



## CHAPTER 3

# LAND

**Lead Author:** Munyaradzi Chenje

**Contributing Authors:** Clever Mafuta, Ahmed Abdelrheim

### REGIONAL SYNTHESIS

Africa is the second largest continent in the world after Asia, and with a total land area of more than 3 025.8 million ha, its landmass is more than three times that of the United States of America. Of Africa's 53 countries, Sudan is the largest, covering 250.39 million ha and Seychelles the smallest, covering only 45 600 ha (Global Geografia undated). In terms of population density, Mauritius was in 2001 the most densely populated with 583 people/100 ha, compared to Namibia, the least densely populated at 2 people/100 ha (Global Geografia undated).

### OVERVIEW OF RESOURCES

The African landscape is a rich and dynamic mosaic of resources, which includes forests and woodlands, arable land, mountains, deserts, coastal lands and freshwater systems, that holds vast opportunities for development and improving human well-being if managed sustainably.

#### Forests and woodlands

Forests and woodlands cover about 650 million ha or 21.8 per cent of the land area (FAO 2003). About 16.8 per cent of global forest cover is found in Africa, with the Congo basin home to the second largest contiguous block of tropical rainforest in the world (FAO 2003). Chapter 6: *Forests and Woodlands*, provides a more comprehensive analysis of the resources and opportunities they provide for sustainable development in Africa.

#### Arable land

About 630 million ha of land in Africa is suitable for cultivation, supporting the majority of the people through subsistence and commercial agriculture. Agricultural productivity is closely linked to environmental factors, including soil quality and water availability.

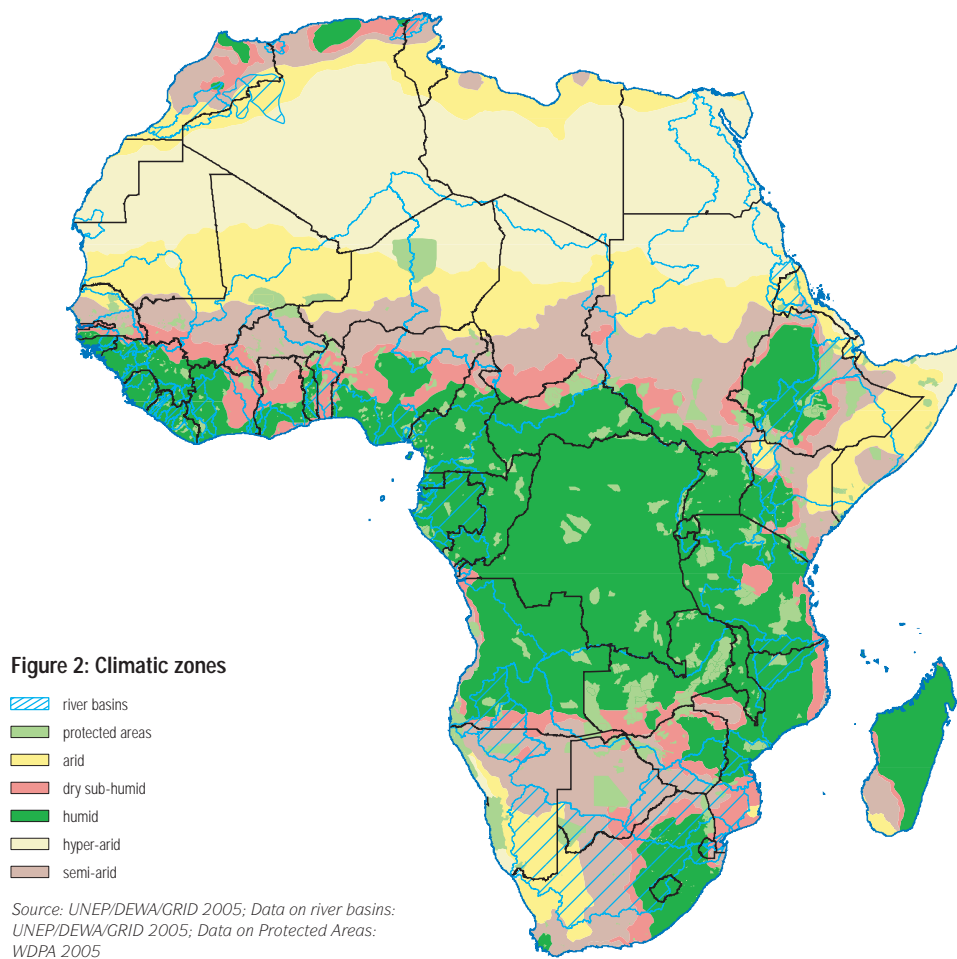
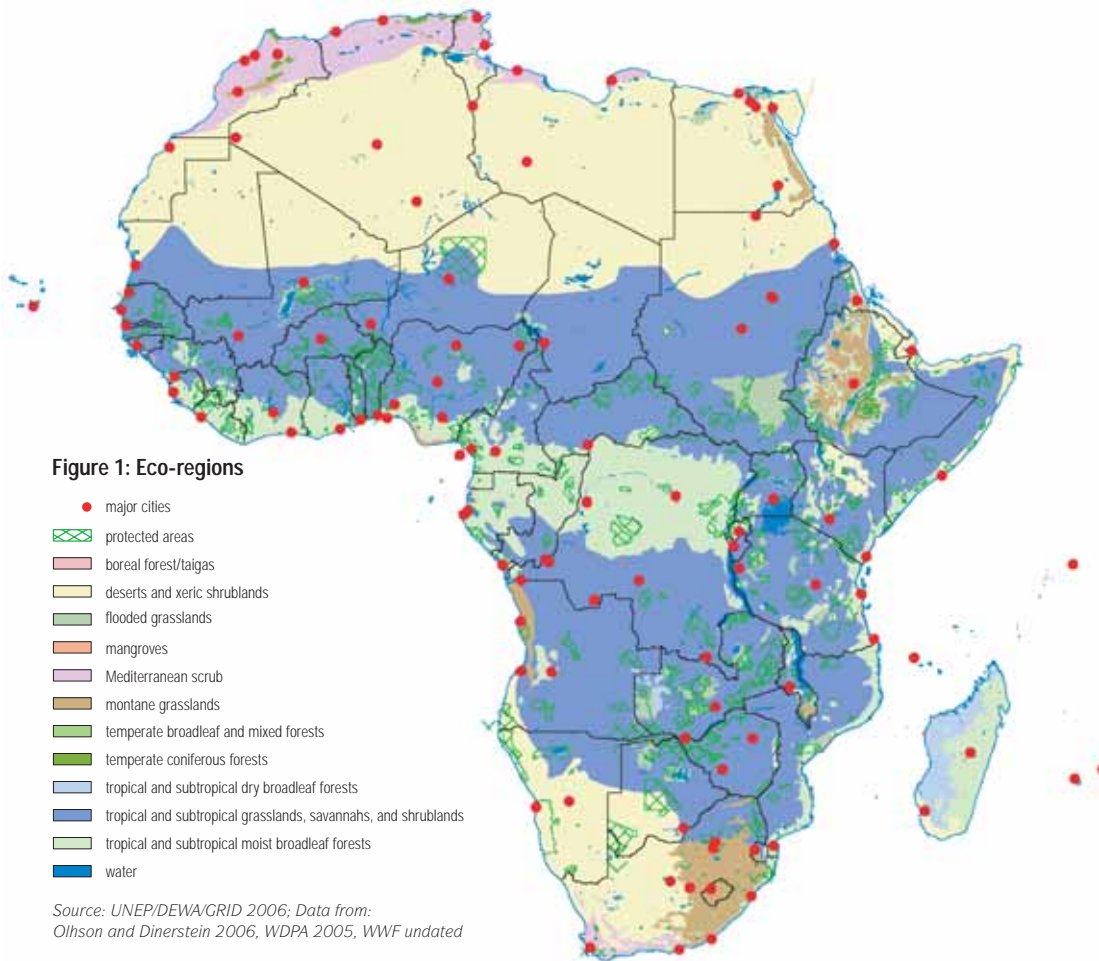
Agriculture makes an important contribution to earnings. In Morocco, for example, the agricultural sector was worth US\$7 000 million in 2002, of which US\$1 000 million was export earnings (FAO 2004b).

Africa's soils are classified into six different categories, with the first four being of good quality which unfortunately cover only 10.6 per cent of the land area or 3 100 million ha and support about 400 million people (Reich and others 2001). Classes I-IV do not have major constraints and rainfall is usually stable and adequate for at least one major crop per season. However, Classes V-VI of the soils in Africa are of poor quality and have limitations which make low-input agriculture on which many people depend a challenge. Classes V-VI soils are highly acidic, impermeable, frequently waterlogged, easily accumulate salts, and require major investments to manage. They cover 11 200 million ha and support about 200 million people, that is about 23 per cent of the population (Reich and others 2001).

#### Wetlands

Wetlands cover about 1 per cent of the region's total surface area, and are found in virtually all countries. Some of the more prominent wetlands include the Congo Swamps, the Chad Basin, the Okavango Delta, the Bangweulu swamps, the floodplains and deltas of the Niger and Zambezi Rivers, and the Greater St Lucia Park wetlands in South Africa. In 1999 the Okavango Delta, which covers 6.864 million ha of Botswana's land area, constituted nearly 10 per cent of the total area of the world's wetlands protected under the Ramsar Convention and almost 50 per cent of the area designated in Africa (Frazier 1999).

Wetlands are not only critical in terms of biodiversity but also support many communities, providing a diversity of livelihood activities. For example, in



Aerial view of islands and waterways of the Central Okavango Wilderness Area in the Okavango Delta, Botswana.

Source: M. Harvey/  
Still Pictures



Tanzania's Rufiji Delta, a study covering 720 000 ha found that crop production has a gross market value of US\$3.8 million annually, and natural resources have an economic direct use value of US\$10.3 million annually (Turpie 2000). Most coastal wetlands in Africa support mangrove forests, which extend from Senegal to Angola on the west coast and from Somalia to South Africa on the east coast. Fisheries in estuaries and lagoons, for example, contribute to national economies, accounting for more than three-quarters of fishery landings in Africa (UNEP 2003). Wetlands issues are analysed in more detail in Chapter 4: *Freshwater* and Chapter 5: *Coastal and Marine Environments*.

### Mountains

Some of the physically smallest countries in Africa also have the highest percentage of mountainous areas. These include Lesotho, Rwanda and Swaziland. The three countries are in the top 20 countries in the world with the highest percentage of mountainous areas (Mountain Partnership 2001). African mountain ranges are the headwaters of most of the large African rivers such as the Nile and Tana Rivers. According to the Food and Agriculture Organization of the United Nations (FAO), one out of every two people worldwide drinks water that originates in mountains (FAO 2002a).

In terms of economic activity, mountains support forestry and tourism, as they support birdwatching, hiking and climbing, among other recreational activities. They are, therefore, key in both local and national economies. Mountain water generates hydroelectricity, facilitates industrial processes, and is critical in irrigated agriculture. Table 1 lists some of the highest mountain ranges in Africa.

Mountains in Africa have been described as "islands of high productivity in a continent where dryness and aridity are increasing at an alarming rate" (Njiro 1998). People also settle in mountain areas as the lowlands are difficult to manage due to poor soils and erratic rainfall patterns, and are usually home to pests such as mosquitoes and tsetse flies.

Mountains are also important biodiversity areas. Stretching across Tanzania and into Kenya, the Eastern Arc Mountains and coastal forests are recognized as one of 32 globally important "hotspots" for biodiversity. The Uluguru Mountains, for example, are renowned for biodiversity conservation and supply water to the capital, Dar es Salaam, whose population is between 3-4 million people (ACF 2004). More than 100 000 of the Luguru people live on the mountains and grow crops through much of the year, including fruits and temperate vegetables. Their produce is sold to urban residents in the lowlands (ACF 2004).

Table 1: Some selected mountain ranges in Africa

Mountain	Mountainous chain	Height (m)	Countries
Kilimanjaro	Rift Valley	5 895	Tanzania
Mount Kenya	Rift Valley	5 199	Kenya
Ruwenzori	Mitumba Mountains	5 119	Uganda/ Dem. Rep. of the Congo
Ras Dascian	Simen Mountains	4 620	Ethiopia
Karisimbi	Mitumba Mountains	4 507	Rwanda
Jebel Toubkal	Haut Atlas	4 167	Morocco
Mont Cameroun	Adamoua	4 070	Cameroon
Thabana Ntlenyana	Drakensberg	3 482	Lesotho
Injasuti	Drakensberg	3 446	South Africa
Emi Koussi	Tibesti	3 415	Chad
Kinyeti	Al Istiwa'iyah	3 187	Sudan
Jabal Marrah	Jabal Marrah	3 088	Sudan
Piton des Neiges	Réunion Island	3 069	Réunion (France)
Pico de Santa Isabel	Bioko Island	3 008	Equatorial Guinea
Satipwa Peak	Mulanje Mountains	3 002	Malawi
Tahat	Ahaggar	2 918	Algeria
Maromokotro	Tsaratana	2 876	Madagascar
Pico de Fogo	Fogo Island	2 829	Cape Verde
Jabal Hamoyet	Red Sea Hills	2 780	Eritrea
Serra Môco	Planalto do Bié	2 620	Angola
Mount Brandberg	Namib Desert	2 606	Namibia
Nyangani	Manicaland Mountains	2 593	Zimbabwe
Surud Ad	Cal Madow	2 408	Somalia
Kartala	Grande Comore Island	2 361	Comoros
Mount Gréboun	Air Azbine	2 310	Niger
Makutu Mountains	Makutu Mountains	2 164	Zambia
Musa Ali	Danakil Mountains	2 063	Djibouti/Eritrea/Ethiopia
Vogel Peak	Shebshi Mountains	2 042	Nigeria
Pico de São Tomé	São Tomé Island	2 024	São Tomé and Príncipe
Bintimani	Loma Mountains	1 948	Sierra Leone
Emlembe	Lebonboberge	1 862	Swaziland
Nimba Mountains	Nimba Mountains	1 752	Côte d'Ivoire/Guinea
Mont Iboundji	Massif du Chaillu	1 575	Gabon

Source: Global Geografia undated

## Deserts

A total of 1 274 million ha in Africa are extreme deserts, exemplified by the Sahara Desert in Northern Africa – the largest desert in the world – and the Kgalagadi Desert and the Namib Desert in Southern Africa. The Sahara covers 906.5 million ha and is home to about 2 million people excluding those in the Nile valley (The Columbia Encyclopaedia Sixth Edition 2003). At about 26 million ha, the Kgalagadi Desert is about the size of France, and together with Namibia's Skeleton Coast, is the world's

largest body of sand (Linacre and Geerts 1998). Along Namibia's coastal areas, the desert is commonly referred to as the Namib Desert (GraphicMaps.com undated).

Desert ecosystems support distinctive plants and animals specially adapted to the harsh environment. Even though the Sahara has one of the harshest climates in the world, the inhabitants produce date palms, fruits, vegetables, grains and other crops. Huge oil and gas deposits also exist in Algeria and Libya (The Columbia Encyclopaedia Sixth Edition 2003).

### ENDOWMENT AND OPPORTUNITIES

Africa has priceless land resources which provide environmental goods-and-services from local to global levels. Land resources are terrestrial features that exist above the mean sea level. They include landforms such as plains, valleys, plateaux, mountains, deltas and peninsulas, islands and basins; soils; and plants and animals. In terms of economics, land resources also include mineral and fossil fuel deposits, natural and farmed timber, crops, animals and fish (Hamblin 1998).

Land resources are terrestrial features that exist above the mean sea level. They include landforms such as plains, valleys, plateaux, mountains, deltas and peninsulas, islands and basins; soils; and plants and animals. In terms of economics, land resources also include mineral and fossil fuel deposits, natural and farmed timber, crops, animals and fish.

Hamblin 1998

Land is a critical factor in natural and human-managed production systems, influencing the level of natural capital, and social and economic development. These resources are just as important at the household level as they are at national and global levels. In Uganda, for example, land constitutes between 50-60 per cent of the asset endowment of the poorest households (World Bank 2003a).

Land in Africa is used for many activities: agriculture and forestry; urban expansion and infrastructural development including transportation; mining and oil extraction; tourism and recreation; and also as a sink for domestic and industrial waste. It is critical in the cradle-to-grave cycle of both living and non-living things, providing habitats and other ecological goods-and-services, sustaining investment and human livelihoods, and absorbing solid and liquid waste, pollutants and pesticides.

Land is critical to all aspects of human well-being. It provides material resources for livelihoods, food and health, provides security against environmental shocks and future uncertainties, and underlies many social and cultural systems. Access to land and the resources it offers is at the core of enhancing opportunities and choices, particularly for those who depend more directly on it.

Africa's significant land resources can contribute to sustainable development, and to achieving the targets under all the eight Millennium Development Goals (MDGs). (The MDGs and their targets are set out in

Annex 1). Whether in pristine condition or degraded, land resources provide vast opportunities for investment for internal and external investors. The degraded lands can be restored in some cases or converted to other land uses, and thus still contribute to development. Through careful planning, degraded lands can be used and thus avoid the need for conversion of well-conserved land to other uses, such as settlement.

Land-use decisions from the household to the national level, in rural and urban areas, have a major role to play in sustainable development, influencing environmental governance and thus resource sustainability. Tenure regimes, access and equity issues, poverty alleviation and gender dimensions all shape governance and the opportunities available at different levels. Governance today will have important implications for the opportunities of future generations, either enhancing or foreclosing choices.

Land and its value are closely related to the environment, with the sustainability of one being a product of the other. The value of land resources is not only monetary but also includes values such as ecosystems function and non-use values. Such non-use values, as shown in Table 2, include intrinsic significance in terms of culture, aesthetic, heritage and bequest. Some of these values are shown in Table 2. A broad methodology for the valuation of environmental goods-and-services is described in Chapter 1: *The Human Dimension*.

### Agriculture

Agriculture is a crucial economic activity, providing employment and livelihoods for many and serving as the basis for many industries. About 203 million people or 56.6 per cent of the total labour force engaged in agricultural labour in 2002 (FAOSTAT 2004). In most African countries, agriculture supports the survival and well-being of up to 70 per cent of the population (ECA 2004c). Thus, for many, their livelihoods are directly affected by environmental changes, both sudden and gradual, which impact on agricultural productivity.

Livestock and environmental goods offer some security from such shocks. About 70 per cent of the rural poor in Africa own livestock (ILRI 2004) contributing significantly to household and community resilience to disasters, particularly in arid and semi-arid zones. More than 200 million people rely on their livestock for income (sales of milk, meat, skins) and draught power. Overall, livestock contributes about 30 per cent of the gross value of agricultural production in Africa (ILRI 2004). According to the International Livestock Research Centre (ILRI) (2004), opportunities

#### Box 1: Land use issues key to sustainable development

Land lies at the heart of achieving sustainable development:

- It is a multidimensional store of value capable of yielding a stream of economic, social, environmental and cultural benefits indefinitely into the future.
- People are central, including those who "own" the land or property rights.

Source: IIED and WBCSD 2002

Table 2: Land and land-based ecosystems

Direct values	Indirect values	Option values	Non-use values
<b>Consumptive and non-consumptive use of resources:</b>	<b>Ecosystem functions and services such as:</b>	<b>Premium placed on possible future uses, including:</b>	<b>Intrinsic significance in terms of:</b>
Domestic use	Land quality	Pharmaceutical	Culture
Industrial input	Soils	Agricultural	Aesthetic
Commercial use	Micro-organisms	Industrial	Heritage
Mining	Water flow	Mining	Bequest etc.
Oil extraction	Water storage	Tourism	
Growing crops	Water recharge	Forestry	
Human settlements	Flood control	Human settlements	
Wood fuel	Storm protection	Leisure etc.	
Wild plants	Nutrient retention		
Wild animals	Moisture retention		
Tourism	Microclimate		
Waste disposal etc.	Natural sink etc.		

*Source: Adapted from Hirji and others 2002*

exist to commercialize livestock production to target regional deficits in livestock products where they can be produced competitively.

