

SECTION 1

ENVIRONMENT FOR DEVELOPMENT





CHAPTER 1

THE HUMAN DIMENSION

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“However improbable it may sound to the sceptics, Africa will prosper!

Whoever we may be, whatever our immediate interest, however much we carry baggage from our past, however much we have been caught by the fashion of cynicism and loss of faith in the capacity of the people, let us err today and say – nothing can stop us now!”

THABO MBEKI, THEN DEPUTY PRESIDENT OF SOUTH AFRICA (MBEKI 1996)

INTRODUCTION

The productivity and sustainability of Africa’s environment is heavily dependent on how this asset is managed. This, in turn, can affect the availability, stocks and functioning of the remaining assets, either enhancing opportunities or putting livelihoods at risk. The range of livelihoods, with its opportunities for human development and alleviating extreme poverty and hunger, extends from total dependence on natural resource systems either for subsistence or as part of business, to total dependence on wage earnings, from trade or industry.

National and local aspirations for sustainable development are linked to the integrity of natural resources and the environment. It is, therefore, critical to conserve and sustainably use the region’s environmental assets, not only from an environmental perspective but also as a sustainable resource to support human well-being and development and as a sink for wastes from production processes. Over 70 per cent of Africa’s population is rural and depends directly on the land and the natural environment for its livelihoods and well-being (IFAD 2001). Thus, how environmental goods-and-services are used will have practical consequences for alleviating poverty, improving human well-being, and ensuring sustained economic development.

The environment and human development are the principal focuses of sustainable development. The challenges faced by African governments are many and complex. Governments must reduce human vulnerability to environmental change and hazards, improve standards of living and generally enhance human well-being. They have to provide social services and security, ensure adequate functioning of infrastructure, provide a climate conducive to investment, economic growth and employment generation, as well as pay their debts while at the same time ensuring that the environment which supports much of its economy and livelihoods is used sustainably. The challenges of meeting the needs of the present generation must be realized without compromising those of future generations. Successfully delivering on all these fronts requires not only good national and regional policies but also supportive global policies and practices. How Africa positions itself globally is critical: it must capture the benefits associated with globalization while at the same time trying to minimize the negative impacts of inequitable relations. Globalization is bringing with it both new opportunities and risks. In the health sector, diseases, such as SARS and avian flu, have the potential through the increased movement of people and goods to impact on already stretched health services. Africa will need to increase its preparedness to respond to such risks. The

complex relationship between different sectors – including health, transportation, human resources, technology, water, forests – and their multiple implications for poverty, well-being and development will need to be faced head-on.

Over the past two decades, African countries have sought to consolidate their efforts towards sustainable development despite the economic difficulties the region has experienced. Many countries have embraced access to a clean and productive environment as a fundamental human right for their citizens. At the regional and sub-regional level, Africa has also adopted forward-looking responses. A healthy environment is seen as critical to the success of Africa's development agenda, and to achieving the various goals and targets of the Millennium Development Goals (MDGs), the World Summit on Sustainable Development (WSSD) Johannesburg Plan of Implementation, the New Partnership for Africa's Development (NEPAD) and its Environmental Action Plan (NEPAD-EAP). The MDG targets are listed in Annex 1.

New efforts have been made to reconcile economic development and environmental sustainability. The Brundtland Commission in 1987 noted that, "The downward spiral of poverty and environmental degradation is a waste of opportunities and of resources. What is needed is a new era of economic growth – growth that is forceful and at the same time socially and environmentally sustainable." (WCED 1987). Five years later, the Earth Summit reinforced the Brundtland Commission's measure of the interdependence of environment and development, stating in Agenda 21: "Integration of environment and development concerns and greater attention to them will lead to the fulfilment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future." (UN 1992). This message remains important and its challenges are being confronted head-on by Africa.

Through the African Union (AU) and NEPAD – the region's response to tackle poverty and hunger, underdevelopment, governance problems and environmental degradation – African leaders have recognized that a healthy and productive environment is a prerequisite for the successful implementation of its programmes. The environment is considered as one of the central building blocks of the NEPAD agenda from two important perspectives. First, African leaders recognize that underdevelopment itself constitutes a serious threat to the conservation of the environment. Second, and perhaps more importantly in the context of a development agenda, African leaders recognize the

inherent challenge to nurture environmental assets and to use them for the development of the region while, at the same time, preserving them for future generations. The core objectives of the NEPAD-EAP are to combat poverty and to contribute to socioeconomic development. New developments in science and technology, including in information and communication technology (ICT), have been recognized as potentially beneficial. The challenge lies in being able to apply these new developments to Africa's social and economic reality, to avoid risks to the environment and to seize the opportunities for human development.

Against the backdrop of today's information-driven and increasingly globalized economy, the contribution of the environment to the realization of Africa's development goals, as reflected in initiatives such as NEPAD, will not only be from the use of the resource base but also from the ability to leverage the total value of these environmental assets. The opportunities for development presented by the different environmental resources are considered in full in Chapters 2-7 of Section 2: *Environmental State-and-Trends: 20-Year Retrospective*. In natural resource valuation, value is not necessarily derived only from the use of the resources or commoditization, but also takes into account

● Integration of environment and development concerns and greater attention to them will lead to the fulfilment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future.

●
Agenda 21 (UN 1992)



Waterfalls in Bwindi Impenetrable National Park, Uganda.

Source: C.Lambrechts/UNEP

intrinsic and non-use values. Figure 6 shows use and non-use values. Non-use values include existence values (the value derived from the knowledge of the continued existence of the resource or service), bequest values (the value of leaving use and non-use options available for future generations) and option values (the value derived from having available future direct and indirect use values). Use values include consumptive use as well as indirect use derived from the environmental services, such as carbon sequestration.

ENVIRONMENTAL CHANGE AND SOCIOECONOMIC FACTORS

Various human factors drive, influence and affect environmental change at the global, regional, national and local levels.

Drivers of environmental change vary in nature and scope but can be broadly grouped together as demographic, economic and social, science and technology, conflict and governance. Critical social dimensions include poverty and health. Policy and institutions, although most often thought of as the response to mitigate such change, may also drive environment change and impact directly on human vulnerability. Although each driver is discussed individually, there are links between the different drivers – sometimes acting in concert to maximize negative impacts and sometimes producing positive change.

DEMOGRAPHIC CHANGE

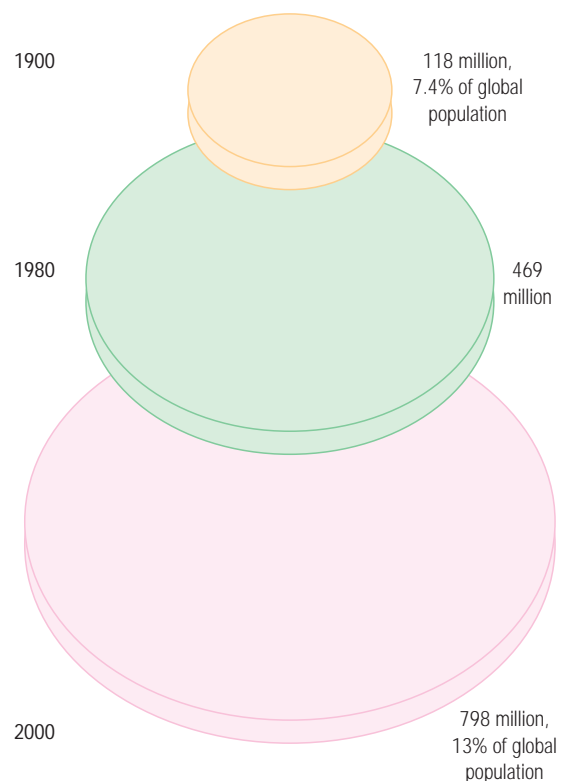
People in Africa are at the centre of sustainable development – in rural and urban areas. Although still largely rural, the region has been experiencing major transformation in terms of population composition and distribution, with positive and negative implications for the environment and development. The challenge is not to arrest development but to use the available resources in a more productive and efficient manner, ensuring better and more equitable returns to people while at the same time lessening pressure on the environment.

Changing demography, and particularly the changing age structure of the population, a high rate of urbanization, and a faster rate of population growth in relation to economic growth are major drivers of environmental change in Africa, with significant impacts on the natural resource base. Due to this, it is imperative that population growth and its structural changes are addressed to reduce environmental degradation. Each year, the number of people increases, but the amount of

natural resources with which to sustain this population, to improve the quality of lives and to eliminate poverty remain finite (WCED 1987), increasing the challenge of sustainable development. Demographic change is the major driver of land cover change: its primary and most direct impact is through opening new land for agricultural, settlement and infrastructural development (UN Millennium Project 2005a), although other extractive activities such as logging and mining are also significant. Section 2: *Environmental State-and-Trends: 20-Year Retrospective* assesses the state of Africa's environmental assets and some of its chapters also consider the relationship between human settlement and environmental change.

At the beginning of the 20th century, the total population of Africa was about 118 million, accounting for 7.4 per cent of the global population (United Nations Population Division 1996). From 1980 to 2000, it grew from 469 million to 798 million, representing 13 per cent of the world population in 2000 (FAO 2003). By 2020, the urban population is expected to be 646 million up from 302 million in 2000 (FAO 2003). While insufficient data exists to accurately ascertain the magnitude of urbanization, available statistics indicate a current rate of urbanization in Africa of around 3.5 per cent per year (UNCHS 2001). This

Figure 1: Population growth in twentieth-century Africa



Source: Data from FAO 2003

● By 2030, the proportion of Africa's urbanized population is expected to reach 53.5 per cent, compared to 39 per cent in 2005.