The irony is that, despite the majority of the total labour force working in agriculture, the region is still unable to feed its growing population. For example, between 20 and 75 per cent of the population in 29 countries in Central, Western, Eastern and Southern Africa were reported in 2004 to be undernourished (WFP 2003). In the Democratic Republic of the Congo (DRC), where 75 per cent of the total population of 51 million people were reported to be undernourished, 50 per cent of infant mortality is related to malnutrition (WFP 2003). Poor nutrition impacts on health, education and the opportunity to participate fully in community and public affairs. Most often women and children carry a disproportionate burden from food insecurity.

Africa spends between US\$15 and 20 000 million on food imports annually, in addition to the US\$2 000 million it receives in food aid annually (ECA 2004a). These are vast amounts of money that the region can ill afford to externalize, and which could be used to revitalize agriculture, particularly the low-input agriculture whose yields are limited, and thus increase productivity. About 70 per cent of Africa's poor, and at least two-thirds of its population, live in rural areas (ECA 2004a) depending mainly on agriculture and natural resources for their livelihoods.

Agriculture provides the opportunities to address extreme poverty in Africa, where the proportion of

people living below the poverty line, of less than US\$1 a day, increased from 47.6 per cent in 1985 to 59 per cent in 2000 (ECA 2004a). As a result, more and more people in Africa have limited access to food and other basic amenities such as potable water, minimum health care and education, effectively limiting the opportunities available to them. Poverty and nutritional status are closely linked. About 26 per cent of the people in Africa – more than 200 million people, particularly women and children – are undernourished (ECA 2004a); this is a reflection of poverty (FAO 2002c). It deepens other



Clear-felling of forests for agriculture, post-conflict Liberia, May 2005.

*Source: Y. Katerere*

**Box 2: Food for thought**

- Agriculture in Africa accounts for about 60 per cent of the total labour force, 20 per cent of total merchandise exports and 17 per cent of GDP.
- Between 1997 and 1999, about 200 million people – or 28 per cent of Africa's population – were chronically hungry, compared to 173 million in 1990-92.
- Only 10 countries reduced the number of the hungry during the 1990s. At the end of the 1990s, 30 countries had over 20 per cent of their population undernourished, and in 18 of them, more than 35 per cent of the population were chronically hungry.
- As of 2001, about 28 million people in Africa were facing food emergencies due to droughts, floods and strife, of which some 25 million needed emergency food and agricultural assistance.
- The World Food Programme – which accounts for two-fifths of international food aid – has spent US\$12 500 million (45 per cent of its total investment since its establishment) in Africa and 50 per cent in 2001. In 2000, Africa received 2.8 million tonnes of food aid, which is 25 per cent of the world total.
- Africa spent an estimated US\$18 700 million on food imports in 2000 alone. Imports of agricultural products have been rising faster than exports since the 1960s, and Africa as a whole has been a net agricultural importing region since 1980.
- Agriculture-led development is fundamental to cutting hunger, reducing poverty (70 per cent of which is in rural areas), generating economic growth, reducing the burden of food imports and opening the way to an expansion of exports.
- A mere 7 per cent (barely 3.7 per cent in sub-Saharan Africa) of Africa's arable land is irrigated, compared to 10 per cent, 29 per cent and 41 per cent for South America, East and Southeast Asia and South Asia respectively.
- Soils covering 38 per cent of the region are classified as having low nutrient reserves.

Source: NEPAD 2002

aspects of poverty such as incapacity to work and resistance to disease. It also affects children's mental development and educational achievements.

Agriculture is not limited to subsistence food crops and livestock production but includes crops grown for sale, such as tobacco, cotton and flowers. Most agricultural households rely to some extent on sale of agricultural products. Thus, access to markets, finance and supporting infrastructure are crucial.

Horticulture, which includes vegetables, fruits and cut flowers, has become a major activity. It has grown to be the single largest category in world agricultural trade, accounting for over 20 per cent of such trade in recent years (World Bank undated). While in sub-Saharan Africa (SSA), horticultural exports now exceed US\$2 000 million, this is only 4 per cent of the global total (World Bank undated). Significant opportunities for expansion, therefore, exist in Africa to boost employment as well as

foreign currency earnings. The challenges would be to adequately deal with environmental problems, which include pollution from chemicals.

An opportunity which is yet to be fully exploited is irrigated agriculture. Only 6 per cent of the total cultivated land is under irrigation in Africa, compared to 33 per cent in Asia (FAO 2002a). In a region where droughts are prevalent, often destroying crops and exacerbating food insecurity, irrigation could be a key factor in enhancing food security. Irrigation increases yields of most crops by between 100 and 400 per cent, and it has been projected that in the next three decades, 70 per cent of gains in cereal production globally would be from irrigated land (FAO 2002a). According to the Economic Commission for Africa (ECA) (2004), little progress towards sustainable development can be achieved until Africa reaches a minimum level of developing and managing water resources for secure food and agricultural production. The potential for and the challenges related to irrigation are more fully discussed in Chapter 4: *Freshwater*.

In order to maximize the potential of the agricultural sector, institutional and governance reforms which increase opportunities for rural people, such as better access to finance, and support the development of small and microenterprises is essential. Agricultural opportunities are closely linked to global trade policies and practices. These are discussed in Chapter 1: *The Human Dimension* and opportunities to respond effectively to these are considered in Chapter 8: *Interlinkages: The Environment and Policy Web*.

### Taking action in the agricultural sector

Various policy responses have been proposed to reverse the slide in agriculture and help boost production and enhance food security. One of the major responses is the Comprehensive Africa Agriculture Development Programme (CAADP), which was endorsed by African governments in late 2002 in the context of the New Partnership for Africa's Development (NEPAD). The CAADP has three immediate "pillars" and a long-term one which together can help tackle Africa's agricultural crisis (NEPAD 2002). The mutually reinforcing pillars on which to base the immediate improvement of agriculture, food security and trade balance are:

- **Extending the area under sustainable land management and reliable water control systems.** Building up soil fertility and the moisture-holding capacity of agricultural soils, and rapidly increasing the area under irrigation, especially small-scale irrigation, will not only provide farmers with



Irrigation. Large-scale farming in south-western Burkina Faso.

Source: D.Tiveau/CIFOR



Smallholder farming using furrow irrigation, Burkina Faso.

Source: Y. Katerere

Irrigation can increase crop yields and food security.

opportunities to raise output on a sustainable basis, but will also contribute to the reliability of food supplies.

- **Improving rural infrastructure and trade-related capacities for market access.** Roads, storage, markets, packaging and handling systems, and input supply networks should be improved to raise the competitiveness of local production vis-à-vis imports and export markets.
- **Increasing food supply and reducing hunger.** Several factors including the limited use of irrigation and other inputs undercut crop and livestock yields. There is a need to improve access to technology by small farmers. These can play a major role in increasing food availability close to where it is most needed, raising rural incomes, and expanding employment opportunities and contributing to growth in exports. Food storage and its protection from mildew and pests are of critical importance. It is also important to respond to the growing frequency and severity of disasters and emergencies which impact on food security. In addition, conflict and war also disrupt food production. As a result, more aid is being diverted to emergency relief than to necessary long-term development.
- **Agricultural research, technology dissemination and adoption,** is the long-term pillar to achieve accelerated gains in productivity and requires:
  - a) enhanced rate of adoption of the most promising available technologies by linking, more efficiently, research and extension systems to producers;
  - b) technology delivery systems that quickly bring innovations to farmers and agribusinesses through appropriate use of new information and communication technologies;

- c) renewing the ability of agricultural research systems to efficiently and effectively generate and adapt to Africa's new knowledge and technologies, including biotechnology; and
- d) mechanisms that reduce the costs and risks of adopting new technologies.

It was estimated that a budget of US\$251 000 million for the period 2002-2015 was needed to successfully implement these four pillars. If Africa were to invest in agriculture the total of about US\$22 000 million (ECA 2004a) it spends annually on food imports and food aid, it would take the region less than a decade to implement the four proposed agricultural pillars highlighted in the CAADP.

The CAADP budget is slightly less than Africa's total debt of over US\$292 000 million for the period 2000-2002 (UNCTAD 2004). Africa's debt burden has been described as a major obstacle to the region's economic growth and poverty reduction, threatening efforts to meet the MDGs, particularly that of halving poverty by 2015 (UNCTAD 2004).

### **Settlement, urban expansion and infrastructural development**

African society is rapidly changing from rural to urban, with cities and towns expanding, not only in terms of population growth, but also spatially. They are taking up more space and encroaching on rural and agriculturally productive land. Globally, urban and built-up areas occupied in 1999 more than 471 million ha – about 4 per cent of the total land area (WRI and others 2000). Abidjan, for example, covered in 1999 more than 57 735 ha of which 36 003 ha, or 62 per cent of the area of the metropolis, was for natural spaces,

3 396 ha or 5.88 per cent was classified as urban land, 1 778 ha or 4.9 per cent of the city area was set aside for human activities and 2 825 ha for installations, excluding road networks (Attahi 1999).

One of the major impacts of urbanization in Africa is the increased generation of solid waste, which contributes to land conversion for landfills. For example, in the African Small Island Developing States (SIDS) of the Indian Ocean, at least 2.8 million tonnes of solid wastes are generated annually, of which only 30 per cent are collected routinely. Beach deposited rubbish is estimated to be about 40 640 tonnes per year (Payet and others 2004), threatening coastal ecosystems and undermining economic activities such as fisheries and tourism. The dumping of solid wastes in rivers, on beaches and in the sea has become common practice,

particularly in the Comoros and Madagascar. However, such practices have been discontinued in Seychelles and Mauritius, both of which have adopted a national solid waste management plan. They have also invested in infrastructural development, with Seychelles spending between US\$6-8 million in solid waste management over the last ten years (Payet and others 2004).

Despite the negative attributes of urbanization, these new and growing areas, which are located in coastal areas and the hinterland, have also become vibrant centres of education, culture, commerce and industry and technological innovation, providing opportunities for various manufacturing and service industries (WRI and others 2000).

### Mining and oil extraction

Globally, mining has played a key role in driving the economic development of many countries in the world, including South Africa, Australia, Canada, Sweden and the United States. Many of the world's richest countries have extensive minerals industries, which they have used as a platform for broad-based industrial development (IIED and WBCSD 2002).

For a region rich in minerals, mining provides many opportunities to support sustainable development. The region contains about 30 per cent of the Earth's mineral reserves, including 40 per cent of gold, 60 per cent of cobalt and 90 per cent of platinum (UN 2002a). In the Southern African Development Community (SADC), for example, the mining industry contributes about 60 per cent of foreign exchange earnings, 10 per cent of Gross Domestic Product (GDP) and 5 per cent of employment (SADC 2004a). The economies of Angola, Botswana, the DRC, Namibia, South Africa, Tanzania, Zambia and Zimbabwe get between 22 per cent and 90 per cent of their foreign exchange directly from mining and mineral exploitation (Hounsoume and Ashton 2001).

However, the environmental costs of mining can be massive in terms of land conversion and degradation, habitat conversion and groundwater pollution. A major by-product of large-scale mining is large volumes of waste and chemical pollution, which may have devastating impacts on ecosystems. Acid drainage has been described as the most pervasive problem associated with waste dumps (IIED and WBCSD 2002). The effects of mining and smelting that occurred over past decades, centuries, or even millennia prove that some impacts can be long-term, forcing society to continue to pay for natural capital stocks that have been drawn down by past generations. Due to the long-lasting impact of mining, many governments have, since the 1990s, enacted environmental impact assessment

Urban settlements can offer important opportunities for trade, culture, education and development.



Market street in Essaouira, Morocco.

Source: J.C. Mohamed-Katerere



Downtown Antananarivo, Madagascar.

Source: V. Rabesahala



Gold panning in Kalsaka Village, Yatenga Province, Burkina Faso.

Source: M. Edwards/Still Pictures

(EIA) policies and laws. This has helped countries to make a better evaluation of the benefits and costs associated with mining and to adopt measures to avoid and mitigate harmful impacts. (Chapter 8: *Interlinkages: The Environment and Policy Web*, examines the opportunities value of EIA in more depth). South Africa, for example, undertook an EIA of a proposed mining venture of titanium along the eastern shores of St Lucia, an area renowned as a valuable source of biological diversity. A review panel, which was charged to determine whether mining would be compatible with nature conservation and tourism, concluded that there was no compatibility. As a result, mining permission was refused and in 1999 the area was declared a World Heritage Site (IIED and WBCSD 2002).

Africa is a significant player in oil production. All sub-regions of Africa are crude oil exporters, except Eastern Africa, but this could change given the recent discovery of crude oil reserves in Sudan.

In 2003, Africa produced 8.7 million barrels per day (bbl/d) of oil with the top producers being Nigeria, Algeria, Libya, Angola and Egypt (Energy Information Administration 2005c). Total African oil consumption in 2003 was 2.7 million bbl/d and the top oil consumers were Egypt, South Africa, Nigeria, Libya and Algeria (Energy Information Administration 2005d). In 2002, South Africa was the largest net crude oil importer in

Africa, followed by Morocco (Energy Information Administration 2005e).

In the Great Lakes countries of Burundi, Kenya, Rwanda, Tanzania and Uganda, oil consumption averaged about 91 000 bbl/d in 2001, virtually all imported. Kerosene is used extensively in rural areas for lighting and, in urban areas, for cooking and lighting (Energy Information Administration 2004).

Oil has been a key factor in the positive economic growth Africa has experienced, with key oil producers showing impressive growth: Chad grew at 39.4 per cent and Equatorial Guinea at 18.3 per cent (ECA 2005a). Similarly, the overall impressive growth rates in Central Africa and Northern Africa are directly linked to oil (ECA 2005a). The full potential of the oil resources, which fuelled economic development in these countries and the rest of the region, however, is yet to be realized. The irony is that in many cases, these resources have often contributed to environmental degradation and civil conflict. The challenges associated with managing natural resource abundance are discussed fully in Chapter 12: *Environment for Peace and Regional Cooperation*. An increasing number of countries are establishing governance and institutional systems that promote social investment. In Chad, for example, the government, in collaboration with the World Bank and non-profit organizations, agreed to ensure that oil

**Box 3: Chad charts a new path in oil revenue management**

The World Bank approved funding for the project in 2000 (see attached figure), and the government received its first US\$38 million in oil revenues in 2004. Over the next two decades, the country expects to receive at least US\$2 000 million, boosting national revenues by 50 per cent, according to the World Bank. About 80 per cent of oil revenues would be spent on schools, clinics, roads and other basic needs. Five per cent would be ploughed into a fund for future generations, and another 5 per cent would be used to develop the southern oil region, near the border with Cameroon. The remaining 10 per cent would be invested to absorb possible oil price falls.

The World Bank has most of the revenue in a London account to avoid "leakage." A citizens' committee, with four members from non-profit groups and five from government, must approve all oil revenue expenditures. The World Bank has commended the establishment of the Committee of Control and Monitoring of the Oil Revenues. However, the project has not been without its critics. Damage to the environment has been a major concern.

Sources: MacLaughlin 2004, Tcheyan 2003



New oil venture in Chad provides opportunities.

revenues benefit poor people. This project faces various challenges regarding agreement on exactly which sectors should benefit from the profits.

**Tourism and recreation**

Land-based tourism is a major economic activity in Africa, drawing millions of visitors to different sites across the region every year and generating millions of dollars in foreign exchange earnings. Sites such as the pyramids of Egypt, the Great Rift Valley of Eastern and Southern Africa, Great Zimbabwe, Table Mountain in South Africa, Mount Kenya in Kenya and Mount Kilimanjaro in Tanzania are some of the major attractions. Mountains, wildlife, wetlands and coastal areas are also major tourist attractions. These and other attractions contributed to the arrival of a total of about 124 million international tourists in the five years of 1990, 1995, 2000, 2002 and 2003 (World Tourism Organization 2005). The visitors spent a total of US\$52 891 million in those five years (World Tourism Organization 2005). In 2003 and 2004 the region attracted 78.1 million international tourists.

In 2004, international tourist arrivals grew at 10 per cent worldwide and 14 per cent in Africa – to 41.6 million, up from 36.5 million in 2003. However, the region shared only 7.4 per cent of the global increase of 69 million tourists, and almost all the increase was concentrated in Northern Africa (ECA 2005).

Ecotourism accounted for 20 per cent of total international tourism. In recognition of ecotourism's growth potential, particularly for developing countries, the UN Economic and Social Council (ECOSOC) declared 2002 the International Year of Ecotourism. Many countries in Africa, such as Kenya and South Africa, have invested heavily in ecotourism.

Tourism in Africa varies widely, from viewing gorillas in the Great Lakes Region to lemurs in Madagascar, from trekking in Ethiopia to birdwatching in Botswana, from looking at rock paintings in South Africa to visiting rainforests in Ghana, from mountain-climbing in Eastern Africa (Mt Kilimanjaro and Mt Kenya, for example) to scuba-diving in the Seychelles and to photographic safaris in Eastern and Southern Africa (Vieta 1999). In the Great Lakes Region, for example, revenue from tourism based on gorilla viewing and other activities brings in about US\$20 million to the region annually (Pickrell 2004). Tourism in the area is certain to be boosted with the news in 2004 that the first census since 1989 revealed that the population of the apes in the Virunga mountains has grown by 17 per cent, increasing from 324 in 1989 to 380 by the end of 2003 (Pickrell 2004).

Tourism can serve as a powerful incentive to protect natural resources. In Madagascar, where tourism is the country's second largest foreign exchange earner, the country had by 1998 established 40 new protected areas, covering roughly 2 per cent of the country's land

Cultural heritage offers important opportunities for tourism.



Great Zimbabwe, Masvingo. Great Zimbabwe, one of the oldest preserved architectural monuments in Africa, are the ruins of an 11<sup>th</sup> - 15<sup>th</sup> century kingdom, and a UNESCO World Heritage site.

Source: R. Gilling/Still Pictures

area (Vieta 1999). In Southern and Eastern Africa, privately-owned protected areas that support tourism and hunting enterprises are also growing.

Tourism not only generates revenue to support conservation and management of natural environments but also generates many jobs. For example, hundreds of people live off the Bwindi Impenetrable Forest in Uganda, where foreign tourists trek to view gorillas. It has been argued that tourism has larger multiplier effects, with revenue spreading from hotel accommodation, food and beverages, shopping, entertainment and transport to income of hotel staff, taxi operators, shopkeepers and suppliers of goods-and-services (UN undated).

Despite the growth of tourism, the region still only accounts for less than 4 per cent of world tourism,



The Great Pyramids, Egypt, considered one of the Seven Wonders of the Ancient World, is a UNESCO World Heritage site.

Source: M. Chenje

with its revenue share at only 2.5 per cent – about US\$16 000 million in 2002 of the annual sales of about US\$4.5 billion (Saunders undated). Therefore, opportunities for further investment and development are vast in the region. In Kenya, for example, new regulations that will allow sport bird shooting are expected to attract up to 2 000 sport hunters annually, boosting revenues by US\$5 million each year. New Kenya Wildlife Service (KWS) rules provide for

**Table 3: International tourist arrivals and receipts**

Year	1990	1995	2000	2002	2003
Arrivals (thousand)	15 160	20 438	28 154	29 492	30 763
Receipts (US\$ million)	6 402	8 544	10 608	11 843	15 494

Source: World Tourism Organization 2005

Tourists at Bemaraha Tsingy, a UNESCO World Heritage site, Madagascar.

Source: R. Butler/  
*WildMadagascar*



private landowners to obtain special authorization to manage their own game bird populations, including breeding, as well as determine open and closed seasons (African Environmental News Services 2003).

Several African countries including Ethiopia, South Africa, Kenya and Benin have significant palaeontology sites. In Ethiopia, the government is using these sites to promote “palaeo-tourism,” and to generate revenue (IRIN 2004a). Ethiopia is home to some of the most famous prehistoric remains ever found, including some of the world’s oldest human remains: Ethiopia’s discoveries chart man’s prehistory from more than 6 million years ago to modern ancestors (IRIN 2004a). Tourism officials in Afar believe that “palaeo-tourism” could generate an additional US\$2 million in revenue annually for this region alone (IRIN 2004a). The Ethiopian Tourism Commission has reported that the sector generated more than US\$77 million in 2003 (IRIN 2004a). This revenue is important in the fight against poverty and plays a key role in the government’s poverty reduction strategy paper (PRSP). South Africa has also made palaeontology and other cultural heritage sites a focus of their tourism industry.