● compiled from WRI 2005

rate is the highest in the world, and is resulting in the rapid growth of urban agglomerations throughout the region. By 2030, the proportion of Africa's urbanized population is expected to reach 53.5 per cent, compared to 39 per cent in 2005 (compiled from WRI 2005). This fast rate of urbanization places strain on infrastructure and other services. Many of the newly urbanized live in slums. There is a growing and urgent need for integrated approaches to environmental planning and management.

In the absence of alternative livelihood opportunities and strategic management of the environment, this rapid population growth and urbanization has resulted in environmental degradation and resource depletion. Between 1990 and 2000, Africa lost 52 million hectares of forests: this amounts to a decrease of 0.8 per cent per year and 56 per cent of the global total (FAO 2003). It is estimated that 60 per cent of the tropical forest areas cleared in Africa as a whole between 1990 and 2000 were converted to permanent agricultural smallholdings (UNEP 2003). However, migration to urban areas is not inevitably destructive, nor does it necessarily lead to the formation or growth of dangerous and unhealthy slum areas (IOM 2005a). It is important to recognize the valuable role urbanization can play in stimulating the economy. The challenge lies in reversing the current pattern, and enhancing the efficiency of and the value derived from natural resource use.

Over the last 20 years, Africa's population has got younger, primarily as a result of the impact of HIV/AIDS, but also due to other setbacks. In 2003, more than 40 per cent of the region's population was below the age of 15 years (FAO 2003). Given this, the youth are becoming increasingly important in natural resource management. The lack of employment and other livelihood opportunities, as well as setbacks in education, health and other capabilities, may mean

that this generation will have increased natural resource dependence and pose new threats to the sustainability of marine and terrestrial ecosystems. Degraded environments may spur further social and economic conflicts and hardships.

Population growth presents a major challenge because of the patterns of production and consumption that shape the world, as well as the problems of pervasive poverty (Ness and Golay 1997). Population growth affects the natural resource base in many ways. First, it causes increased demand for food, water, arable land and other essential materials, such as firewood, in all areas. Second, expanded agricultural activities encourage encroachment into forest and woodlands. These consequences are more pronounced in the context of high levels of poverty. Third, the degradation of the natural resource base in turn impinges on the livelihoods of all, but particularly rural, communities. More small farmers are forced to work harder, often on shrinking farms on marginal land, to maintain household incomes (WCED 1987). The option of migration to new lands is virtually closed. In most cases, the impacts vary for men and women depending on the gender relations within the social unit (household, community, livelihood system) that regulates access to and control over resources and management responsibilities. Fourth, global population growth and the increasing demand for fossil fuels and other resources, also places new stress on Africa's environment.

HIV/AIDS has had a significant impact on human capacity with severe economic, social and environmental consequences. Of the 45 most affected countries globally, 35 are in Africa. More than 25.8 million Africans are living with HIV/AIDS (UNAIDS and WHO 2005). Sub-Saharan Africa (SSA) is home to just 10 per cent of the global population but has more than 60 per cent of all people living with HIV (UNAIDS and WHO 2005). In SSA, the adult prevalence rate has

Table 1: Population changes in Africa (million)

Sub-Region	1980	1990	2000	2010	2020
North Africa	109	140	170	209	239
East Africa	104	141	182	230	269
Southern Africa	70	90	113	129	150
Central Africa	54	74	98	127	164
West Africa	132	178	234	278	344
Total Africa	469	623	797	973	1 166

Source: FAO 2003. [Data from World Bank 2002; Africa Development Bank, 2000]

Expanding settlement in the Atlas Mountains, Morocco.

Source: J.C. Mohamed-Katerere



gone down marginally from 7.3 per cent in 2003 to 7.2 per cent in 2005. There is considerable variation between countries. In Zimbabwe, the epidemic is declining (from 26 per cent prevalence among pregnant women in 2002 to 21 per cent in 2004) and there is some suggestion of a similar trend in Kenya, Uganda and Burkina Faso (UNAIDS and WHO 2005). For other countries the threat continues to grow and is particularly severe in South Africa, Nigeria and Mozambique. In Northern Africa, several countries are experiencing an increase in the prevalence of HIV/AIDS, including Algeria, Libya and Morocco (UNAIDS and WHO 2005). Life expectancy at birth in SSA has been reduced from 50 in 1990 to 46 in 2002 (World Bank 2005a) as shown in Annex 2, Table 1a: *Sub-Saharan Africa Region Socioeconomic Indicators*. The productive labour sector has been particularly hard hit by the high mortality in the 20-50 age bracket (FAO 2003). The loss of productive capacity is monumental (UNAIDS 2005, FAO 2003) and results in a decrease in disposable income, increased food insecurity and an increased dependency on the natural resource sector. At the same time, the loss of the most knowledgeable and productive age groups impacts on environmental managerial capacity. There is a significantly higher prevalence among women, due to unequal education and inequitable gender relations (UNAIDS and WHO 2005). The disproportionate impact of HIV/AIDS on women is particularly significant from an environmental perspective, as women in many parts of Africa assume major responsibility for natural resource stewardship (Oglethorpe and Gelman 2004). This

demonstrates the importance of meeting MDG 3, to promote gender equity and empower women, not only from a rights perspective but also because of its environmental significance. The realization of this goal is closely related to MDG 2 on achieving universal primary education. Health, food security and environmental degradation are closely linked, and a negative change at any of these levels may have implications for the others.

Conflict affects population distribution and is a leading cause of internal migration. Africa now has more than 7.3 million refugees, 3 million more than in 1990 (FAO 2003). This places new pressures on environmental resources. In crisis situations, a large number of people may be displaced in a short period of time, causing a high level of environmental stress in the place where they are relocated due to increased demand and lack of preparedness. The depletion and deterioration of the areas in which camps are located are often related to the high demand for wood for shelters and energy. The inherent competition between local groups and forced migrants over access to natural resources may polarize social relations in refugee settlement areas and undermine opportunities for collaborative environmental management (Ertegun 2002). State-initiated resettlement initiatives to make way for development and conservation, such as dams and national parks, may also result in large-scale displacements that impact negatively on environmental resources and well-being more generally. Chapter 12: *Environment for Peace and Regional Cooperation* discusses the complex relationship between conflict

and environmental change, and how the environment can be used as a vehicle to improve cooperation.

Migration has important implications for development, both positive and negative. Although it contributes to the transmission of disease, the introduction of alien species and the loss of skilled personnel, it may also bring new economic opportunities. The United Nations Economic Commission for Africa (UNECA) and the International Organization for Migration (IOM) estimate that between 1960 and 1975 more than 27 000 highly skilled Africans left the region for industrialized countries. This rose to 40 000 between 1975 and 1984 and then almost doubled by 1987, representing 30 per cent of the highly skilled labour stock (IOM 2005a). It is estimated that since 1990, at least 20 000 highly skilled and qualified persons leave the region annually (IOM 2005b). Although the loss of skilled people has negative impacts on the economy and other sectors, it also contributes to development through significant remittances and the enhancement of capacity of those that have left, in terms of skills and experience, potentially building an important human resource for Africa. Internal transnational migration in Africa is significant – the profile of such migration has changed from being unidirectional and permanent to being increasingly temporary, seasonal and circular. Africa has the most mobile populations in the world: there are many reasons for migration – one important motivation is to cope with ecological and economic problems (IOM 2005b).

SOCIAL CHANGE

Improved human well-being is a crucial objective of sustainable development and is closely linked to environment goods-and-services.

Human well-being is multidimensional and requires access to resources to live a good life in good health, such as income, food, clean water and energy; personal security through the absence of conflict, the ability to mitigate environmental disasters and good governance; good social relations which include all people and promote fairness and equity; and the opportunity to make choices (MA 2005a). This implies a condition in which people are not just physically well, but have choices and live in dignity. The extent of well-being, as reflected in income, health, education and inequity, is an indication of how successful or unsuccessful development policies have been. In turn, the well-being of people affects their ability to effectively and sustainably manage resources. How these social factors impact on the environment is a product of a complex cultural milieu.

The Human Development Index (HDI) measures the state of human development at the global, regional and national levels and offers an opportunity to make comparisons over time. It looks specifically at the state of development in terms of the goal of increasing people's choices and their ability to live a long and healthy life, to acquire knowledge and to have access to resources needed for a decent standard of living (UNDP 2005). Other human development indicators look at the extent of inequality between rich and poor as well as between men and women; the consumption of environmental resources such as energy; the level of personal security through measures related to refugees, armaments, violence and crime; and the existence of good social relations through the enjoyment of human and labour rights. Between 1990 and 2003, globally, 18 countries, 12 of which are in Africa, experienced reversals in human development, affecting some 240 million people (UNDP 2005). There has also been an increase in the number of African countries identified as having low human development, from 17 countries in 1990 to 30 countries in 2005 (UNDP 2005). Extending human development achievements requires not only reducing income poverty but also making improvements across a broad range of areas. Progress towards achieving the MDGs is presented in Annex 1, Table 2: *Progress to meeting the MDGs*.



Clay pots drying in the open air at an artisanal pottery enterprise, Khartoum, Sudan.

Source: J. Maillard/ILO

Masai women, who support themselves by selling beaded artwork and jewellery, welcome WAVE participants to the Ngong Hills, Kenya.