The tourism industry in Africa also has human and environmental costs, contributing to the displacement of communities and thus undermining rights and livelihoods, the generation of waste and pollution, and the unsustainable use of water. In Africa, for example,

tourism’s effects on indigenous peoples have been profound, with the eviction of communities from their lands, in addition to economic dislocation, breakdown of traditional values, and environmental degradation. Pastoralism has been attacked as primitive and destructive (Chavez 1999). The massive influx of tourists and their vehicles in the Masai Mara National Park in Kenya and in the Ngorongoro Conservation Area in Tanzania has destroyed grass cover, affecting plant and animal species in the area. Hotels have dumped their sewage in Masai settlement areas while campsites have polluted adjacent rivers (Chavez 1999). One emerging approach is to focus on promoting community conservation areas and also collaborative tourism initiatives in order to ensure greater benefits to communities. There are different levels of community participation, varying from passive participation to interactive decision making to community empowerment initiatives.

The challenge facing policymakers in this industry and other land-based activities is to critically assess the costs and benefits to ensure that all options are fully weighed and that the policy responses contribute to sustainable development and minimize overexploitation. Additionally, measures need to be adopted to ensure that the benefits associated with tourism are spread across society, and that those who are directly involved in conservation are rewarded for this.

### CHALLENGES FACED IN REALIZING OPPORTUNITIES FOR DEVELOPMENT

As already indicated, Africa is endowed with enough land to undertake small- and large-scale activities to strengthen household security, national development, transboundary cooperation and regional integration to transform trade, and create new opportunities for sustainable development which is sensitive to the environment and social and economic issues. There are, however, many threats and challenges which continue to undermine such progress, limiting its potential. These include pandemics such as HIV/AIDS, climate variability and change, extreme weather events such as drought and floods, ineffective land-use planning, land degradation and desertification, invasive alien species (IAS), limited or weak governance systems, corruption and greed, armed conflict and the attendant overexploitation of natural resources, and limited foreign direct investment (FDI). Limited domestic investment and wasted opportunities and loss of revenue due to leakage in sectors such as tourism are also important factors.

#### HIV/AIDS pandemic

One of the biggest threats to Africa's capacity to implement the necessary response measures to derive the most benefits from the opportunities available in terms of land is the HIV/AIDS pandemic.

About 70 per cent of the world's 42 million people with HIV/AIDS are in Africa, the worst region impacted by the pandemic. More than 25 million Africans have so far succumbed to the pandemic and more than 12 million children have been orphaned. The tragedy is that the very human resources upon whom Africa should depend to convert its land resources into opportunities for sustainable development are being buried in millions every year. About 2.3 million Africans – men and women, and most of them in the prime of their lives as parents and workers – die each year (World Bank undated).

No economic sector in Africa is spared, and this is Africa's greatest tragedy of the 21st century which threatens sustainable development in the region. Box 4 illustrates some impacts of HIV/AIDS in the agricultural sector in Africa:

#### Other diseases

Malaria, water-borne diseases, tuberculosis, childhood diseases, tropical diseases, respiratory and nutrition-related diseases are also significant contributors to death (WHO 2004). All diseases affect well-being and labour productivity – some

fundamentally undercut production systems. The environment-health connection and its implications for well-being and livelihoods are discussed in Chapter 1: *The Human Dimension*.

The tsetse fly is a major threat to people and livestock. About 60 million people in the region are at risk from Human African Trypanosomiasis (HAT), or sleeping sickness, which is spread by the tsetse. Sleeping sickness is found in 36 countries in sub-Saharan Africa. Between 300 000-500 000 cases are reported annually, and it kills about 66 000 people annually (WHO/TDR 2002). The WHO/Special Programme for Research and Training in Tropical Diseases (TDR) reports that although 55 million people are exposed to the risk of infection, only 4 million are under regular surveillance (WHO/TDR and Trends in Parasitology 2002), and the disease has re-emerged since the 1970s (WHO/TDR 2002). In 2002, there were 24 000 deaths from trypanosomiasis (WHO 2004). Authorities often lack, or do not have, adequate economic resources to fund programmes to control sleeping sickness due to competing health priorities. Governments often accord sleeping sickness a low priority, until it assumes the level of an epidemic (TDR/Scientific Working Group 2003). In some countries, sleeping sickness is a major cause of death. In some areas of Angola, the DRC and southern Sudan, its

#### Box 4: HIV/AIDS and agriculture in Africa

- HIV/AIDS has killed about 7 million agricultural workers since 1985 in the 25 hardest-hit countries in Africa. About 16 million more could be killed before 2020.
- The most badly affected African countries could lose up to 26 per cent of their agricultural labour force in two decades.
- Food consumption has dropped by 40 per cent in homes afflicted by HIV/AIDS.
- A meagre US\$150 million is spent every year in Africa on HIV/AIDS, largely for prevention.
- In 2000, about 3 million people died of HIV/AIDS and 5.3 million people became infected around the world.
- By 1999, there were 13.2 million HIV/AIDS orphans, 95 per cent of them in sub-Saharan Africa.
- HIV infection rates are three to five times higher in young women than in young men.

Source: FAO 2002b

prevalence is between 20 and 50 per cent (WHO 2001), surpassing that of HIV/AIDS.

About 46 million cattle are at risk of contracting tsetse-transmitted trypanosomiasis in Africa. About 3 million cattle die of Animal African Trypanosomiasis (AAT) annually (FAO undated). In the tsetse-infested areas, trypanosomiasis reduces meat and milk production by at least 50 per cent. It also limits opportunities for farmers in terms of crop and livestock production: there is less efficient nutrient cycling, less access to animal traction, lower income from milk and meat sales and less access to liquid capital (Swallow 1999). The economic losses in cattle production alone are between US\$ 1 000 and 1 200 million annually, while total losses, in terms of agricultural GDP in Africa, amount to about US\$4 750 000 million per year (FAO undated).

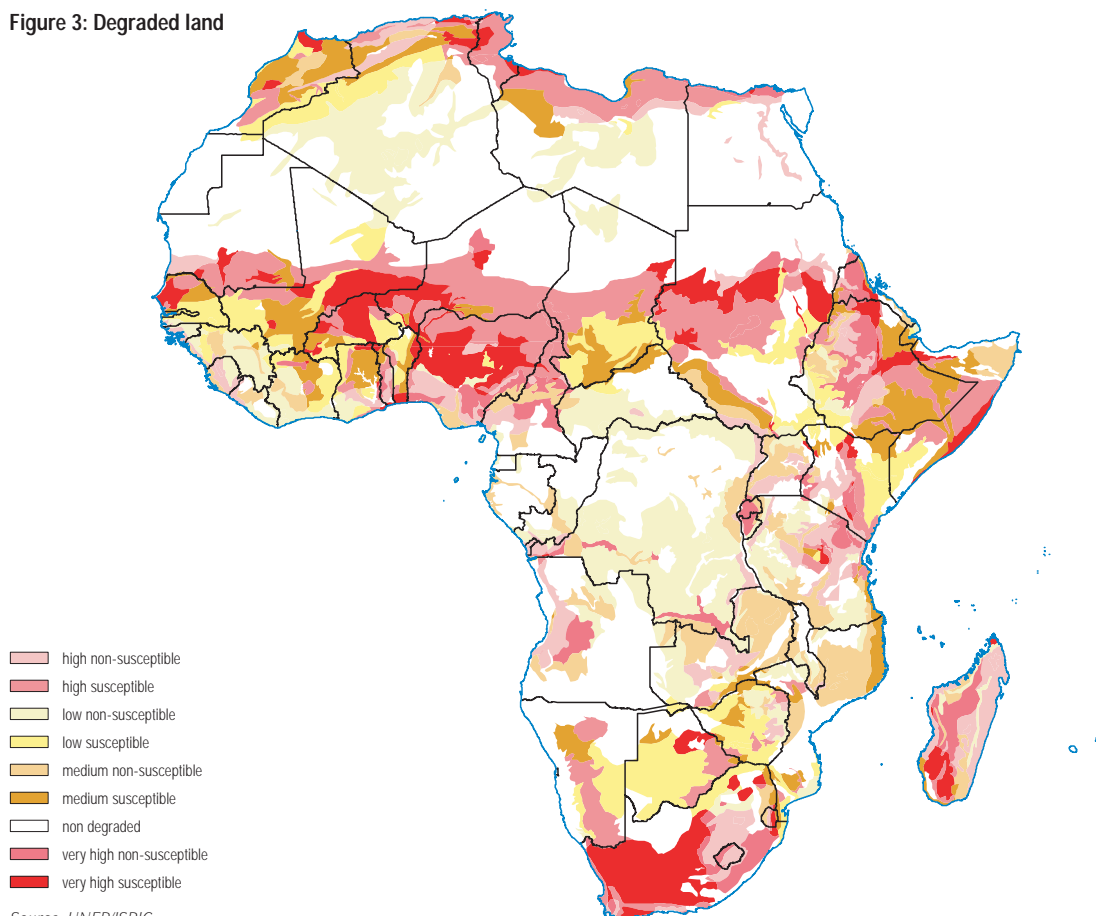
### Land degradation and desertification

While irrigation could enhance food production, its inefficient application could also be a risk, particularly in terms of salinization. For example, about 10 per cent of the world's irrigated land has been damaged by salt, increasing the threats to food security (FAO 2002a). The build-up of salts in the soil lowers yields and can damage the land beyond economic repair.

Salinization is reducing the world's irrigated area by 1 to 2 per cent every year (FAO 2002a), hitting hardest in the arid and semi-arid regions such as those common in Africa. In Senegal, for example, land has been cultivated and farmed without appropriate management of organic and mineral fertilizers, enhancing mineralization and soil organic matter loss (Tieszen and others 2004).

A further threat to Africa realizing the full potential of its land resources is desertification. UN Secretary-General, Kofi Annan, has said that desertification undermines the fertility of the world's land, with productivity losses reaching 50 per cent in some areas (UN 2004). Today, a third of the Earth's surface is threatened by desertification, which adds up to an area of over 4 000 million ha of the planet (UNCCD 2004). It not only contributes to food insecurity, famine and poverty, but may also fuel social, economic and political tensions that can cause migration, conflicts, further poverty and land degradation. It is estimated that the livelihoods of more than 1 000 million people globally are at risk from desertification, which may eventually force 135 million people off their land. The problem appears to be most severe in SSA and the Horn of Africa.

Figure 3: Degraded land



### Climate variability and change

Climate variability and change are major threats limiting opportunities for sustainable development. For example, crop yields in SSA are projected to fall by 20 per cent due to global warming and climate change (Simms and others 2004). It has been projected that as climate change pushes the world towards more extreme weather, more and more people would be exposed to recurrent disasters.

Droughts and floods are common problems impacting on different parts of the region with devastating results on people and the environment. Millions of people face famine with relentless regularity, increasing their vulnerability to disease and other hardships. For example, at the beginning of 2003, about 25 million people faced famine, and by April 2003, this figure had jumped to 40 million (Harsch 2003a). In Southern Africa, for example, much of the famine in 2003 was attributed to the severe drought of 2002-2003. In the Horn of Africa (Sudan, Eritrea and Ethiopia), famine is mainly a result of drought, although in Ethiopia and Eritrea, war was also a contributory factor (Harsch 2003b). A total of 13.6 million people in the two countries faced immediate food shortages in early 2003 (UN 2003). In Mozambique, the floods in 2000 – the worst in 150 years – left the country's lowlands in the Limpopo River basin inundated for up to three months, affecting the plant resources upon which people relied (IRIN 2004b).

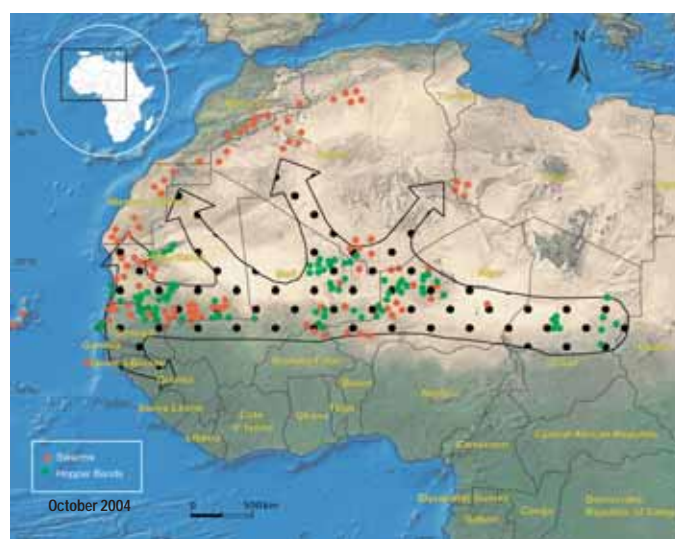
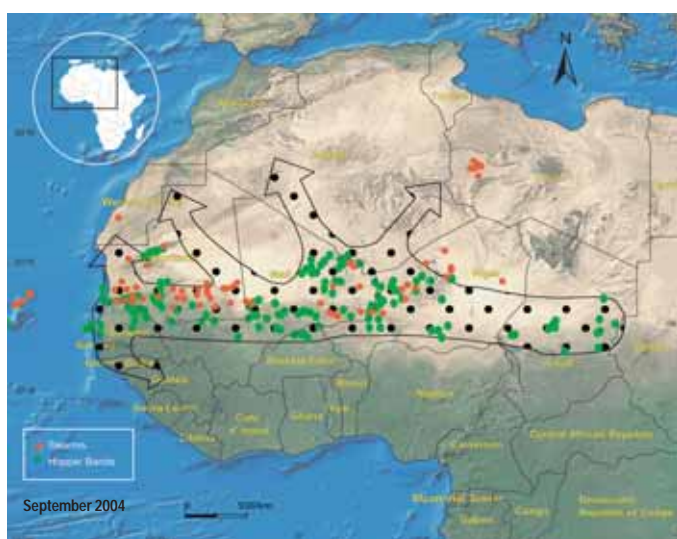
Global warming is also a threat to mountain glaciers, many of which are melting at unprecedented rates. For example, an ice cap on Mount Kenya has shrunk by 40 per cent since 1963 (FAO 2004b).

### Pests

In addition to extreme weather events, such as drought and floods, pests pose a serious threat to food security. For example, in 2004, more than ten countries in Western and Northern Africa were invaded by swarms of locusts, destroying vegetation and crops.

Desert locusts periodically invade Northern Africa and the Sahel – the 1986-1989 plague cost more than US\$300 million to control (USAID 2004). In 2004, locusts started invading the Sahel from the end of June, with Mauritania, Mali, Senegal and Niger the worst affected. More than 2.5 million rural households were at risk of food shortages as over four million ha of crops and farmland were invaded by the swarms. In Mauritania, about 1.6 million ha were invaded and an estimated 80 per cent of crops were destroyed (FAO 2004b). The invasion also affected national economies. For example, Morocco spent about US\$30 million in defence of an agricultural sector worth US\$7 000 million in 2002, of which US\$1 000 million were in export earnings (FAO 2004a).

Ironically, good rains, which would normally boost agricultural production, also provided ideal weather conditions for the locusts to multiply. The desert locust has been described as a pest of unusually destructive powers (FAO 2004a). A tonne of locusts – just a small part of an average swarm – eats the same amount of food in a day as 2 500 people. Each swarm is composed of millions of insects, sometimes covering several hectares. Adult locusts can fly over 200 km per day, easily crossing borders (FAO 2004b).



### Locust invasions, 2004

More than ten countries were affected by the locust invasion in 2004 – the worst since 1986-89.

Control involves spraying, and FAO has promoted the sound use of pesticides to reduce risks to human health and the environment. The pesticides used usually degrade in a week. The Food and Agriculture Organization of the United Nations and governments in the region are seeking a safer replacement for conventional pesticides by testing a fungus that attacks locusts in the field, and a natural hormone that disrupts the insects' normal behaviour (FAO 2004b).

In Western Africa, the Centre for Eco-toxicological Research in the Sahel, which was established in 1991 in Senegal with FAO assistance, helps governments to monitor the risk of environmental and human health from pesticides. It helps governments establish safety measures, check the health of people, and ensure the safe handling of leftover pesticides. The centre also trains national environmental monitoring teams and collaborates with national chemical laboratories and other institutions such as universities (FAO 2004c). Chapter 11: *Chemicals* considers the challenges and opportunities the use of chemicals pose for Africa.

### Invasive alien species

Invasive alien species (IAS) are a major factor in environmental change in Africa, contributing to or exacerbating human vulnerability and foreclosing some livelihood and development options. Invasive species impact on economic sectors such as agriculture, forestry, fisheries, tourism, water management and hydropower production (UNEP 2004).

The region is now home to hundreds of IAS – both plant and animal – but the magnitude of the problem varies from country to country, with some such as South

Africa facing serious challenges to control different types of IAS. On Marion Island, for example, the numbers of the island's only land bird – the lesser sheathbill – have dropped, and the introduced house mouse is suspected of out-competing the bird species for food (Joubert 2005).

Plant and animal invasive alien species cost millions of US dollars annually in terms of lost revenue and expenditure on control measures. The World Conservation Union (IUCN) estimates that worldwide the economic costs of invasive alien species are about US\$400 000 million annually (Howard and Matindi 2003). If control measures can be used as an indicator of the magnitude of the problem, the proposals by the African Ministerial Conference on the Environment (AMCEN) to raise more than US\$265 million to fund various projects in Africa over 3-5 years (NEPAD 2003) show that IAS are as significant an environmental issue in the region as land degradation, drought and biodiversity loss. The IAS problem has been identified as an emerging issue and is analysed in greater detail in Chapter 10: *Invasive Alien Species*.

### Armed conflict

Armed conflict has affected most parts of the region at one time or another. Millions of lives have been lost and tens of millions of people have been displaced, either internally or as refugees, throwing this critical human resource into a virtually unproductive existence for long periods. Displaced people end up unable to contribute to the economic development of their countries and being dependent on humanitarian assistance. The displacement of people, for example, in the Great Lakes Region, has contributed to the overexploitation of resources in national parks. In Rwanda's Kagera

#### Box 5: WSSD decisions on land

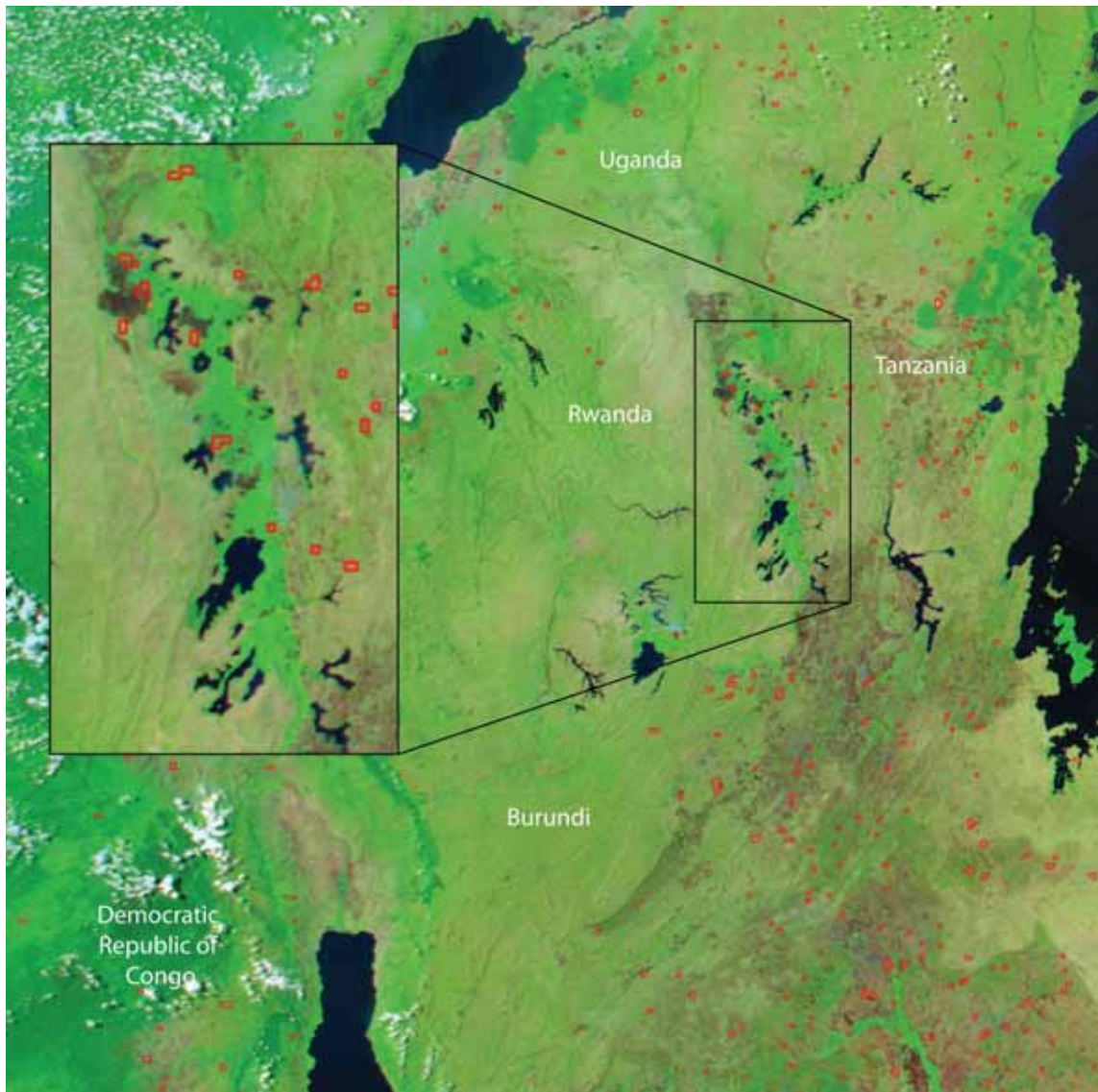
The World Summit on Sustainable Development (WSSD) Johannesburg Plan of Implementation chapter on Africa highlights a number of activities related to land. It emphasizes, among other priorities, the need to achieve significantly improved sustainable agricultural productivity and food security to meet the agreed MDGs, particularly to halve by 2015 the proportion of people who suffer from hunger.