Source: UNEP



Gender and divisions of labour

Gender relations and the divisions of labour are important factors in the economic development, human well-being and environmental stewardship in Africa and therefore need to be part of an integrated environmental management approach.

Gender inequity, and its impact on resource management, is shaped by many factors including unequal access to basic facilities, such as education and health care, differences in income, the extent of social and political inclusion, as well as social and cultural factors. All these impact upon the choices and opportunities women have, and ultimately on how they use and manage natural resources. African countries generally rank very low on the Gender-related Development Index (GDI): they constitute 35 out of the 40 countries with the lowest GDI ranking (UNDP 2005). However, African countries perform much better in the Gender Empowerment Measure (GEM) with, for example, several African countries having higher rates than the global average for participation of women in parliament (UNDP 2005).

The differential access and control of natural resources by men and women determine how much influence they have on environmental management. In many African societies, productive and parenting roles are clearly divided along gender lines. Gender roles, however, are complex and shaped by other factors, such as age and position in the family. For example, rural women in many parts of Africa are responsible for child rearing, the nutritional and health needs of the family, food production and weeding of crops, while men open up the land. In many places, women are the primary custodians of environmental resources by virtue of their position in the household, giving them

responsibility for managing energy, water and farming among other things. They are often the repositories of indigenous knowledge and the promoters of biodiversity conservation and environmentally-friendly management (UNEP 2005).

Labour divisions may also be gendered. In rural Africa, for example, women and girls are almost always the exclusive suppliers of water for household use (Dankelman 2004). They play a lead role in the provision of water for animals, crop growing, and food processing. It is often women who decide where to collect water, how to draw, transport and store it, what water sources should be used for which purposes, and how to purify drinking water. Women make a disproportionately high contribution to the provision of water for family consumption in comparison to men. In many countries, women and children spend much time on water collection, effectively reducing the time for other valued activities (Gordon and others 2004). Gathering non-timber forest products (NTFPs), such as edible foods, is predominantly children and women's responsibility. For example, in the mountain areas of east Africa, women expend close to a third of their daily calories in collecting and supplying water to their homes and communities (UNEP 2005). Degradation, deforestation or the extension of prohibitions on resource extraction may further penalize women in rural areas who already have to travel long distances to collect water or fuelwood. Collection activities compete for time spent in food preparation, child care and providing for the household's nutrition (Picard 1996) and reduce free time and thus limit the opportunity for women to pursue other interests. Technological developments are changing the gender landscape of labour. Where water collection involves long distances,

men may now use bicycles or carts for water transportation, freeing women from this task.

In some instances, however, the division of labour and respective roles give men the opportunity to be custodians of some environmental knowledge. Among nomadic pastoralists, it is the men who take the cattle out on two-day watering regimes and to far-off grazing lands, and deal with predators and raiding.

In urban areas, many women are involved in urban agriculture to supplement household food security and income. Many also participate in markets, selling produce and other wares derived from natural resources.

Given the multiple ways environmental management is gendered, policies and technologies must be gender sensitive. Women need to be empowered to be able to participate more effectively in policy processes and environmental decision making.

Health

Good health is essential for people to maximize the opportunities available and is closely linked to the state of the environment. Poor environmental management exacerbates the incidence and negative health impacts of many “natural occurrences” such as floods, droughts and

cyclones. Degraded environments also place strain on the ability to meet needs for medicines, food and energy – all central to health. Certain development activities, including agriculture and industry, may strain environmental systems through pollution and environmental degradation, which in turn affect human health.

Environmental hazards comprise a significant portion of the health risks facing the poor, and children bear the brunt of this. Although children constitute only 10 per cent of the world’s population, they suffer 40 per cent of the environment-related burden of disease (WRI and others 2005). This disease burden is closely associated with environmental management practices and the opportunities available to poor people. Malnutrition is a crucial contributing factor to the impact of disease and is linked to land management and productivity, which in turn are related to environmental changes such as salinization and climate change. In SSA, infant mortality showed a decline from 143 per 1 000 in 1970 to 105 per 1 000 in 2003 (UNDP 2005). However, in parts of SSA, child mortality is still increasing. The overall reduction is largely due to a decrease in deaths from diarrhoeal diseases and the increased use of vaccines. Acute respiratory infection

Figure 2: Child diseases and clean water

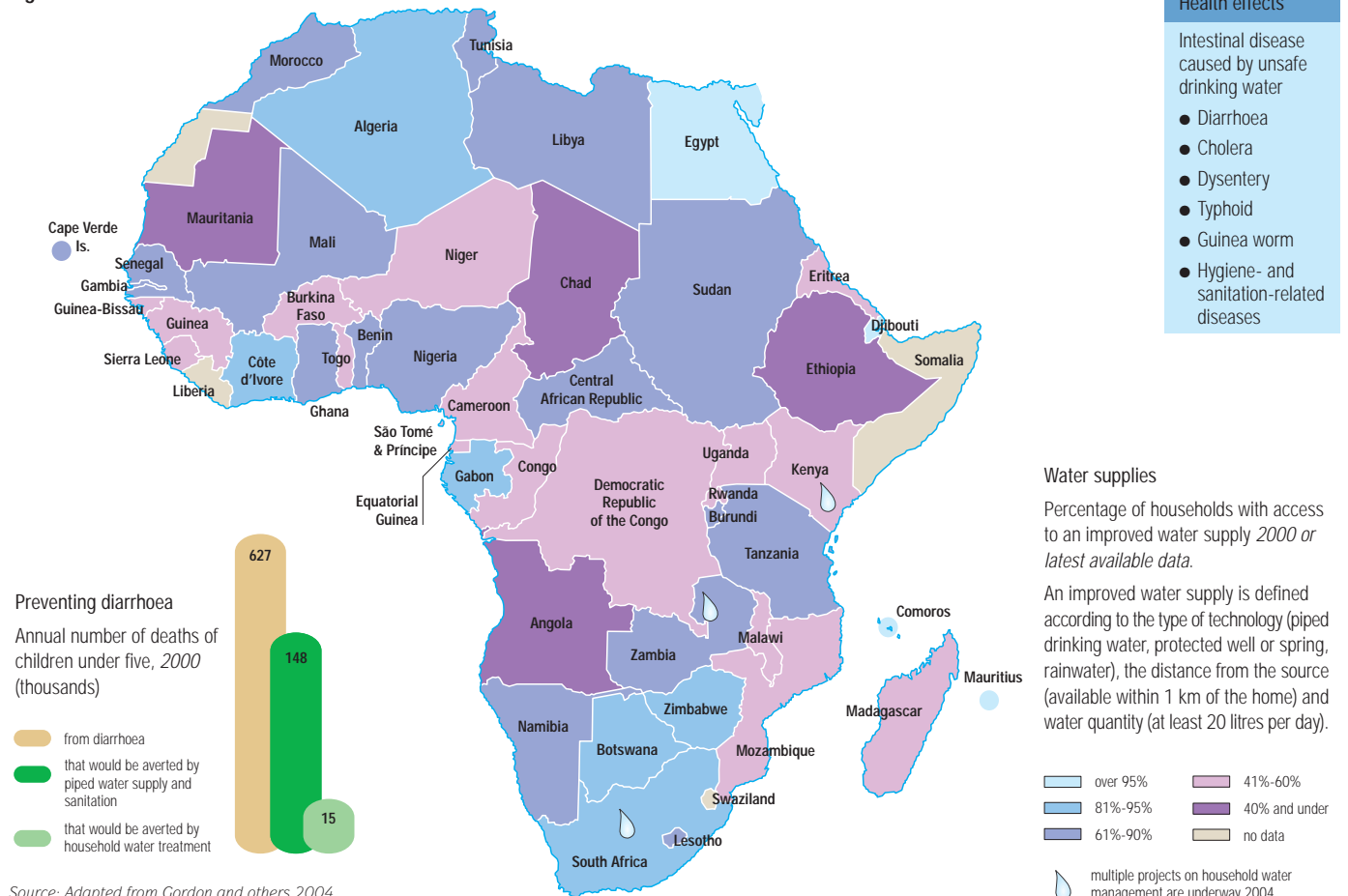
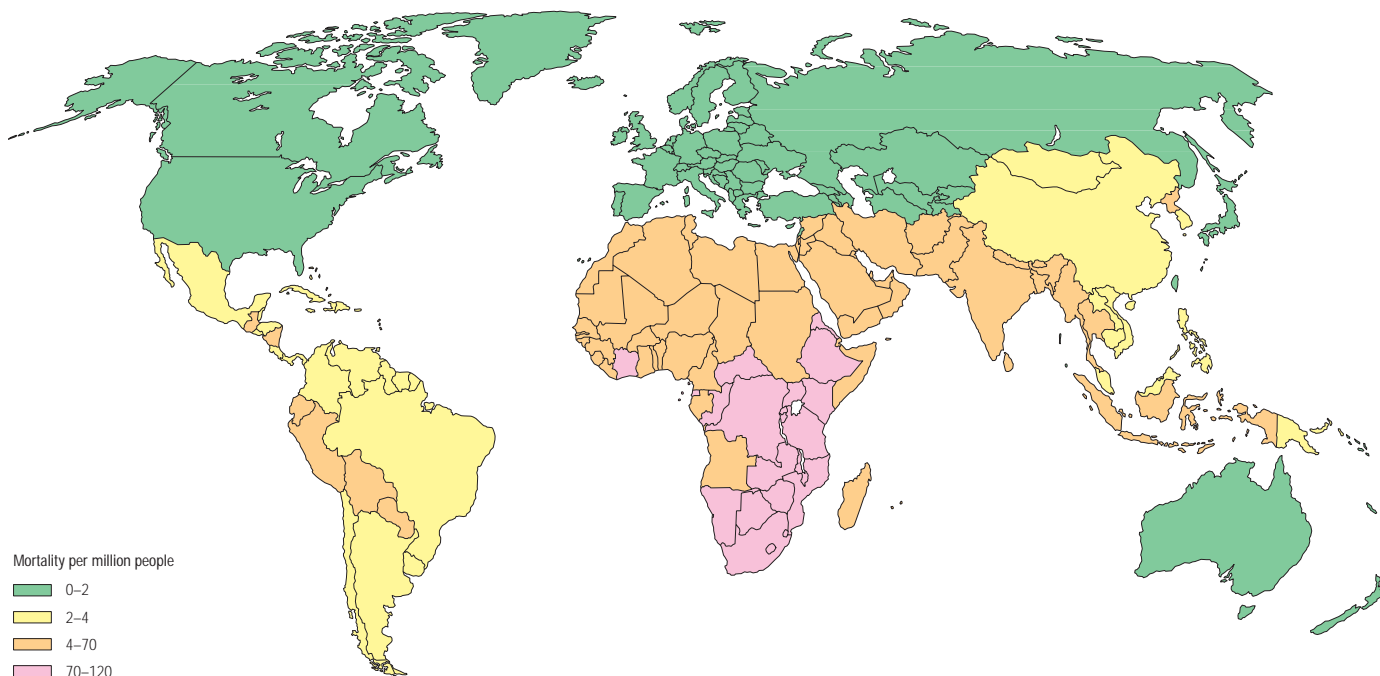