This would be undertaken through initiatives at all levels which:

- Support the development and implementation of national policies and programmes to regenerate the agricultural sector. African countries were expected to have developed and implemented food

security strategies in their national poverty eradication programmes by 2005.

- Promote and support efforts and initiatives to secure equitable access to land tenure and clarify resource rights and responsibilities. This was to be done through land and tenure reform which respects the rule of law.
- Provide access to credit to all, especially to women, and enable economic and social empowerment and poverty eradication as well as efficient and ecologically sound utilization of land.
- Enable women producers to become decision-makers and owners in the sector, including the right to inherit land.



#### Fires along the boundary of Rwanda's Kagera National Park

Numerous fires (marked in yellow) are believed to have been started by poachers who may have burned as much as one-third of the protected land in the park. The park is a last refuge for elephants, lions, hyenas, leopards, buffalo, antelopes, zebra and other wildlife in the country.

Source: Earth Observatory 2004

National Park, for example, fires captured by satellite imagery in July 2004 are reported to have been started by poachers and as much as one-third of the protected land has been damaged (Earth Observatory 2004). The park's landscapes have been almost completely deforested or otherwise transformed.

Insecurity due to armed conflict has major impacts on tourism, forcing visitors to stay away. The 1998-2000 Ethiopia-Eritrea war, for example, severely dented tourism, with thousands of potential visitors deciding to stay away from Ethiopia. The country had only 109 000 visitors in 2000, but the industry has since recorded an increase of more than 30 per cent in the number of foreign visitors (IRIN 2004a).

Chapter 12: *Environment for Peace and Regional Cooperation* discusses the opportunities the environment offers for improving cooperation and thus promoting a climate conducive to sustainable development.

#### Governance and land policies

The governance of land has social, economic and environmental dimensions which are interlinked and, therefore, require careful considerations of all available options to minimize potential conflict among people and across economic activities. Given that Africa's land is critical to agriculture, mining, wildlife conservation, urbanization and infrastructural development, governance issues and policies are complex,



Women played an active role in the "citizens' jury" on the use of GM crops in Mali and its implications for food security, January 2006.

Source: M.Pimbert

often requiring juggling acts to balance and satisfy competing interests. Land-use management, therefore, has implications at disparate levels from household to community, from community to national, from sub-regional to regional, and finally to international.

Governance has social and economic dimensions, and inequitable gender relations often place women at a disadvantage. Poverty in Africa has strong gender dimensions. Women often have weaker land and natural resources rights than men, which, coupled with inequitable education, lessens the opportunities available to women. In Cameroon, for example, women have only user rights and not ownership rights to the land (Baye 2002).

Property rights are often at the core of available opportunities. Existing property regimes often favour the rich and other established sectors. This has been particularly evident in land and natural resource tenure. The enforcement of property rights, without due consideration of equity and justice issues, may exacerbate conflict among users at different levels including the local and national, and possibly beyond this. It has been argued that land ownership makes poor people less reliant on wage labour and increases opportunities available to them, thus reducing their vulnerability to shocks. Providing poor people with access to land, together with building their capacity to effectively use the land, is central to reducing poverty. It also empowers the poor and communities (World Bank 2003a). Improving land productivity needs to be part of a multi-pronged economic strategy that amongst other things promotes industrial development and diversifies options.

### Land-use management

Effective land-use management, which takes into account equity and access issues and tenure rights, is critical to sustainable development in Africa. Ineffective land-use planning and management can only lead to overexploitation of the resource, contributing to increased land degradation, salinization, pollution, soil erosion and conversion of fragile lands.

### Legal and institutional frameworks

A disparate body of legal and institutional frameworks exist at national, sub-regional, regional and international levels to deal with the different dimensions of land.

Many resource-rich countries in Africa face special governance challenges related to weak and poorly enforced law and policy. Countries dependent on oil, gas and mining and that have weak political institutions often have higher levels of inequality and poverty than non-oil and -mineral economies at similar income levels. Such countries often lag behind in overall development, with higher levels of child malnutrition, lower educational outcomes, and even shorter life expectancy (Nankani 2004). To maximize the benefits of increased economic growth, countries must build stronger governance structures and strengthen accountability and transparency as well as eliminating graft.

In terms of agriculture, ministries or departments of agriculture administer different laws and policies aimed at enhancing food production for national consumption as well as for export. The fact that food production in Africa has been declining over the past few decades is arguably an indicator of inefficiency, although there are other root causes. An opportunity which policymakers should pursue in terms of food production is the expansion of irrigation, particularly in sub-regions and countries with the most potential. The adoption by Africa of CAADP is also an opportunity to turn around agriculture and livestock production in the region.

Africa has played a significant role in various international conferences of the past two decades, including the 1992 Earth Summit and the 1996 World Food Summit. These conferences, as well as the follow-up international conferences such as the World Food Summit +5 and the WSSD, have given Africa the opportunity to put forward its concerns and to have the global community take them on board.

The region has also ratified various multilateral environmental agreements, whose objectives vary from biodiversity and biotechnology, climate change and desertification to persistent organic pollutants and other chemicals initiatives. Several of these are directly relevant to the challenges of land.

At the regional level, NEPAD's Environmental Action Plan (NEPAD-EAP) adopted in 2002 and endorsed by the African Union (AU) in July 2003, has become the blueprint to help address, among others, land issues in Africa. The opportunities and challenges of addressing these through an interlinkages approach are considered in Chapter 8: *Interlinkages: The Environment and Policy Web*.

### UN Convention to Combat Desertification

One of the main challenges facing Africa is desertification. Both the global community and Africa have specifically recognized the need to address this issue. The United Nations Convention to Combat Desertification (UNCCD) is the key global instrument addressing this. The UN General Assembly has declared 2006 the International Year of Deserts and Desertification (UN 2004). Regarding land degradation and desertification, Africa collectively as a region and individually as countries has been in the forefront of implementing the UNCCD. All the 53 African countries have ratified the Convention and are in various stages of implementing its provisions. In 2005, the Committee for the Review of the Implementation of the Convention (CRIC) reviewed the status of implementation in Africa, and concluded that countries are moving from planning to action.

The AU, and its predecessor the Organization of African Unity (OAU), have played a key role in the implementation of the UNCCD, which the OAU described in 2002 as "an umbrella Convention for Africa for environment and natural resources management" (OAU 2002).

The AU – the region's highest policy-making body – has been involved in the preparatory activities for national, sub-regional and regional action programmes and in desertification and land degradation control activities in many parts of Africa. In 1998, for example, the OAU granted US\$300 000 from its Special Emergency Assistance Fund for Drought and Famine in Africa (OAU/SEAF) to the UNCCD Secretariat to implement transboundary projects to combat desertification and land degradation, and to fight hunger in the Sahel and Maghreb border regions.

Between 1998 and 2001, the OAU/SEAF provided grants totalling about US\$4 million to Sudan, Chad, Tanzania, Cameroon and Niger to fund activities to combat both the causes and impacts of desertification and land degradation. Funding was also made available for transboundary projects on desertification, land degradation and food security in the Sahel and Maghreb border regions (OAU 2002).

Sub-regional organizations and economic groupings have been involved in implementing sub-regional action programmes as well as supporting the implementation of national action programmes (NAP) in various sub-regions (UNCCD 2005). A total of 32 African countries had by November 2005 finalized (see Table 4), validated and adopted their NAP and two others had working drafts (UNCCD 2005). The United Nations (UN)

**Table 4: National Action Programmes (NAP)**

Country	Year of submission
Algeria	2004
Benin	2000
Botswana*	2001
Burkina Faso	2000
Burundi	2005
Cape Verde	2000
Chad	2000
Democratic Republic of the Congo*	2004
Djibouti	2000
Egypt	2005
Eritrea	2002
Ethiopia	2000
Gambia	2000
Ghana	2002
Kenya	2002
Lesotho	2000
Madagascar	2001
Malawi	2001
Mali	2000
Mauritania	2002
Morocco	2002
Mozambique	2002
Niger	2000
Nigeria	2001
Senegal	2000
South Africa	2004
Sudan	2002
Swaziland	2000
Tanzania	2000
Togo	2002
Tunisia	2000
Uganda	2000
Zambia	2002
Zimbabwe	2000

\* *working draft of NAP document*

Source: UNCCD 2005

**Box 6: Thematic Programme Networks**

The UNCCD has facilitated the establishment of Thematic Programme Networks (TPNs) in the context of the Regional Action Programme (RAP) to combat desertification in Africa. The TPNs are networks of institutions and agencies linked together via an institutional focal point. Regional, sub-regional and national focal institutions will involve key actors at regional, sub-regional and national levels in the affected countries.

The following are the themes of the TPNs:

- Integrated management of international river, lake and hydrogeological basins;
- Promotion of agroforestry and soil conservation;
- Rational use of rangelands and promotion of fodder crops development;
- Ecological monitoring, natural resources mapping, remote sensing and early warning systems;
- Promotion of new and renewable energy sources and technologies; and
- Promotion of sustainable agricultural farming systems.

*Source: UNCCD 2005*

system has played a critical role in the implementation of the Convention in different regions. For example, the UN Development Programme has, through its Drylands Development Centre (formerly the Office to Combat Desertification and Drought (UNSO)), made considerable investment, financial and otherwise, and spent since 1995 a total of US\$18 million to support 29 countries in Africa, 22 in Asia and 19 in Latin America and the Caribbean to develop national action plans to combat desertification and drought (UNDP 2002). The United Nations Environment Programme (UNEP) and United Nations Development Programme (UNDP) Joint Venture with UNSO also provided funding to desertification control projects in the Sudano-Sahelian region over the years from 1979 up to the mid-1990s. The Joint Venture also provided extensive support to governments to develop National Action Plans to Combat Desertification (NPACDs) of which many seem to have been converted into NAPs, for example, the Tunisia NPACD which was already in its second phase of implementation in the mid-late 1990s.

Programmes and projects by UNEP and its Division of Global Environment Facility Coordination (DGEF) on land and land degradation, such as the Desert Margins programme in nine SSA countries, People, Land Management and Environmental Change (PLEC) in Kenya, Tanzania, Uganda, Ghana, and Guinea, Land Degradation Assessment in Drylands (LADA) in Fouta Djallon, Senegal-Mauritania and Niger-Nigeria, and the Kalahari-Namib Action Plan, have been key policy interventions.

The implementation of the UNCCD has also facilitated strategic coordination at different levels including at the national, regional and international levels. For example, at the regional level, governments adopt common positions through various fora. At a preparatory African Ministerial Conference in mid-2003 to the sixth session of the UNCCD Conference of the Parties (COP.6), the ministers urged the parties to take appropriate measures to strengthen access to the world market for agricultural products from arid, semi-arid and dry sub-humid areas of Africa (UNCCD Secretariat 2003). The linkage between African agricultural trade and desertification is obvious because in many African countries, combating desertification and promoting development are “virtually one and the same due to the social and economic importance of natural resources and agriculture” (UNCCD Secretariat undated).

Networks such as the FAO-UNEP Global Land Cover Network (GLCN), which has already implemented Africover in ten Eastern African countries, and the present expansion of GLCN to Western, Southern and Northern Africa are major efforts to harmonize land cover classification, and data and information in Africa. They will help to create a comparable land cover database which is usable across scales and users/operators in different sectors of society.

In terms of climate change, which has been projected to have a major impact on Africa, a total of 52 countries have ratified the UN Framework Convention on Climate Change (UNFCCC), and nearly all of the countries have ratified the Kyoto Protocol, which came into effect in late 2004.

## SUB-REGIONAL SECTIONS

### CENTRAL AFRICA

#### OVERVIEW OF LAND RESOURCES

Nearly 19 per cent of Central Africa's total area of about 536.6 million ha is used for agriculture, although, as Table 5 shows, there are variations between the countries (FAOSTAT 2005). Irrigated agriculture is limited due to high, reliable rainfall in the humid zone which is conducive to rain-fed agriculture. Only about 88 000 ha are irrigated (FAOSTAT 2005).

As shown in Table 5 São Tomé and Príncipe has the smallest land area, covering 96 000 ha, while total land cover in the DRC is nearly 234.5 million ha. The sub-region has extensive forest and woodland resources; about 240.33 million ha is forested (FAO 2005).

Table 5: Status of land in Central Africa

Country	Total area (1 000 ha)	Land area (1 000 ha)	Agricultural area (1 000 ha)	Agricultural as % of total area*	Total forest area ('000 ha)
Cameroon	47 544	46 540	9 160	19.27	23 858
Central African Republic	62 298	62 298	5 149	8.27	22 907
Chad	128 400	125 920	48 630	37.87	12 692
Congo, Dem. Republic of the	234 486	226 705	22 800	9.72	135 207
Congo, Republic of the	34 200	34 150	10 547	30.84	22 060
Equatorial Guinea	2 805	2 805	334	11.91	1 752
Gabon	26 767	25 767	5 160	19.28	21 826
São Tomé and Príncipe	96	96	56	58.33	27
<b>Total*</b>	<b>536 596</b>	<b>524 281</b>	<b>101 836</b>	<b>18.98</b>	<b>240 329</b>

\* aggregated data

Source: FAO 2005 and FAOSTAT 2005

## ENDOWMENTS AND OPPORTUNITIES

In 2004, Central Africa led economic growth in Africa with 7.3 per cent. This was fuelled by high oil prices supported by higher oil production in all oil-producing countries of the sub-region except Gabon (ECA 2005). Chad and Equatorial Guinea recorded the fastest growth in the continent in 2004: although oil was the principal factor in Chad, cattle and cotton production also contributed to the impressive growth (ECA 2005).

Agriculture contributes significantly to the Gross Domestic Product of the sub-region, with Cameroon, Central African Republic and Chad registering 44, 55 and 39 per cent respectively during the year 2000 (WRI and others 2003). Agropastoralism is the main agricultural activity, while major crops in the sub-region include cassava, cocoa, coffee, cotton, groundnuts, maize, millet, palm oil, rubber and sorghum. In 2000, Cameroon was the main exporter of cereals and pulses, which accounted for US\$1 41 million and US\$860 000 respectively (WRI and others 2003). However, Central Africa is a net importer of food. Due to the vast resources available, there is a glaring opportunity for the countries to diversify agricultural production so that they fully achieve their potential to become net food exporters. The sub-region has made great strides in improving its cereal yields, with as much as 56 and 30 per cent improvement having been realized in Cameroon and the Central African Republic, respectively, since 1989 (WRI and others 2003).

Central Africa is also endowed with considerable oil reserves, particularly in Cameroon, Chad and São Tomé and Príncipe. São Tomé has untapped off-shore oil reserves estimated at 6 000 million barrels (Infoplease



Cocoa farmers collecting cocoa pods, São Tomé and Príncipe. National Smallholders Support Programme.

Source: G. Planchenault/IFAD

2005). Cameroon is SSA's sixth-largest oil producer, with reserves estimated at 400 million barrels, while Chad has 900 million barrels (Energy Information Administration 2005a).

## CHALLENGES FACED IN REALIZING OPPORTUNITIES FOR DEVELOPMENT

Land degradation, which includes erosion and soil compaction, is the main threat to the sustainable use of land resources. The main causes of land degradation are vegetation removal through commercial logging and tree cutting to provide domestic fuel, as well as clearance of forests for commercial or subsistence cultivation. During the period 1990-2000, the sub-

region experienced extensive forest loss, ranging from 0.1 per cent in the Republic of Congo to 0.9 per cent in Cameroon (WRI and others 2003). Its soils are exposed to salinization, through inundation and saltwater intrusion into irrigated land (WRI 2001).

Declining productivity and soil structure in the Sahelian zones of Chad and Cameroon are exacerbated by unpredictable rainfall and drought, resulting in extreme degradation and desertification. Chad is highly vulnerable to desertification, with 58 per cent of the area already classified as desert, and 30 per cent classified as extremely vulnerable (Reich and others 2001).

Armed conflict is also a threat to the sustainable management and use of land resources. The sub-region has experienced considerable conflict over the past two decades, displacing people and causing land degradation through deforestation.

As part of efforts to address the various threats to the land resources, a number of institutions and policies are in place, and they include the Economic and Monetary Community of Central Africa (CEMAC); the Economic Community of Central African States (ECCAS); the Lake Chad Basin Commission (LCBC); and the African Timber Organization (ATO). The primary aim of these organizations is to promote economic cooperation and sound environmental management in the sub-region.

Central Africa is challenged to improve food production and cut down on food imports. A comprehensive, integrated approach to improving food security and land quality is an environmental and developmental priority.

Land tenure and access to land resources are two important factors influencing land and natural resources

management. An improvement in tenure arrangements has a direct effect on people's security and on their investment in land resources management. In particular, there is a need to harmonize customary and statutory laws in order to avoid conflicting situations that can lead to disputes over access to land resources.

## EASTERN AFRICA

### OVERVIEW OF LAND RESOURCES

Land is a primary asset for survival and development in Eastern Africa. Land supports the livelihoods of most rural people. Rural population is high: in Rwanda, Ethiopia, Burundi, Eritrea and Uganda more than 80 per cent of the people live in rural areas; in Kenya and Somalia more than 60 per cent live in rural areas; and, in contrast, in Djibouti only 16.3 per cent live in rural areas (FAO 2005). Land also provides diverse functions in support of ecosystem processes.

As shown in Table 6 below, Uganda has the highest proportion of potentially arable land, whereas in Rwanda, all arable land is in use (FAO/AGL 2003) and land pressure is pushing cultivation into marginal areas. In Eritrea, 88 per cent is under cultivation. Countries such as Rwanda and Burundi face enormous challenges as they are physically small with high population densities. Burundi's population density is 265.8 per km<sup>2</sup> and Rwanda's 340.1 per km<sup>2</sup> (FAO 2005). Burundi has the highest rate of deforestation in Africa, and one of the highest globally, with a 9 per cent change per year (FAO 2005). Potential arable land is negligible in Djibouti because of the extremely arid conditions in the country.