Figure 3: World Health Organization estimated mortality attributable to climate change by the year 2000



Source: Patz and others 2005

and malaria, alongside neonatal mortality, remain primary causes of death for children under five. Inadequate sanitation and unclean water are still major threats, causing the deaths of an estimated 1.8 million people worldwide each year, of which 1.6 million are children (Gordon and others 2004). Improving water quality can have major improvements on child mortality as shown in Figure 2. In most of Africa, more than 75 per cent of households depend on biomass for energy for cooking (Gordon and others 2004); in some countries this rises to as much as 90 per cent of households (Warwick and Doig 2004). Indoor air pollution presents a major health risk for poor people dependent on fuelwood for energy, and children under five account for more than half of the 1.6 million deaths per year (Warwick and Doig 2004).

Although Africa has some of the lowest per capita emissions of greenhouse gases that cause global warming, it carries the greatest burden of climate-sensitive diseases (Patz and others 2005). Vector-borne diseases, such as malaria, dengue fever, schistosomiasis, and chagas disease, could expand their ranges as temperature and rainfall patterns change (WRI and others 2005). Malaria is a major cause of death in Africa. Mosquitoes are among the first organisms to expand their range when climate conditions become favourable, so cases of malaria and dengue fever may increase their already heavy toll among the poor (WRI and others 1998). Higher

temperatures and humidity may promote the growth of diarrhoeal organisms increasing health risks (WRI and others 2005) and reducing human well-being. This high disease burden is in part due to Africa's low capacity to adapt to the new risks and the challenges associated with a high incidence of poverty. Global climate change not only presents new region-specific health risks, but also a global ethical challenge (Patz and others 2005).

Many African countries prioritized the development of health services from as early as independence. Efforts included the expansion of access to primary health-care facilities, increased spending in the health sector and investment in human capacity. This prominence has continued with the implementation of health sector strategies and, since 2000, programmes to meet the MDG health targets. In many countries, significant improvements have been made in selected health-care indicators, like infant mortality rates and life expectancy. However, cutbacks in health budgets, privatization of health services, and structural adjustment programmes which diverted public spending away from social sectors have reversed the gains made over the past two decades in many countries. In addition, many African countries have lost health professionals to the developed countries where they are able to obtain better benefits. It is estimated that 23 000 health-care professionals emigrate annually from Africa (IOM 2005b). For example, between 1993 and 2002, Ghana lost 630 medical doctors, 410 pharmacists, 87 laboratory

technicians and 11 325 nurses; in 2002 alone, 70 doctors, 77 pharmacists and 214 nurses left Ghana (IOM 2005b). Zimbabwe, South Africa and Nigeria have all suffered significant losses of health personnel (IOM 2005b). The 27 most powerful countries – also members of the Organization for Economic Cooperation and Development (OECD) – saved a “staggering” US\$552 000 million by employing professionals trained in developing countries (IRIN 2005).