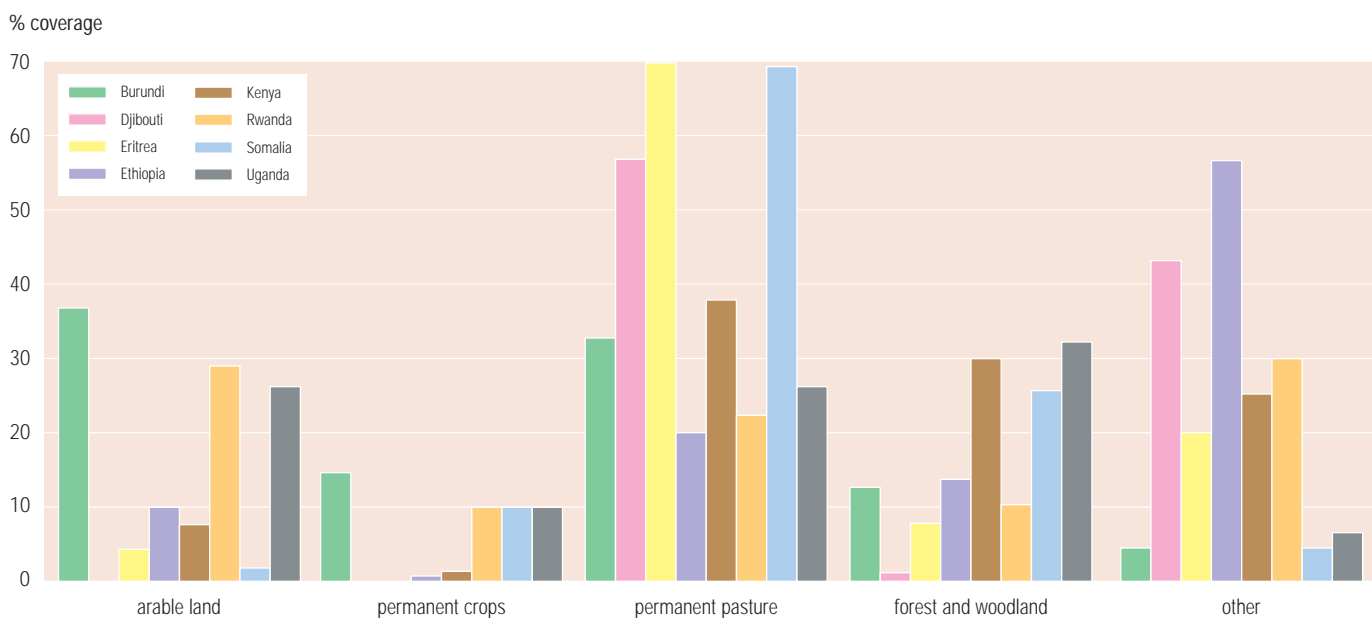
More than one-third of the land area is covered by permanent pasture as the dominant land use is

**Table 6: Actual and potential arable land in countries of Eastern Africa**

Country	Total area	Potential arable land		Actual arable land in 1994	
	'000 km <sup>2</sup>	'000 ha	% of total area	'000 ha	% of potential
Burundi	26	1 414	54.4	1 180	83.5
Djibouti	23	0	0	0	0.0
Ethiopia	1 101	42 945	39	11 012	25.6
Eritrea	94	590	6.3	519	88.0
Kenya	569	15 845	27.8	4 520	28.5
Rwanda	25	746	29.8	1 170	156.8
Somalia	627	2 381	3.8	1 020	42.8
Uganda	200	14 169	70.8	6 800	48.0
<b>Total</b>	<b>2 665</b>	<b>78 090</b>	<b>29.3</b>	<b>26 221</b>	<b>33.6</b>

Source: Compiled from FAO/AGL 2003

Figure 4: Land use and land cover for Eastern African countries (1994)



Source: Compiled from FAOSTAT 2004

livestock grazing as shown in Figure 4 (FAOSTAT 2004). About 73 per cent of the total area is characterized by desert and dryland conditions, of which significant proportions fall in Djibouti, Eritrea and Somalia.

Though immense, the potential of irrigation is underutilized. The current extent of irrigated land is largest in Somalia, followed by Ethiopia, Kenya and Burundi. In the Horn of Africa, less than 1 per cent of the cultivable area is irrigated (IATFUND 2000). In Ethiopia, about 214 720 ha is irrigated, while the potentially irrigable land is estimated to be 3 328 910 ha (MoWRD 2001), implying that only 6.5 per cent of the potentially irrigable land is currently under irrigation. The area currently under irrigation accounts for about 3 per cent of the country's total food production (FDRE 2003). In Kenya, potentially irrigable land is estimated to be 540 000 ha, of which 52 000 ha or 9.6 per cent of the potential has been developed.

### ENDOWMENTS AND OPPORTUNITIES

Agriculture and tourism are the main drivers of growth in Eastern Africa. Improved agriculture was a key factor in Tanzania's growth of 6.1 per cent and Ethiopia's growth of 11.6 per cent per year (ECA 2005).

Land is primarily utilized for agriculture (crop and livestock production), nature-based tourism and extraction of other land-based natural resources such as metal ores and oils. By putting in place appropriate institutional and policy frameworks, and conservation-based agricultural development technologies, the breadth of opportunities to be derived from land can be

immense and thus hold great potential for breaking the circle of poverty. Though variable between countries, agriculture accounts for the highest share of GDP, contributing 51.5 per cent in Burundi, 49.9 per cent in Ethiopia, 43.1 per cent in Uganda and 38.9 per cent in Rwanda. For Djibouti, Eritrea and Kenya, the GDP is derived from diverse service sectors.

Integrated land-use planning is an essential tool and defines an approach to land resources management. It introduces mechanisms and incentives for bringing about change in land allocation as well as for identifying suitable biophysical and economic uses, and it prescribes appropriate management practices and options to ensure that land resources are conserved (FAO/UNEP 1999). In Ethiopia, attempts have been made to formulate and implement integrated land-use plans at village, district, regional and national levels. The national land-use plan was based on a nationwide socioeconomic and physical land resources database (Henricksen 1988). There are attempts to implement local or village level integrated land-use planning using watershed or farmer's service cooperative boundaries as planning units (Gittins and Henricksen 1986, LUPRD 1989, MoARD 2005). In Kenya, the watershed management approach has been used extensively to conserve and develop resources at a microlevel.

There are opportunities from agricultural research and technologies which can contribute to development, such as the use of improved seed varieties, agrochemicals and other improved agronomic practices (appropriate planting date, seeding rate, etc). This could

result in substantive yield increases, as current production is often characterized by low input and management levels.

The sustainable use of land resources requires, among other things, a strong institutional framework at all levels. The mushrooming of multiple sub-regional institutions to manage resources, which are of an inter-country nature, is a key element in fostering economic growth. The Intergovernmental Authority on Development (IGAD) was put in place in 1986 with seven member countries including Djibouti, Sudan, Uganda, Kenya, Ethiopia, Eritrea and Somalia, with the aim of strengthening regional cooperation and efforts in areas of food security and environmental protection, maintenance of peace and security and humanitarian affairs, and enhancing economic cooperation and integration of member countries.

Recurrent drought, limited alternative sources of income, population pressure, limited technology, lack of product diversification and market integration, lack of institutional capacity, environmental degradation and poor access to credit all undermine efficient and sustainable land use. In some countries, including Ethiopia, many interlocking and reinforcing factors including poverty, misguided policies, technological stagnation, population pressure, insecurity of land rights, weak institutional support (credit, extension, etc), drought and political instability contributed to the stagnation of agriculture, food insecurity and the degradation of natural resources (Shiferaw 1994, FDRE 2003). These factors may make efficient planning and

management difficult: in Ethiopia, for example, the effectiveness of the recently launched nationwide agricultural extension programme, which embraces about 40 per cent of the farming population, has been constrained by high agricultural input prices, shortage of complementary inputs and inadequate extension services (Bonger and others 2004). Access to improved technology in Ethiopia is minimal where the average rate of fertilizer (nutrient) application per hectare of cultivated land is 17.5 kg (CSA 1996). In Uganda, increased crop and livestock disease, soil degradation, lack of access to improved agricultural inputs, weak agricultural extension systems, inefficient markets, increasing land fragmentation and unreliable weather have been cited as contributing to the declining crop yield of smallholder farmers (McDonagh and Bahigwa 2002). On the high and medium potential lands of Kenya, land productivity potential is adversely affected by soil erosion, decline in soil fertility, soil salinization, crop and livestock diseases and fragmentation of landholdings. In the lowlands, where pastoralism is the predominant farming system, a combination of physical, environmental and socioeconomic factors constrain production efficiency. Gradual resource shrinkage, tenure insecurity and inadequate livestock watering may also be major problems in pastoral areas, as they are in Ethiopia (Arsano 1999, Sisay 1999).

Land degradation is a serious problem as shown in Table 7. The total area suffering from severe to very severe degradation is about 14 per cent (FAOSTAT 2005). In particular, Burundi and Rwanda face a serious



Green tea plantations, Gokeke, Rwanda.

Source: D. Balducci/Still Pictures

**Table 7: Land degradation in Eastern Africa**

Country	Total area		Severe		Very severe	
	'000 km <sup>2</sup>	area (%)	'000 km <sup>2</sup> *	area (%)	'000 km <sup>2</sup> *	
Burundi	26	0	0	76	0	
Djibouti	23	0	0	0	0	
Eritrea	94	55	51.7	8	4.136	
Ethiopia	1 101	8	88.08	20	17.616	
Kenya	569	19	108.11	11	11.8921	
Rwanda	25	0	0	71	0	
Somalia	627	0	0	15	0	
Uganda	200	41	82	12	9.84	
Total	2 665		329.89		43.4841	
<b>Total (severe - v. severe)*</b>	<b>373.3741</b>	<b>14.01</b>				

\* aggregated data

Source: FAOSTAT 2005

threat of land degradation, where about 76 and 71 per cent of the respective country's total area encounters very severe degradation problems (FAOSTAT 2005). They are followed by Eritrea, Uganda, Kenya and Ethiopia, where areas with severe to very severe degradation constitute about 63, 53, 30 and 26 per cent respectively of total land area (FAOSTAT 2005). In Djibouti, wind erosion is the principal form of erosion but is mainly viewed as "natural" due to the absence of agricultural land (FAO/AGL 2003).

The pressures and driving forces that are attributable to land degradation are similar across the countries of the sub-region. Typical proximate causes include overcultivation, overgrazing and deforestation. The process of soil degradation is affected by poverty, population dynamics, insecure tenure, weak institutional support (eg extension, credit, etc), political instability and factors related to physical land attributes such as topography, soil and rainfall conditions. Topography is an important consideration, as many countries are mountainous. In order of magnitude, Rwanda, Burundi and Ethiopia encounter the highest potential erosion risk due to steep topography.

The areas with the most severe land degradation are also those with the highest population density. The high population density, in the central and northern highlands of Eritrea, Rwanda and Burundi, is an important consideration. Rwanda has the highest population in Africa, with 340 people per km<sup>2</sup>; its population is growing at 2.1 per cent per year (FAO 2005). Burundi, with a population density of 265.8, is growing at 3.1 per cent per year (FAO 2005).

Land tenure is profoundly political, and it continues to be a critical factor in the development of African politics and economies (Bruce and others 1996). Land tenure, and in particular ownership and access rights, has been widely recognized to have important bearings on effective, efficient and sustainable management and production regimes. The topography of land tenure varies from country to country and includes freehold tenure, state leasehold and community-based tenure (legally recognized indigenous tenure and community-based). A combination of freehold, state leasehold and community-based tenure prevail in Kenya, Uganda and Rwanda (Bruce and others 1996). In Burundi and Djibouti, freehold and community-based tenure, including pastoral systems, occur extensively (Bruce and others 1996). In Ethiopia and Eritrea, state leasehold and community-based tenure, including pastoral regimes, dominate. Overall, the tenure situation assessment in most of the sub-region's countries (Uganda, Somalia, Kenya and Rwanda) reveals that compulsory and systematic tenure conversion to individual ownership offered little benefit to smallholder farmers (Bruce and others 1996). In Ethiopia, tenure insecurity is described as being one of the major problems associated with the existing land system (Rahmato 2004, EEA/EEPRI 2002). In Kenya, where formal titles to land are held by many farmers, the lack of any significant relationship between land title and crop yield is perhaps explained by the limited use of land titles in obtaining formal credits (Migot-Adholla and others 1994).

## NORTHERN AFRICA

Northern Africa is characterized by mostly arid areas, yet land resources play a pivotal role in its development and the well-being of its people.

### OVERVIEW OF LAND RESOURCES

The main three land-use categories are cultivated land, forests and rangelands. Agricultural land constitutes 233 590 ha, which is nearly 28.8 per cent of the total land area (FAOSTAT 2005).

Arable land in Northern Africa is of varied soil characteristics, which belong to the Aridisol group. Aside from the alluvial soils of the river basins, the desert soils are of inferior chemical, physical and nutritional properties. In general, soil resilience is rather weak with rapid responses to development and degradation.

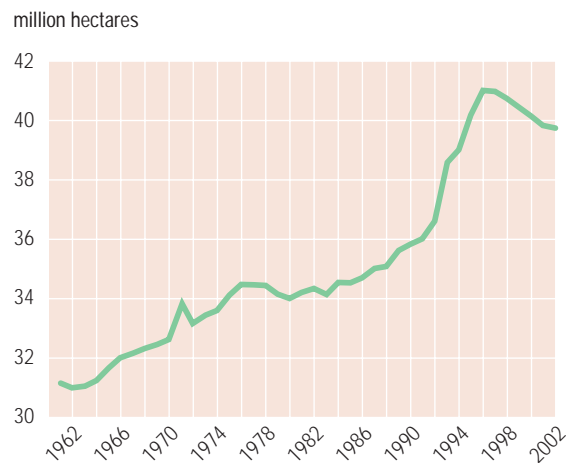
The extent of use of arable land varies considerably among the countries. Some countries have already fully utilized the land resources available to them, while others are still to fully utilize them. In Sudan, for example, there are vast areas of potential arable land yet to be developed. The extent to which irrigation is used varies dramatically, with 99.94 per cent of all agricultural land in Egypt being under irrigation, compared with less than 1.5 per cent in Algeria and Sudan (FAOSTAT 2005).

Over the past 50 years, the traditional systems of cultivation and conservation have broken down. Productivity has declined as soil erosion from

overcultivation and overgrazed lands has reduced soil fertility. Coupled with naturally inadequate drainage, this has led to the accumulation of high levels of soluble salts, especially in Egypt and Sudan. In Egypt 3.4 million ha of all agricultural land is irrigated (FAOSTAT 2005). About one million hectares are suffering from primary or secondary salinization (Goossens and others 1994). This is in part due to the use of saline drainage water and brackish water in irrigation.

More than 57 per cent of the total land of Northern Africa is threatened by desertification (CAMRE and others 1996).

**Figure 5: Northern Africa: arable land**



Source: UNEP 2005



A farmer using an irrigation pump near the village of Talla in the El Minya district. Egypt-Minya Agricultural Development Project.

Source: G. Bizzarri/IFAD

## ENDOWMENTS AND OPPORTUNITIES

The continued expansion of the oil sector contributed to an overall growth rate of 4.8 per cent in 2004, close to that in 2003 (ECA 2005). Gross Domestic Product was projected to be 5.2 per cent for 2005, led by growth in the agricultural sector, assuming good weather conditions and continued gains from oil through foreign investment inflows to oil-related activities in Libya, Mauritania and Sudan (ECA 2005).

Growth in tourism in Morocco and Tunisia offers opportunities for development. In Egypt, tourism continues to be an important industry and a key factor in its sustained growth of 3.2 per cent in 2004 (ECA 2005).

Land cultivation is becoming increasingly dualistic in nature. A high technology agribusiness sector is developing alongside traditional smallholder agriculture. The cultivable land covers between 22 and 25 per cent of the total land area. The percentage of agricultural land (including arable, forests and rangeland) to the total land area ranges from 2.6 per cent in Egypt to 77.4 per cent in Morocco. The percentage of irrigated land as a percentage of arable land varies between nearly 100 per cent in Egypt, where rain-fed agriculture is almost negligible, to around 15 per cent in Morocco and Sudan, where arable rain-fed areas amount to 16.1 per cent and 3.32 per cent respectively. The expansion and intensification of land use in marginal dry areas has greatly exacerbated the risk of land degradation.

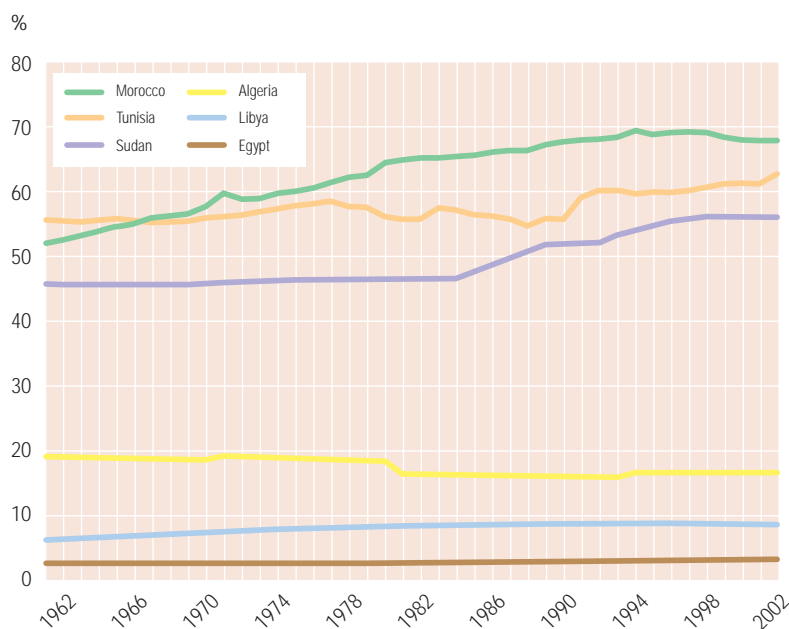
## CHALLENGES FACED IN REALIZING OPPORTUNITIES FOR DEVELOPMENT

Land resources are affected by population dynamics. Since 1970, the population size has doubled and is continuing to grow at an average of 2 per cent per year. Population growth, coupled with the resulting higher consumption of food commodities, places new pressures on resources (Miladi 1999).

Despite the increase in agricultural land resources, the rapid population increase has caused a decline of the per capita share of cultivated land. High population in coastal towns, such as Alexandria in Egypt, is resulting in pollution-related degradation and thus threatens the tourism industry as well as local livelihoods.

Degradation processes of the available land resources are varied and widespread. The main pressures include rapid population growth, climatic stresses, drought and overgrazing. The resulting impacts include serious losses of soil through wind and water erosion, loss of soil fertility, loss of biodiversity through degradation of natural plant cover and deforestation, pollution of land and water resources, increased soil

Figure 6: Northern Africa countries: agricultural area (as per cent of land area)



Source: UNEP 2005

salinity and waterlogging, and social impacts including increased poverty and rural-urban migration.

Combating such degradation processes is of paramount importance for the sustainable development of the land resources, improving agricultural productivity and food security, securing a safe environment and enhancing socioeconomic benefits. In response to the various adverse impacts of degradation processes, the countries of Northern Africa are carrying out various activities to assess and monitor the degradation processes.

Lack of secure land tenure has been reported as a major constraint to land development (FAO 1993). Lack of secure property rights is a hindrance to land development and improvement, and does not support the development of trade. It may be a factor in environmental degradation.

Earthquakes are one of the natural disasters faced by Northern African countries. Establishing a regional network of seismic stations is necessary if the Earthquake Prognostics Strategy is to be implemented. Other tasks of high priority are:

- Studying the relation between the modern tectonic movements and the seismic activity to make micro-zonation maps which may be applied to better designed buildings, dams and power plants;
- Increasing public awareness and preparedness for earthquakes in threatened areas; and
- Facilitating insurance and the development of technologies which provide physical defence against the negative impacts of earthquakes.



Goats feeding in a tree, Morocco.

Source: Y. Katerere

## SOUTHERN AFRICA OVERVIEW OF LAND RESOURCES

Southern Africa covers a total land area of 693 000 million ha, of which approximately 20 per cent is arable as shown in Table 8 (SADC 2000). Arable and domesticated land is used for agriculture, forestry, wetlands and wildlife conservation, and human settlements.



Cattle grazing in Miombo woodland, north-western Zimbabwe.

Source: Y. Katerere

## ENDOWMENTS AND OPPORTUNITIES

Economic growth in the sub-region is closely linked to land resources. The strongest growth was in Angola which grew at 11.5 per cent in 2004 (linked to oil and diamonds) and 8.3 per cent in Mozambique (strong agricultural performance and donor support). South Africa, which accounts for one-fifth of Africa's total GDP, grew at 2.8 per cent in 2004. Increased mining activities was the key growth factor in Botswana, Mozambique, Namibia and Zambia; agricultural expansion was an important factor in Mozambique and Zambia, and increased tourist activity in South Africa and Zambia

Crop production is the dominant land use, contributing about 34 per cent to GDP (Chenje 2000). For this reason, the performance of crop production has a strong influence on food security, economic growth and stability. As most economies in Southern Africa are based on agriculture, there is a big demand for arable land, mainly in the rural areas. Up to 62 per cent of the population lives in rural areas, depending on agriculture for their livelihood (UNEP 2002a). There is a growing trend towards export agriculture, influencing an increase in the production of cash crops including cotton, tobacco, tea, coffee, sugar and wheat. However, maize, a staple food for the majority of the region's population, is still an important crop and is widely grown. Increased commercial agriculture offers important employment opportunities. However, where labour is gendered, as it is in much of Africa, with cash crops identified as men's crops and

Table 8: Total land in Southern Africa

Country	Total area (in million ha)	Arable land (in million ha)
Angola	124.7	3.0
Botswana	58.2	0.3
Lesotho	3.0	0.3
Malawi	11.8	2.1
Mozambique	80.2	3.9
Namibia	82.4	0.8
South Africa	122.1	114.7
Swaziland	1.7	0.1
Tanzania	94.5	4.0
Zambia	75.3	5.3
Zimbabwe	39.1	5.2
<b>Total</b>	<b>693.0</b>	<b>139.7</b>

Source: SADC 2000

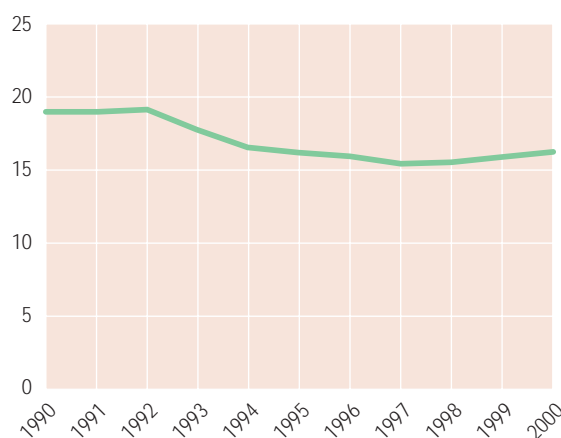
subsistence food crops as women's crops, women may not derive the same benefit (ECA 2005). Disproportional income levels are also a factor in the gendered nature of poverty.

Livestock farming is another common form of land use, although livestock production has fluctuated over the last three decades due to drought and diseases such as foot-and-mouth, cattle-lung disease and anthrax. Meat production per capita has generally been declining as shown in Figure 7.

### CHALLENGES FACED IN REALIZING OPPORTUNITIES FOR DEVELOPMENT

Land tenure arrangements and associated equity issues are a major threat to the sustainable use of land resources. The communal land tenure system is the most widespread, in which individual property rights are weak. In some countries, particularly Namibia, South Africa and Zimbabwe, colonial dispossession and weak land tenure rights are key factors in the high levels of unemployment and poverty (ECA 2005). Unemployment rates are particularly high in Namibia (34 per cent) and South Africa (30 per cent) (ECA 2005). The land tenure system is closely associated with social inequity, including high levels of income inequality. The Gini index, which is a measure of the extent of inequality in a country, is 50 in Zimbabwe, 59 in South Africa and 74 in Namibia, while the SSA average is 42.8 and the global average is 40.0 (UNDP 2004).

**Figure 7: Per capita meat production in Southern Africa production (kilograms per person)**



Source: UNEP 2002b

Table 9 shows the land tenure system in 1999. The situation has changed quite a lot, especially in Zimbabwe, where the government has made efforts to decongest rural areas, settle landless people and deracialize commercial agriculture by acquiring 10 million ha of prime large-scale farms for resettlement (SLSA 2001).

The major cause of tenure insecurity in the communal lands is the lack of devolution of planning and decision making, poor resource-mobilization, inadequate enforcement and inadequate administration of matters relating to the affairs of local communities (Katerere and Guveya 1998).

**Table 9: Land tenure in Southern Africa in 1999**

Country	Private/Freehold and Leasehold (%)	Communal/Tribal/ Customary (%)	Conservation/Minerals/ Water Catchment/ Reserves/etc (%)
Angola	5.4	88.0	6.6
Botswana	5.0	70.0	25.0
Lesotho	5.0***	90.0	5.0
Malawi	4.3	78.7	17.0
Mozambique	2.9	93.0	4.1
Namibia	44.0	41.0	15.0
South Africa	72.0	14.0	14.0
Swaziland	40.0	60.0**	-
Tanzania	1.5	84.0	14.5
Zambia	3.1	89.0	7.9
Zimbabwe	41.0*	42.0	16.0

\* includes small-scale farm leases and resettlements.

\*\* includes Swazi Nation Land held under customary tenure and leased to companies.

\*\*\* leases in urban areas.

Source: Cumming 1999

Trade liberalization and globalization are putting severe pressure on the livelihoods of the people, resulting in many having to depend further on land and other natural resources. Notable among these factors are a fall in formal sector employment, privatization of key resources and enterprises, reduced levels of state support to agriculture, and the continuing marginalization of the non-commercial or peasant sectors. Chapter 1: *The Human Dimension* considers how economic change impacts on the environment and livelihoods and specifically looks at some of the challenges associated with structural adjustment programmes (SAPs). Chapter 8: *Interlinkages: The Environment and Policy Web* discusses the link between economic policy and environmental change, and considers the need for interlinked responses.

Declining per capita landholdings and the general skewed land ownership pattern in Southern Africa have been accompanied by a fall in human well-being indicators, such as per capita food production. The production of cereals, root crops and livestock, which form the primary staple food in Southern Africa, has been increasing since 1970, but has not kept pace with population growth, resulting in overall per capita food production falling by 25 per cent since 1980 (Cumming 1999). While the declining trends in per capita food production are largely attributable to declining landholding sizes as shown in Table 10, other factors have also shaped the trends over the past two decades. Drought is one factor that

caused a significant decline in the per capita food production index for Southern Africa following the poor seasons experienced in 1991-92, 1994-95, 2001-03 and 2004-05.

Soil erosion is the most widespread form of land degradation, and one of the biggest threats to agricultural productivity in Southern Africa. It is estimated that about 15 per cent of the land is degraded through erosion (UNEP 2002a).

Land policy debates are characterized by a range of challenges:

- The privatization of resources, including both communal and state resources;
- The retreat by the state from key areas of the economy, including both productive activities and services;
- The pursuit of FDI;
- The sweeping deregulation of markets;
- Dealing with the emerging issue of genetically modified organisms (GMOs); and
- Effectively reforming the land sector.

As a result there is convergence of policy in key areas that can be attributed to the growing exposure of the sub-region to globalization, which has seen an accelerated phase of regional integration and intergovernmental programmes such as the Regional Indicative Strategic Development Plan (RISDP). Box 7 shows the food security objectives of the RISDP.

**Table 10: Per capita access to land and food production trends 1980-2000**

Country	Per capita arable land area (ha)			Food production per capita (index trends)			
	1980	1990	2000	1980	1990	1995	1999
Angola	0.5	0.36	0.28	120	98	104	105
Botswana	1.5	1.06	0.70	103	100	92	79
DRC	*	*	*	101	101	90	68
Lesotho	0.2	0.18	0.12	112	111	80	83
Malawi	0.4	0.28	0.36	137	97	100	140
Mauritius	*	*	*	86	101	100	77
Mozambique	0.3	0.20	0.21	119	107	89	104
Namibia	*	*	*	142	96	96	77
South Africa	*	*	*	112	98	79	888
Swaziland	0.3	0.21	0.14	110	97	76	69
Tanzania	0.3	0.19	0.18	102	100	86	83
Zambia	0.9	0.62	0.21	94	94	82	83
Zimbabwe	0.4	0.29	*	105	104	68	92

\* data unavailable

Source: Cleaver 1993

**Box 7: Food security objectives of the Regional Indicative Strategic Development Plan**

- **Improving food availability.** Member states are required to promote agricultural production and productivity, take measures that increase competitiveness and promote trade and also promote the sustainable use of natural resources.
- **Improving access to food through rural non-farm income generation.** Member states are encouraged to adopt policies which will generate the maximum employment gains and incomes, introduce measures that improve income stability and equity, and develop safety nets (such as food for work, cash for work and targeted distribution of inputs or food) for vulnerable groups. Most of these measures require public, private and non-governmental organization (NGO) partnerships.
- **Improving nutrition.** Member states are urged to adopt strategies that improve the nutritional value of food, minimise food losses, particularly for the resource-poor, and address food safety.
- **Disaster-induced emergencies.** The objective is to improve forecasting, prevention, mitigation and recovery from the adverse effects of natural disasters.
- **Enhance institutional frameworks.** The objective is to strengthen the institutional framework of the relevant institutions and expertise, as well as build capacity for implementing food security programmes in the SADC region.

Source: SADC 2004b

The Southern African Development Community member states have demonstrated strong commitment to implement the UNCCD by ratifying it and by developing national and sub-regional programmes to combat desertification. The SADC Sub-Regional Action Programme (SRAP), which was approved by the SADC Council of Ministers in 1997, provides a collective response to problems of land degradation, drought and desertification, especially those of a transboundary nature.

## WESTERN AFRICA

As shown in Figure 8, about 70 per cent of Western Africa, covering mainly the Sahelian zone, is semi-arid to desert (CILSS 2005). The sub-region is experiencing an increase in land degradation caused by salinity, erosion and the loss of soil fertility.

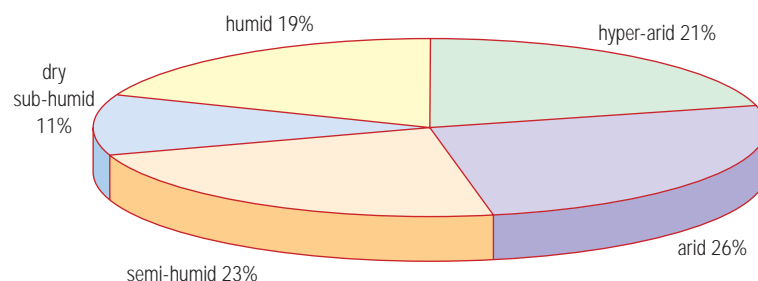
### OVERVIEW OF LAND RESOURCES

The total land area of the sub-region is 607.84 million ha (FAO 2005). Arable land, permanent pasture and protected areas are shown in Table 11.

### ENDOWMENTS AND OPPORTUNITIES

West Africa is projected to grow 4.5 per cent in 2005, with 8 of the 15 countries expected to record improvements over those achieved in 2004. These are Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Guinea, Guinea-Bissau, Mali and Senegal (ECA 2005). Land resources are the primary driver of this growth. Factors behind this growth include agricultural growth in Benin, Gambia, Guinea, Mali, Senegal, Sierra Leone and Togo; donor support for Guinea-Bissau, Liberia and Sierra Leone; expansion in mining in Burkina Faso, Guinea, Ghana, Mali and Sierra Leone; foreign

Figure 8: State of aridity in Western Africa



Source: CILSS 2005

investment inflows to Cape Verde and Liberia (in response to anticipated improvement in political stability); and growth in tourism in Cape Verde and Gambia (ECA 2005).

Agriculture is the main source of revenue of almost 60 per cent of the population. The main subsistence and cash crops are maize, rice, coffee, cotton, cocoa, palm oil and fruits. Agricultural income represents an important part of GDP.

In the Sahelian zone, semi-nomadic and domestic livestock production are important activities. However, the long duration of the dry season compels breeders to move their cattle towards the south. This happens in Senegal, Niger, Gambia, Guinea-Bissau, Mali, Mauritania and Burkina Faso.

Regionally, oil has been an important stimulant of growth. The full potential of this for Western Africa is not known. Benin, Ghana, Gambia, Guinea-Bissau, Mali, Niger, Senegal and Togo are all believed to have some oil deposits. Nigeria is the largest oil producer in Africa and the eleventh largest in the world. In 2004, Nigeria's

**Table 11: Arable land and permanent pasture**

Country	Land area (1 000 ha)		Arable land (1 000 ha)		Permanent pasture (1 000 ha)	
	1990	2003	1990	2003	1990	2003
Benin	11 062	11 062	1 615	2 650	550	550
Burkina Faso	27 360	27 360	3 520	4 840	6 000	6 000
Cape Verde	403	403	41	46	25	25
Côte d'Ivoire	31 800	31 800	2 430	3 300	13 000	13 000
Gambia	1 000	1 000	182	315	450	459
Ghana	22 754	22 754	2 700	4 185	8 405	8 350
Guinea	24 572	24 572	728	1 100	10 788	10 700
Guinea-Bissau	2 812	2 812	300	300	1 080	1 080
Liberia	9 632	9 632	400	382	1 993	2 000
Mali	122 019	122 019	2 053	4 660	30 000	30 000
Mauritania	102 522	102 522	400	488	39 250	39 250
Niger	126 670	126 670	11 036	14 483	22 000	24 000
Nigeria	91 077	91 077	29 539	30 500	40 000	39 200
Senegal	19 253	19 253	2 325	2 460	5 744	5 650
Sierra Leone	7 162	7 162	486	570	2 204	2 200
Togo	5 439	5 439	2 100	2 510	1 000	1 000
<b>Total</b>	<b>605 537</b>	<b>605 537</b>	<b>59 855</b>	<b>72 789</b>	<b>182 489</b>	<b>183 464</b>

Source: FAOSTAT 2005

production averaged 2.5 million barrels per day (bbl/d) and it plans to increase this to 3 million bbl/d in 2006 and to 4 million bbl/d by 2010 (Energy Information Administration 2005b).

Mining, including for gold, phosphates, iron, uranium and diamonds, offers opportunities for development.

### CHALLENGES FACED IN REALIZING OPPORTUNITIES FOR DEVELOPMENT

Land degradation is the main threat to the opportunities of land for sustainable development. There are several reasons for land degradation in Western Africa: overexploitation, bush fires, and population pressure associated with high population growth rates, to name but few. Land degradation can also be attributed to repeated periods of drought. The immediate effects of the degradation process are erosion, loss in soil fertility, reduction of biodiversity and biomass productivity, and impoverishment of the population.

In the Sahel, overgrazing is another threat to opportunities as it emphasizes land degradation.

### WESTERN INDIAN OCEAN ISLANDS OVERVIEW OF LAND RESOURCES

The four island countries of the Western Indian Ocean (WIO) sub-region have a total land area of 59.2 million ha,

99 per cent of which is Madagascar, the fourth largest island country in the world (UNDP 2004). Large parts of the sub-region are mountainous, rugged and dry.

### ENDOWMENTS AND OPPORTUNITIES

The main use of land is agriculture, although this has been steadily declining due to pressures from population growth and industrial development. As shown in Figure 9, only in Madagascar and the Seychelles is the majority of land still used for agriculture. Agriculture contributes 3 per cent and 6 per cent of the GDP for the Seychelles and Mauritius, respectively, and 35 per cent and 41 per cent of the GDP for the Comoros and Madagascar, respectively (FAO 2003).

The pattern of agriculture varies between the islands depending on climatic conditions for producing particular crops. The islands, however, remain net importers of cereals and staples such as rice and potatoes.

Agricultural expansion and tourism were the main growth factors for Madagascar, Mauritius and the Seychelles.

### CHALLENGES FACED IN REALIZING OPPORTUNITIES FOR DEVELOPMENT

Population growth in WIO countries puts pressure on land, as demonstrated in Box 8. Population growth in

**Table 12: The extent of land area in the Western Indian Ocean island countries and the population**

Countries	Population Millions	Land area km <sup>2</sup>	Population density Pop/km <sup>2</sup>	Population growth % per year	Population growth '000 per year	Land use Agriculture as % of total land	Coastline km
Comoros	0.7	2 171	315	2.6	18.2	34	469
Madagascar	16.4	587 041	27	2.7	442.8	53	9 935
Mauritius	1.2	2 045	581	0.8	9.6	44	496
Seychelles	0.1	455	173	0.8	0.0	84	746
<b>Total</b>	<b>18.4</b>	<b>591 712</b>	<b>31.09</b>	<b>2.56</b>	<b>470.6</b>	<b>53</b>	<b>11 646</b>

Sources: FAOSTAT 2005, UNDP 2004; WRI 2005

Madagascar is predicted to be 2.5 per cent per annum for the period 2003-2015: with the current population at 17.6 million this will give an increase to 23.8 million by 2015 (UNDP 2005). In 2003, population density in Madagascar was 29.9 people per km<sup>2</sup> (FAO 2005). In contrast, population density in Mauritius was 604.5 people per km<sup>2</sup> – the highest in Africa (FAO 2005), with the population expected to grow at 0.8 per cent per annum (UNDP 2005).

In Madagascar, frequent drought conditions and seasonal floods from cyclones create food emergencies. Climate change will also increase the pressure on land resources, through less predictable weather conditions and the impact of sea-level rise on the coastal regions, especially in the smaller islands.

The WIO islands are challenged to respond to the NEPAD policy to combat land degradation. This is being done through the Indian Ocean Commission's (IOC) Environment Programme which calls upon each of the four countries to develop and implement action plans to promote sustained livelihoods and mitigate the past impact of land degradation on other resources. In Madagascar, an environmental awareness programme supports the national conservation strategy, focusing on habitat and biodiversity protection, the creation of a national environmental fund with research projects on land mapping and management, environmental education, training and institutional support.

The sub-region should also develop irrigation; over one million hectares of land has potential for irrigation. In a sub-region where droughts are prevalent, often destroying crops and exacerbating food insecurity, irrigation could be a key factor in enhancing food security.

Enhancing and extending property rights are key challenges for promoting development and conservation. Mauritius and the Seychelles have established more equitable mechanisms for

**Figure 9: Western Indian Ocean countries: agricultural areas (as a percentage of total land area)**

Source: FAO 2003

distribution of land with effective protection of land rights. In Mauritius, 90 per cent of the land is privately-owned and more than 85 per cent of people live in owner-occupied property with government-registered deeds. By contrast, in Madagascar, landownership has been without enforceable land registration, creating difficulties in its use as collateral for investment. This is now changing and land registration is being introduced as part of a general policy to improve land use, to reduce land degradation and short-term exploitation, and to promote the development of investment.

Controlling and managing pollution is important for the tourism sector which is an important part of the economy.



Sugar cane fields, Mauritius.

Source: A. Mohamed

## CONCLUSION

Land is a key factor in sustainably managing the environment for development in Africa, but there are many challenges to be overcome. The region has sufficient land resources to produce enough food to feed its people and yet one in three people in the region is presently undernourished (USAID 2003). Increasing agricultural production in Africa – the dominant economic activity in most parts of the region – is the key to addressing extreme poverty and hunger (USAID 2003).

Although mainly arid and semi-arid, Africa has significant freshwater resources to harness and expand irrigated agriculture and enhance food production, and yet governments often depend on food imports and/or humanitarian aid. The challenges of physically accessing the water resources, as well as inadequate investment in appropriate technology, limit irrigation

### Box 8: Pressures on land use in Mauritius

The demand for housing in Mauritius is the single largest pressure on the future use of land and could involve conversion of 5 000 ha by 2020. About 800 ha of land could be needed for new business parks and industry, including small- to medium-scale enterprises, while 400 ha may be needed for new schools, colleges and universities and other institutions. To this should be added demand for integrated resorts, leisure complexes, public transport, highways and utilities including the proposed Light Railway system and new water storage dams.

Because of land scarcity, residential estates have been built on hillsides and there is increasing pressure to develop housing on mountain slopes. Some 66 per cent of industry in Mauritius is located in the central urban zone. In many coastal areas, rapid development of housing and commerce has outstripped the rate of provision of environmental services and community facilities, especially waste management and sewage. Many coastal settlements do not conform to the planning guidelines for set-back, sea defences, access to the beach and height of buildings. The effects include a reduction in scenic attractiveness, restricted public access to the beaches, pollution of coastal waters with sewage and solid wastes, and beach erosion. The Tourism Development Plan for Mauritius (2002) predicts that provision for tourists will expand from around 9 000 rooms at present to 20 000 by 2020.

Some 20 per cent of wetlands in Mauritius have been filled in the northern tourist zone, 50 per cent in the western area, and 50 per cent of the remainder are under pressure. Building has increased pollution of the lagoon by affecting the important functions of the wetlands in reducing nutrient loads and retaining sediment.

Source: SADC 2004b

The concentration of business, industry and residences in the Port Louis and central area of Plaines Wilhems has put acute stress on infrastructure and resources. These heavily built-up areas, coupled with a lack of adequate planning, give rise to serious problems of traffic congestion. The impact includes localized episodes of poor air quality, its effects on the health of the urban population and delays in travelling around the island and consequent higher transport and operating costs for business. The main challenge facing land resources in Mauritius is to ensure that land is readily available for the economic development objectives of the nation, while taking into account environmental concerns and social needs. One solution is to concentrate future major development in strategic growth clusters in the conurbations, promoting an urban renaissance, particularly in key town centres, thus enabling rural regeneration and tourism development in other settlements in the countryside and on the coast. Development should be planned so that, wherever possible, it minimizes the need to travel and facilitates safe and convenient movement on foot, by bicycle and by public transport. There should also be proper planning in order to make the best use of existing transportation networks whilst also having regard to strategic priorities. This will all require more attention from professionals, skilled in land development and urban planning, which the country lacks at present. The aim would be to manage development in ways which enhance and protect the environment and provide a better quality of life for the people.

expansion. The funds available to import food could, over the next decade, be invested, for example, in strategic areas to incrementally build food security at different levels.

The region is a mining giant: Africa produces 77 per cent of platinum in the world; 62 per cent of aluminium silicate; more than 50 per cent of vanadium and vermiculite; more than 40 per cent of diamonds, palladium and chromium; and more than 20 per cent of gold, cobalt, uranium, manganese and phosphate rock (ECA 2004b). And yet its industrial base is insignificant on the global market, and the majority of its people live in growing poverty. There is a need for Africa to move from being a major exporter of primary resources to strengthening its industrial and manufacturing base.

Africa has numerous tourist attractions, ranging from wildlife to cultural heritage, and yet it contributes only 4 per cent annually to the multi-million dollar global tourism industry. Issues of poor infrastructure, lingering perceptions of instability and other external factors such as adverse travel advisories conspire to retard any significant development in this sector.

The region has the human resource base to tackle these and other challenges, but many who have acquired the necessary skills and experience or are in the process of doing so, are faced with the threat of HIV/AIDS. This is the greatest threat to the security and

development of the region, and to individual countries. In some countries, life expectancy has been cut by about 50 per cent in the past two decades. Women are the most vulnerable to HIV/AIDS and are at least 20 per cent more likely to be infected than men as a result of inadequate education and poor gender relations. Malaria is another serious threat to the realization of the MDGs, contributing to the decrease of the region's GDP by about US\$12 000 million annually (USAID 2003). Malaria kills 2.5 million people every year – 90 per cent of them in Africa (USAID 2004).

Environmental governance in terms of land is well entrenched with so many laws and policies, institutions and stakeholders but yet effectiveness remains a mirage due to various factors, including policy failures.

Some governments have made great strides in opening up the democratic space, with more one-party states being abandoned, and general and presidential elections being held. Since the end of 2002, presidential or parliamentary elections have taken place in countries such as Nigeria, Togo, Rwanda, Guinea, Algeria, South Africa, Ghana, Namibia, Mozambique and Zimbabwe. Opposition politics has flourished since the 1990s and has become entrenched in governance systems across Africa. Even though many stakeholders are now involved in governance, inequalities still persist, particularly in terms of access



Landscapes of northern Shoa, Ethiopia.

Source: S. Sprague/Still Pictures

to land resources, especially for women. Human Rights Watch (Ganesan and Vines 2004), for example, reported that governments in many resource-rich countries are abusive, unaccountable and corrupt: "Rather than representing the citizenry, the government becomes predatory, committing abuses to maintain power and controlling the resources of the state for the benefit of a few."

Managing Africa's land resources is complex, requiring the input and participation of different stakeholders and interests as well as transparent and effective governance structures. Governance systems should be able to balance the needs of small and large investors, community and national interests as well as sectoral demands and conflicts. It is evident from different economic data provided in previous sections that land is the foundation upon which the eight MDGs – from eradicating extreme poverty and improving gender equality to ensuring environmental sustainability and developing a global partnership for development – can be realized in Africa. Land in Africa is a social, economic and environmental good, and as long as all the ingredients critical to achieving the MDGs through the available land resources are rationed, the goals will remain a chimera.

The importance of stronger tenure rights, with related improved governance system as the basis for improving sustainable management and enhancing opportunities can not be overemphasized. Long before the MDGs were adopted by world leaders in 2000, the World Commission on Environment and Development (WCED) was visionary in its analysis of the role of land in sustainable development, saying in its 1987 report:

"In many countries where land is very unequally distributed land reform is a basic requirement. Without it, institutional and policy changes meant to protect the resource base can actually promote inequalities by shutting the poor off from the resources and by favouring those with large farms, who are better able to obtain the limited credit and services available."

"By leaving hundreds of millions without options, such changes can have the opposite of their intended effect, ensuring the continued violation of ecological imperatives."

## References

- ACF (2004). Uluguru Mountains Overview. African Conservation Foundation. <http://www.africanconservation.com/uluguru/>
- African Environmental News Services (2003). Kenya Hopes to Boost Tourism Revenue by Sport Bird Shooting. <http://www.aens.org/news/newsdetails.asp?newsId=2003050210026>
- AOAD (2003). *Arab Agriculture Statistics Yearbook*. Arab Organization for Agricultural Development, Khartoum
- Arsano, Y. (1999). The Predicament of the Ethiopian Pastoralists: Shrinking Resources and Tenure insecurity. Proceedings of the National Workshop on Challenges and Opportunities for Research and Development in Pastoral/Agropastoral Areas of Ethiopia (eds. Mitiku, H. Tegegne, T., Alemayehu, A., Dirres, T. and Merha, Z.), Mekelle, Ethiopia, 16-18 December 1998
- Attahi, K. (1999). Abidjan - Côte d'Ivoire. In *Managing the Monster: Urban Waste and Governance in Africa* (ed. Onibokun, A.G.), pp. 11-48. International Development Research Centre, Ottawa. [http://www.idrc.ca/en/ev-9402-201-1-DO\\_TOPIC.html](http://www.idrc.ca/en/ev-9402-201-1-DO_TOPIC.html)
- Baye, F.M. (2002). Rural Institutions, Access to Primary Assets and Poverty in Two Villages in Cameroon. *Pakistan Economic and Social Review*. 40 (2), 121-52
- Bonger, T., Ayele, G. and Kuma, T. (2004). Agricultural Extension, Adoption and Diffusion in Ethiopia. Research Report I. Ethiopian Development Research Institute, Addis Ababa
- Bruce, J., Subramanian, J., Knox, A., Bohrer, K., and Leisz, S. (1996). Land and Natural Resource Tenure on the Horn of Africa: Synthesis of Trends and Issues Raised by Land Tenure Country Profiles of East African Countries, 1996. Proceedings of the Sub-Regional Workshop on Land Tenure Issues in Natural Resources Management in the Anglophone East Africa with a Focus on the IGAD Region. Addis Ababa, Ethiopia, 11-15 March. [http://www.mekonginfo.org/mrc/html/oss/bru\\_inh.htm](http://www.mekonginfo.org/mrc/html/oss/bru_inh.htm)
- CSA (1996). Agricultural Sample Survey 1995/96. Vol. 3. Report on Agricultural Practices. Statistical Bulletin 152. Central Statistical Authority, Addis Ababa
- Chavez, R. (1999). Globalisation and tourism: Deadly mix for indigenous peoples. *Third World Resurgence*, 103. Third World Network. <http://www.twinside.org.sg/title/chavez-cn.htm>
- Chenje, M. (ed., 2000). State of the Environment—Zambezi Basin 2000. Southern African Development Community, IUCN – The World Conservation Union, Zambezi River Authority, Southern African Research and Documentation Centre, Maseru/Harare/Lusaka
- CAMRE, UNEP and ACSAD (1996). State of Desertification in the Arab Region and the Ways and Means to Deal with it (in Arabic with English summary). Council of Arab Ministers Responsible for the Environment, United Nations Environment Programme and Arab Centre for the Studies of Arid Zones and Dry Lands. Arab Centre for the Studies of Arid Zones and Dry Lands, Damascus
- CILSS (2005). Afrique de l'Ouest 3è Rapport sur la mise en oeuvre de la CCD. Comité permanent Inter Etats de Lutte contre la Sécheresse dans le Sahel / Permanent Interstate Committee for Drought Control in the Sahel, Ouagadougou. <http://www.unccd.int/cop/reports/africa/subregional/2004/cilss-fre.pdf>
- Cleaver, K.M. (1993). *A Strategy to Develop Agriculture in Sub-Saharan Africa and a Focus for the World Bank*. Technical Paper No. 203. World Bank, Washington, D.C.,

- The Columbia Encyclopaedia, Sixth Edition (2004). Sahara. In *The Columbia Encyclopaedia, Sixth Edition*. Bartleby.com. <http://www.bartleby.com/65/sa/Sahara.html>
- Cumming, D.H.M. (1999). *Study on the Development of Transboundary Natural Resource Management Areas in Southern Africa – Environment Context: Natural Resources, Land Use and Conservation*. Biodiversity Support Program, Washington, D.C. [http://www.worldwildlife.org/bsp/publications/africa/trans\\_cumming/1-cumming.html](http://www.worldwildlife.org/bsp/publications/africa/trans_cumming/1-cumming.html)
- Earth Observatory (2004). EO Natural Hazards: Fires in Rwanda's Kagera National Park. [http://earthobservatory.nasa.gov/NaturalHazards/natural\\_hazards\\_v2.php3?img\\_id=12234](http://earthobservatory.nasa.gov/NaturalHazards/natural_hazards_v2.php3?img_id=12234)
- ECA (2005). *Economic Report on Africa 2005: Meeting the Challenges of Unemployment and Poverty in Africa*. Economic Commission for Africa, Addis Ababa. <http://www.uneca.org/era2005/front.pdf>
- ECA (2004a). Achieving Sustainable Development: Building Partnerships. Economic Commission for Africa. Address by Josué Dioné, Director, Sustainable Development Division of the Economic Commission for Africa (ECA) to the Africa Investment Forum, 14 September 2004, Johannesburg. [http://www.uneca.org/eca\\_resources/Speeches/2004\\_speeches/091404speech\\_josue.htm](http://www.uneca.org/eca_resources/Speeches/2004_speeches/091404speech_josue.htm)
- ECA (2004b). *Assessing Regional Integration in Africa*. ECA Policy Research Report. Economic Commission for Africa. <http://www.uneca.org/aria/>
- ECA (2004c). *Land Tenure Systems and their Impacts on Food Security and Sustainable Development in Africa*. Economic Commission for Africa, Addis Ababa. [http://www.uneca.org/eca\\_resources/Publications/sdd/Land\\_Tenure\\_systems.pdf](http://www.uneca.org/eca_resources/Publications/sdd/Land_Tenure_systems.pdf)
- EEA and EEPRI (2002). A Research Report on Land Tenure and Agricultural Development in Ethiopia. Ethiopian Economic Association and Ethiopian Economic Policy Research Institute. [http://oxfam.co.uk/what\\_we\\_do/issues/livelihoods/landrights/downloads/ethltdat.rtf](http://oxfam.co.uk/what_we_do/issues/livelihoods/landrights/downloads/ethltdat.rtf)
- Energy Information Administration. (2005a). Country Analysis Briefs: Chad and Cameroon Country Analysis Brief. [http://www.eia.doe.gov/emeu/cabs/Chad\\_Cameroon/pdf.pdf](http://www.eia.doe.gov/emeu/cabs/Chad_Cameroon/pdf.pdf)
- Energy Information Administration. (2005b). Country Analysis Briefs: Nigeria Country Analysis Brief. Energy Information Administration. <http://www.eia.doe.gov/emeu/cabs/nigeria.html>
- Energy Information Administration. (2005c). International Energy Annual 2003: G.2 World Production of Crude Oil, NGPL, Other Liquids, and Refinery Processing Gain 1980-2003. <http://www.eia.doe.gov/pub/international/iealf/tableg2.xls>
- Energy Information Administration. (2005d). International Energy Annual 2003: 1.2 World Petroleum Consumption 1980-2003. <http://www.eia.doe.gov/pub/international/iealf/table12.xls>
- Energy Information Administration. (2005e). International Energy Annual 2003: 3.1 World Petroleum Supply and Disposition, 2002. <http://www.eia.doe.gov/pub/international/iea2003/table31.xls>
- Energy Information Administration. (2004). Country Analysis Briefs - Great Lakes Region: Burundi, Kenya, Rwanda, Tanzania, and Uganda. Energy Information Administration. <http://www.eia.doe.gov/emeu/cabs/eafrica.pdf>
- Energy Information Administration. (1999). *Energy in Africa*. United States Department of Energy, Washington, D.C. <http://www.eia.doe.gov/emeu/cabs/archives/africa/Africa.pdf>
- FAO (2005). *State of the World's Forests 2005*. Food and Agriculture Organization of the United Nations, Rome. <ftp://ftp.fao.org/docrep/fao/007/y5574e/y5574e00.pdf>
- FAO (2004a). FAO intensifies locust campaign in West Africa. Food and Agriculture Organization of the United Nations, Rome. <http://www.fao.org/newsroom/en/news/2004/50990/index.html>
- FAO (2004b). Hunger in their wake: inside the battle against the desert locust. Food and Agriculture Organization of the United Nations. <http://www.fao.org/newsroom/en/focus/2004/51040/>
- FAO (2004c). New ways to tackle locusts – Research targets biological controls. Food and Agriculture Organization of the United Nations. [http://www.fao.org/newsroom/en/focus/2004/51040/article\\_51053en.html](http://www.fao.org/newsroom/en/focus/2004/51040/article_51053en.html)
- FAO (2003). *Forestry Outlook Study for Africa – African Forests: A View to 2020*. African Development Bank, European Commission and the Food and Agriculture Organization of the United Nations, Rome. <ftp://ftp.fao.org/docrep/fao/005/Y4526B/y4526b00.pdf>
- FAO (2002a). Besieged mountain ecosystems start to turn off the tap: reduced water flow threatens agriculture and food security around the globe. Food and Agriculture Organization of the United Nations. <http://www.fao.org/english/newsroom/news/2002/9881-en.html>
- FAO (2002b). The salt of the earth: hazardous for food production. Food and Agriculture Organization of the United Nations. <http://www.fao.org/worldfoodsummit/english/newsroom/focus/focus1.htm>
- FAO (2002c). *World Agriculture: Towards 2015/2030 - Summary Report*. Food and Agriculture Organization of the United Nations, Rome. [http://www.fao.org/documents/show\\_cdr.asp?url\\_file=/docrep/004/y3557e/y3557e00.htm](http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/004/y3557e/y3557e00.htm)
- FAO (1993). Key Aspects of Strategies for the Sustainable Development of Drylands. Food and Agriculture Organization of the United Nations, Rome. [http://www.fao.org/documents/show\\_cdr.asp?url\\_file=/docrep/T0752E/T0752E01.htm](http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/T0752E/T0752E01.htm)
- FAO (undated). Programme against African Trypanosomiasis (PAAT) - The Disease. Food and Agriculture Organization of the United Nations. <http://www.fao.org/ag/againfo/programmes/en/paat/disease.html>
- FAO/AGL (2003). TERRASTAT – Land resource potential and constraints statistics at country and regional level. <http://www.fao.org/ag/agl/agll/terrastat>
- FAOSTAT (2005). *FAOSTAT – FAO Statistical Databases*. Food and Agriculture Organization of the United Nations. <http://faostat.fao.org/>
- FAOSTAT (2004). *FAOSTAT – FAO Statistical Databases*. Food and Agriculture Organization of the United Nations. <http://faostat.fao.org/>
- FAO and UNEP (1999). *The Future of Our Land: Facing the Challenge*. Food and Agriculture Organization of the United Nations and United Nations Environment Programme, Rome. [http://www.fao.org/documents/show\\_cdr.asp?url\\_file=/DOCREP/004/X3810E/x3810e00.htm](http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/004/X3810E/x3810e00.htm)
- FDRE (2003). The New Coalition for Food Security in Ethiopia: Food Security Programme, Vol. I. Federal Democratic Republic of Ethiopia. [http://www.dagethiopia.org/pdf/The\\_New\\_Coalition\\_for\\_Food\\_Security.pdf](http://www.dagethiopia.org/pdf/The_New_Coalition_for_Food_Security.pdf)
- Frazier, S. (1999). *Ramsar Sites Overview: A Synopsis of the World's Wetlands of International Importance*. Wetlands International, Wageningen. <http://www.wetlands.org/RSDB/Publications/enovervw.pdf>
- Ganesan, A. and Vines, A. (2004). Engine of War: Resources, Greed, and the Predatory State. In *World Report 2004: Human Rights and Armed Conflict* (Human Rights Watch), pp. 301-24. Human Rights Watch, New York. <http://hrw.org/wr2k4/download/wr2k4.pdf>
- Gittins, L. and Henriksen, B.L. (1986). *Manual of Service Cooperative Consultative Planning*. Livestock Development Project, Ministry of Agriculture, Addis Ababa

- Global Geografia (undated). Africa, Principal Mountains (selection). [http://www.globalgeografia.com/africa\\_eng/africa\\_mountains.htm](http://www.globalgeografia.com/africa_eng/africa_mountains.htm)
- Goossens, R., Ghabour, T. K., Ongena, T. and Gad, A. (1994). Waterlogging and soil salinity in the newly reclaimed areas on the western Nile Delta of Egypt. In *Environmental Change in Drylands: Biogeographical and Geomorphological Perspectives* (ds. Millington, A. C. and Pye K.), pp. 365-77. John Wiley and Sons Ltd., New York
- Government of Mauritius (2005). *Mauritius – Staking out the Future*. Ministry of Environment and National Development Unit, Port Louis. [http://www.nssd.net/pdf/peer\\_review/Mauritius.pdf](http://www.nssd.net/pdf/peer_review/Mauritius.pdf)
- GraphicMaps.com (undated). Africa: Major landforms. WorldAtlas.com. <http://www.worldatlas.com/webimage/countrys/afnd.htm>
- Hamblin, A. (1998). *Environmental Indicators for National State of the Environment Reporting – the Land*. Australia: State of the Environment (Environmental Indicator Reports). Department of the Environment, Canberra. <http://www.deh.gov.au/soe/land/pubs/land-ind.pdf>
- Harsch, E. (2003a) Africa beyond famine: New strategies needed to combat hunger, disease and rural poverty. *Africa Recovery*. 17 (1). <http://www.un.org/ecosocdev/geninfo/afrec/vol17no1/171food1.htm>
- Harsch, E. (2003b). Famine spreads across Africa. *Africa Recovery*. 16 (4). <http://www.un.org/ecosocdev/geninfo/afrec/vol16no4/164food1.htm>
- Henriksen, B.L. (ed. 1988). *Master Land Use Plan, Ethiopia, Main Report*. United Nations Development Programme / Food and Agriculture Organization of the United Nations, Rome
- Hirji, R., Johnson, P., Maro, P. and Matiza Chiuta, T. (eds. 2002). *Defining and Mainstreaming Environmental Sustainability in Water Resources Management in Southern Africa*. Southern African Development Community, IUCN – The World Conservation Union, Southern African Research and Documentation Centre and World Bank, Maseru/Harare/Washington, D.C.
- Hounsome, R. and Ashton, P. (2001). Sustainable Development for the Mining and Minerals Sector in Southern Africa. Draft Position Paper. Proceedings of the Sustainable Development Workshop, Stellenbosch, South Africa, 31 March. <http://www.mining.wits.ac.za/Peterob.doc>
- Howard, G.W. and Matindi, S.W. (2003). *Alien Invasive Species in Africa's Wetlands – Some threats and solutions*. IUCN – The World Conservation Union, Nairobi. <http://www.iucn.org/places/earo/pubs/wetlands/INVASIVE.PDF>
- IIED and WBCSD (2002). *Breaking New Ground: Mining, Minerals, and Sustainable Development – the Report of the MMSD Project*. International Institute for Environment and Development and World Business Council for Sustainable Development. Earthscan Publications Ltd, London. <http://www.iied.org/mmsd/finalreport/>
- ILRI (2004). Raising Livestock Production in Africa: summary note. Proceedings of the Assuring Food and Nutrition Security in Africa by 2020: Prioritizing Action, Strengthening Actors, and Facilitating Partnerships Conference. Kampala, Uganda. 1-3 April. International Livestock Research Institute. <http://www.ifpri.org/2020africa/conference/program/day2summaries/sere.pdf>
- Infoplease (2005). São Tomé and Príncipe. <http://www.infoplease.com/ipa/A0107943.html>
- IATFUND (2000). The elimination of food insecurity in the Horn of Africa: a strategy for concerted government and UN agency action – final report. Inter-Agency Task Force of the United Nations. [http://www.fao.org/documents/show\\_cdr.asp?url\\_file=/DOCREP/003/X8406E/X8406e00.htm](http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/003/X8406E/X8406e00.htm)
- IRIN (2004a). Ethiopia: Archaeology and palaeontology to boost tourism revenue. United Nations Integrated Regional Information Networks. IRINNews.org. 12 January. [http://www.irinnews.org/report.asp?ReportID=38868&SelectRegion=Horn\\_of\\_Africa](http://www.irinnews.org/report.asp?ReportID=38868&SelectRegion=Horn_of_Africa)
- IRIN (2004b). Southern Africa: Global warming threatens to deepen poverty. IRINNews.org. 21 October. <http://www.irinnews.org/report.asp?ReportID=43789>
- Katerere, Y. and Guveya, E. (1998). Seeking New Perspectives in Land and Natural Resources Management. In *Setting the Foundation for Building Capacities, Networking and Research on Land Reforms in Southern Africa*. (eds. Marongwe, N. and Matowanyika, J.J.Z.) Proceedings of a regional workshop, Maseru, Lesotho, 1-3 July.
- Joubert, L. (2005). Sub-Antarctic Warming. *Africa Geographic*. February 2005, 64-69
- Linacre, E. and Geerts, B. (1998). The climate of the Kalahari desert. <http://www.das.uwoy.edu/~geerts/cwx/notes/chap10/kalahari.html>
- LUPRD (1989). *Manual for Grassroot Level Land Use Planning*. Land Use Planning and Regulatory Department. Ministry of Agriculture, Addis Ababa
- McDonagh, J. and Bahigwa, G. (2002). Crop-based farming systems and diverse livelihoods in Uganda. LADDER Working Paper No. 7. <http://www.uea.ac.uk/dev/odg/ladder/doc/wp7.pdf>
- McLaughlin, A. (2004). Africa's new model for spreading oil wealth. The Christian Science Monitor. <http://www.csmonitor.com/2004/0728/p07s01-woaf.html>
- Miladi, S.S. (1999). Changes in food consumption patterns in the Arab countries. *International Journal of Food Sciences and Nutrition*. 49, 23-30
- MoWRD (2001). *Water and Development Bulletin, No. 20*. Ministry of Water Resources Development, Addis Ababa
- MoARD (2005). *Community Based Participatory Watershed Development Manual*. Ministry of Agriculture and Rural Development, Addis Ababa
- Migot-Adholla, S.E., Frank, P. and Oluoch-Kosura, W. (1994). Security of Tenure and Land Productivity in Kenya. In *Searching for Land Tenure Security in Africa* (eds. Bruce, J.W. and Migot-Adholla, S.E.), pp 119-40. Kendall/Hunt Publishing Company, Dubuque
- Mountain Partnership (2001). Did You Know? <http://www.mountainpartnership.org/issues/resources/didyouknow.html>
- Nankani, G. (2004). Kenya – Creating Shared Growth in Africa: Public Lecture by Mr. Gobind Nankani, Vice President, Africa Region, World Bank, Nairobi, Kenya, December 6, 2004. <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/KENYAEXT/0,,contentMDK:20291859~menuPK:356516~pagePK:141137~piPK:141127~theSitePK:356509,00.html>
- NEPAD (2003). *Action Plan for the Environment Initiative*. New Partnership for Africa's Development, Midrand. [http://nepad.org/2005/files/reports/action\\_plan/action\\_plan\\_english2.pdf](http://nepad.org/2005/files/reports/action_plan/action_plan_english2.pdf)
- NEPAD (2002). *Comprehensive Africa Agriculture Development Programme (CAADP) – New Partnership for Africa's Development*. Food and Agriculture Organization of the United Nations, Rome. [http://www.fao.org/documents/show\\_cdr.asp?url\\_file=/docrep/005/Y6831E/y6831e00.htm](http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/005/Y6831E/y6831e00.htm)
- Njiro, E.I. (1998). African Mountains Research and Evaluation (AMRE): Mtn-Forum On-Line Library Document. <http://www.mtnforum.org/resources/library/njiro98a.htm>

- OUA (2002). Report of the Organization of African Unity on Activities undertaken to assist the Implementation of the United Nations Convention to Combat Desertification (UNCCD). Organization of African Unity. <http://www.gm-unccd.org/FIELD/OthOrg/AU/oua02en.pdf>
- Olson, D. M. and E. Dinerstein (2006). The Global 200: Priority ecoregions for global conservation. (PDF file) *Annals of the Missouri Botanical Garden* 89:125-126. WWF Conservation Science Program 1998 – 1999. Ecoregions Database. <http://worldwildlife.org/science/data/terreco.cfm>
- Payet, R.A., Soogun, N., Ranaivoson, E., Payet, R.J., and Ali Abdallah, F. (2004). *Indian Ocean Islands – Global International Waters Assessment Regional Assessment 45b*. United Nations Environment Programme, Nairobi. [http://www.unep.org/PDF/SIDS/giwa\\_regional\\_assessment\\_45b.pdf](http://www.unep.org/PDF/SIDS/giwa_regional_assessment_45b.pdf)
- Pickrell, J. (2004). Africa's Mountain Gorillas Rebound, Says New Census. *National Geographic News*, January 27, 2004. [http://news.nationalgeographic.com/news/2004/01/0127\\_040127\\_gorillas.html#main](http://news.nationalgeographic.com/news/2004/01/0127_040127_gorillas.html#main)
- Rahmato, D. (2004). Searching for Tenure Security? The Land System and New Policy Initiatives in Ethiopia. Forum for Social Studies Discussion Paper No. 12. Forum for Social Studies, Addis Ababa
- Reich, P.F., Numbem, S.T., Almaraz, R.A. and Eswaran, H. (2001). Land Resource Stresses and Desertification in Africa. In *Responses to Land Degradation. Proceedings of the 2nd International Conference on Land Degradation and Desertification, Khon Kaen, Thailand* (eds. Bridges, E.M., Hannam, I.D., Oldeman, L.R., Pening de Vries, F.W.T., Scherr, S.J. and Sompattpanit, S.), 2nd International Conference on Land Degradation: Meeting the Challenges of Land Degradation in the 21st Century. Khon Khaen, Thailand, 25-29 January 1999. Oxford Press, New Delhi. <http://soils.usda.gov/use/worldsoils/papers/desertification-africa.html>
- SADC (2004a). Mining Sector – Mining in SADC Member States. Southern African Development Community, Gaborone. [http://www.sadc.int/index.php?action=a1001&page\\_id=tifi\\_mining](http://www.sadc.int/index.php?action=a1001&page_id=tifi_mining)
- SADC (2004b). *Southern African Development Community Regional Indicative Strategic Development Plan*. Southern African Development Community, Gaborone. <http://www.sadc.int/english/documents/risdpl/index.php>
- SADC (2000). *SADC Statistics Facts and Figures*. Southern African Development Community, Gaborone.
- Saunders, D.J. (undated). Africa Needs More Liberalized Trade Initiatives for the Continued Growth and Sustainability of its Travel and Tourism Industry. *Africa Travel Magazine*. [http://www.africa-ata.org/trade\\_2.htm](http://www.africa-ata.org/trade_2.htm)
- Shiferaw, B. (1994). Dual Sector Model Government Intervention and Biases against Agriculture: Theory and Some Evidences from Ethiopia. In *Development, Poverty and Environment: Proceedings from a Nordic Course in Development Economics* (ed. Holden, S.). Agricultural University of Norway, Aas
- Simms, A., Magrath, J. and Reid, H. (2004). *Up in smoke? Threats from and responses to the impact of global warming on human development*. New Economics Foundation, London. <http://www.neweconomics.org/gen/uploads/igeebque0l3nvy455whn42vs19102004202736.pdf>
- Sisay, Z. (1999). Water Economy and its Implication on Pastoral Livestock Production. Proceedings of the National Workshop on Challenges and Opportunities for Research and Development in Pastoral/Agropastoral Areas of Ethiopia (eds. Mitiku, H. Tegegne, T., Alemayehu, A., Dirres, T and Merha, Z.), Mekelle, Ethiopia, 16-18 December 1998
- SLSA (2001). *The Politics of Land Reform in Southern Africa*. Sustainable Livelihoods in Southern Africa. SLSA Land Theme Research Briefing 1 November. Sustainable Livelihoods in Southern Africa, Cape Town. <http://www.uwc.ac.za/plaas/publications/SLSALTRB1.pdf>
- Swallow, B.M. (1999). Impacts of trypanosomiasis on African agriculture. <http://www.fao.org/docs/eims/upload/147342/Pos2.pdf>
- Tcheyan, N.O. (2003). Remarks by Nils O. Tcheyan, Director, Strategy and Operations, Africa Region Vice Presidency World Bank - Komé, October 10, 2003. Chad/Cameroon Development Project News Release, 10 October 2003. [http://www.esso Chad.com/Chad/Library/News/Chad\\_NW\\_speech\\_101003\\_5.asp](http://www.esso Chad.com/Chad/Library/News/Chad_NW_speech_101003_5.asp)
- TDR/Scientific Working Group (2003). Report on African trypanosomiasis (sleeping sickness). Report of the Scientific Working Group Meeting on African trypanosomiasis. Geneva, 4-8 June 2001. World Health Organization, Geneva. [http://whqlibdoc.who.int/hq/2003/TDR\\_SWG\\_01.pdf](http://whqlibdoc.who.int/hq/2003/TDR_SWG_01.pdf)
- Tieszen, L.L., Tappan, G.G. and Toure, A. (2004). Sequestration of carbon in soil organic matter in Senegal: an overview. *Journal of Arid Environments*. 59 (3), 409-25
- Turpie, J. (2000). The Use and Value of Natural Resources of the Rufiji Floodplain and Delta, Tanzania. <http://web.uct.ac.za/depts/fitzpatrick/pdf/turpie01.pdf>
- UN (2004). *Livelihoods of Over One Billion People at Risk from Desertification, Secretary-General Says In Message On International Day*. Message by Secretary-General Kofi Annan on the World Day to Combat Desertification and Drought, 17 June 2004. Press Release SG/SM/9329/OBV/424. <http://www.un.org/News/Press/docs/2004/sgsm9329.doc.htm>
- UN (2003). Assistance to refugees, returnees and displaced persons in Africa: Report of the Secretary-General. A/58/353. United Nations, New York. <http://daccessdds.un.org/doc/UNDOC/GEN/N03/493/06/PDF/N0349306.pdf?OpenElement>
- UN (2002a). Summary of the economic and social situation in Africa, 2001: Recent economic trends in Africa and prospects for 2002. E/2002/17. United Nations. <http://daccessdds.un.org/doc/UNDOC/GEN/N02/345/63/PDF/N0234563.pdf?OpenElement>
- UN (2002b). World Summit on Sustainable Development Plan of Implementation. Proceedings of the World Summit on Sustainable Development. Johannesburg, South Africa. 26 August – 4 September. United Nations. [http://www.un.org/esa/sustdev/documents/WSSD\\_POI\\_PD/English/WSSD\\_PlanImpl.pdf](http://www.un.org/esa/sustdev/documents/WSSD_POI_PD/English/WSSD_PlanImpl.pdf)
- UN (undated). Sustainable tourism in Kenya. United Nations Division for Economic and Social Affairs, New York. <http://www.un.org/esa/agenda21/natinfo/niau/kenyanp.htm>
- UNCCD (2005). Action Programmes – Africa. United Nations Convention to Combat Desertification. <http://www.unccd.int/actionprogrammes/africa/africa.php>
- UNCCD (2004). FAQ. United Nations Convention to Combat Desertification. <http://www.unccd.int/knowledge/faq.php>
- UNCCD Secretariat (2003). Cotonou Declaration (Unofficial translation of the French version). Proceedings of the African Ministerial Conference preparatory to the sixth session of the Conference of the Parties (COP.6) to the United Nations Convention to Combat Desertification (UNCCD). Cotonou, Benin. 30 June-4 July. <http://www.unccd.entico.com/pdfs/reports/declaration-africa.pdf>

- UNCCD Secretariat (undated). Combating Desertification in Africa. United Nations Convention to Combat Desertification (UNCCD). <http://www.unccd.entico.com/english/basicfacts11.htm>
- UNCTAD (2004). *Economic Development in Africa - Debt Sustainability: Oasis or Mirage?* United Nations, New York and Geneva. <http://www.globalpolicy.org/soecon/develop/debt/2004/0930unctad.pdf>
- UNDP (2005). *Human Development Report 2005: International Cooperation at a Crossroads – Aid, Trade and Security in an Unequal World*. United Nations Development Programme, New York. [http://hdr.undp.org/reports/global/2005/pdf/HDR05\\_complete.pdf](http://hdr.undp.org/reports/global/2005/pdf/HDR05_complete.pdf)
- UNDP (2004). *Human Development Report 2004: Cultural Liberty in Today's Diverse World*. United Nations Development Programme, New York. [http://hdr.undp.org/reports/global/2004/pdf/hdr04\\_complete.pdf](http://hdr.undp.org/reports/global/2004/pdf/hdr04_complete.pdf)
- UNDP (2002). History of UNDP's Drylands Development Centre (formerly UNSO). United Nations Development Programme, New York. <http://www.undp.org/seed/unso/aboutus/history.htm>
- UNEP (2005). GEO Africa Data Portal. Global Environment Outlook. United Nations Environment Programme, Nairobi. [www.unep.org/geo/data/africa](http://www.unep.org/geo/data/africa)
- UNEP (2004). *Invasive aliens threaten biodiversity and increase vulnerability in Africa*. Call to Action. United Nations Environment Programme, Nairobi
- UNEP (2003). *Development of an Action Plan for the Environment Initiative of NEPAD: Programme Area 2 - Conserving Africa's Wetlands*. United Nations Environment Programme, Nairobi. <http://www.environment-directory.org/nepad/content/conserving.asp>
- UNEP (2002a). *Africa Environment Outlook: Past, Present and Future Perspectives*. United Nations Environment Programme, Nairobi.
- UNEP (2002b). *GEO-3 Data Compendium*. United Nations Environment Programme. <http://www.grid.inpe.br/geo3/index.htm>
- UNEP/DEWA/GRID (2006) Africa Database. United Nations Environment Programme, Nairobi. <http://gridnairobi.unep.org>
- UNEP/DEWA/GRID (2005) Africa Database. United Nations Environment Programme, Nairobi. <http://gridnairobi.unep.org>
- UNEP and NESDA (2004). *Rapport sur l'Etat de l'Environnement en Afrique de l'Ouest*. United Nations Environment Programme and Network for Environment and Sustainable Development in Africa, Nairobi
- USAID (2004). Locust Swarms Threaten Crops in Northwest Africa and the Sahel. *USAID in Africa*. Summer 2004, p. 5. [http://www.usaid.gov/locations/sub-saharan\\_africa/newsletters/docs/index/usaid\\_in\\_afr\\_sum04.pdf](http://www.usaid.gov/locations/sub-saharan_africa/newsletters/docs/index/usaid_in_afr_sum04.pdf)
- USAID (2003). Making Progress in Africa 2003. US Agency for International Development, Washington, D.C. [http://www.usaid.gov/locations/sub-saharan\\_africa/publications/docs/makingprogress03.pdf](http://www.usaid.gov/locations/sub-saharan_africa/publications/docs/makingprogress03.pdf)
- Vieta, F.E. (1999). Ecotourism propels development: But social acceptance depends on economic opportunities for local communities. *Africa Recovery*, 13 (1). <http://www.un.org/ecosocdev/geninfo/afrec/subjindx/131envir.htm>
- WCED (1987). *Our Common Future*. World Commission on Environment and Development. Oxford University Press, Oxford
- WDPA (2005) World Database on Protected Areas 2005. CD-ROM. United Nations Environment Programme-World Conservation Monitoring Centre and IUCN- The World Conservation Union. <http://sea.unep-wcmc.org/wdbpa/>
- WFP (2003). WFP Interactive Hunger Map. World Food Programme. [http://www.wfp.org/country\\_brief/hunger\\_map/map/hungermap\\_popup/map\\_popup.html](http://www.wfp.org/country_brief/hunger_map/map/hungermap_popup/map_popup.html)
- WHO (2004). *World Health Report 2004: Changing History*. World Health Organization, Geneva. [http://www.who.int/whr/2004/en/report04\\_en.pdf](http://www.who.int/whr/2004/en/report04_en.pdf)
- WHO (2001). African trypanosomiasis or sleeping sickness. Fact Sheet No. 259, March. World Health Organization, Geneva. <http://www.who.int/mediacentre/factsheets/fs259/en/>
- WHO/TDR (2002). African trypanosomiasis: Disease Information. World Health Organization / Special Programme for Research and Training in Tropical Diseases. <http://www.who.int/tdr/diseases/tryp/diseaseinfo.htm>
- WHO/TDR and Trends in Parasitology (2002). African Trypanosomiasis Poster. World Health Organization / Special Programme for Research and Training in Tropical Diseases. <http://www.who.int/tdr/diseases/tryp/files/tryp-poster.pdf>
- World Bank (2004). Kenya: Exporting Out of Africa - Kenya's Horticulture Success Story. The World Bank, Washington, D.C. <http://info.worldbank.org/etools/docs/reducingpoverty/case/120/fullcase/Kenya%20Horticulture%20Full%20Case.pdf>
- World Bank (2003a). *Land Policies for Growth and Poverty Reduction: A World Bank Policy Research Report*. The World Bank, Washington, D.C.
- World Bank (undated). AIDS Regional Update: Africa. World Bank, Washington, D.C. <http://www.worldbank.org/afra/aids/overview.htm>
- World Tourism Organization (2005). International Tourist Arrivals & Tourism Receipts by Country. <http://www.world-tourism.org/facts/menu.html>
- WRI (2005). *EarthTrends: The Environmental Information Portal*. World Resources Institute, Washington, D.C. <http://earthtrends.wri.org>
- WRI in collaboration with UNDP, UNEP and the World Bank (2003). *World Resources 2002-2004 – Decisions for the Earth, Balance, Voice and Power*. World Resources Institute in collaboration with United Nations Development Programme, United Nations Environment Programme and the World Bank. World Resources Institute, Washington, D.C.
- WRI, UNDP, UNEP and World Bank (2000). *World Resources 2000-2001: People and Ecosystems - the Fraying Web of Life*. World Resources Institute, Washington, D.C.