Unless there are significant inflows of external financial support to complement national health budgets, the situation is likely to worsen considerably, especially given the unabated threats from malaria and HIV/AIDS. Health challenges are monumental given pervasive poverty, the high rates of fertility, maternal and childhood mortality and malnutrition. Africa has two-thirds of the world’s known HIV/AIDS cases, 90 per cent of the world’s yearly malaria fatalities, and half of its female population is illiterate (UNECA 1999). The ability of African governments to meet the demands for providing basic services and utilities has decreased tremendously, aggravating social conditions as reflected in the low HDI status of many countries (UNDP 2005).

Education, knowledge and information

Knowledge and access to information are essential for effective environmental management and have significant impacts on the economy and the livelihood choices people make.

Indigenous knowledge systems based on centuries of observation and continually developed in response to changing social and environmental conditions are an important resource for many rural people. This knowledge base offers opportunities not only for conservation but also for the commercialization of wild resources, as demonstrated, for example, by the increasing markets for NTFPs, such as *Prunus africana*, *Harpagophytum procumbens* (devil’s claw) and *Kigelia africana* (African sausage tree). Trade in devil’s claw, a traditional medicinal plant, supports a US\$100 million industry, but most benefits go to processing and transformation actors along the marketing chain, and only a very low proportion goes to domestic producers. This pattern will continue as long as there is low investment in improving community skills and access to relevant information (Katerere and Mohamed-Katerere 2005). The opportunities presented by NTFPs are considered in Chapter 6: *Forests and Woodlands*. Literacy and the level of formal education is also an important factor affecting the kind of information people have access to, and thus the range of opportunities at their disposal.

The adult literacy rate is 67 per cent for people above 15 years of age (WRI 2005), with women having a higher illiteracy rate compared to men (WRI 2005). There is considerable variation between literacy rates in African countries, with Zimbabwe having 90 per cent adult literacy, Morocco 50.7 per cent and Burkina Faso 12.8 per cent (UNDP 2005). Improved literacy increases the capacity of people to communicate and to be reached through the electronic and print media, the capability to effectively participate in their communities and in broader governance issues, and provides new opportunities to engage effectively in the productive sector and the market.

In the absence of improved access to formal education, a considerable reduction in illiteracy rates, and accessible environment-related and functional education, opportunities available to most people will continue to be limited, with possible negative influence on the environment. Choices made in one sector may have a direct bearing on the environment. UNAIDS suggests that gender inequality in knowledge about HIV transmission is a key factor in the high levels of infection among African women (UNAIDS and WHO 2005). Given the important role women play as managers and as custodians of indigenous knowledge, this has ramifications for environmental management (Oglethorpe and Gelman 2004).



A wide variety of NTFPs for sale in Mfoundi Market, Yaoundé, Cameroon.

Source: Y. Katerere

Environmental degradation can affect access to education as children, especially the girl child, will spend more time collecting firewood and fetching water instead of attending school. In Malawi, for example, where more than 90 per cent of households use firewood as their main source of energy, children in fuelwood-scarce districts are 10 to 15 per cent less likely to attend secondary school (Nankhuni and Findeis 2003 in WRI and others 2005). The restoration of traditional forests in some areas has been shown to reduce collection times for fuelwood by on average several hours per day – a direct benefit to poor families (WRI and others 2005).

Poverty

Pervasive poverty and social inequities remain major constraints to sustainable development. Poverty is a cause and an effect of environmental degradation. The equitable, efficient and productive use of natural resources offers important opportunities for sustainable livelihoods which can contribute to reducing poverty.

Poverty is multidimensional: it is more than just the lack of access to financial resources – even though income is the most commonly used indicator of poverty – and material resources. It includes the lack of capabilities that enable a person to make choices to live a life that she or he values (Sen 1999). This includes access to income, health, education, empowerment and social inclusion, and human rights. Poverty may be synonymous with powerlessness, with a lack of access to information, institutions and voice (WRI and others 2005). There is considerable variation among poor people and the extent to which they are disempowered.

This is affected by various factors including gender, location (urban or rural), culture and ethnicity. Global inequity, particularly in trade, continues to be a major contributor to continued poverty in Africa. These relationships are discussed in Chapter 8: *Interlinkages: The Environment and Policy Web*.

In much of Africa, income poverty is particularly severe. There is, however, considerable variation between income poverty levels: less than 15 per cent of Morocco's population live on less than US\$2 a day, compared to Mali where about 91 per cent of people live on less than US\$2 a day (UNDP 2005). Between 1981 and 2001, the number of people living on less than US\$1 per day in SSA nearly doubled from 164 million to 313 million (Chen and Ravallion 2004). Seventy-eight per cent of SSA's population live on less than US\$2 a day. The proportion of people living below the US\$1 poverty line has declined in north Africa from 2.0 per cent in 1999 to 1.9 in 2001, while it has increased in SSA from 42.7 per cent in 1999 to 46.4 in 2001 (UN Statistics Division 2005).

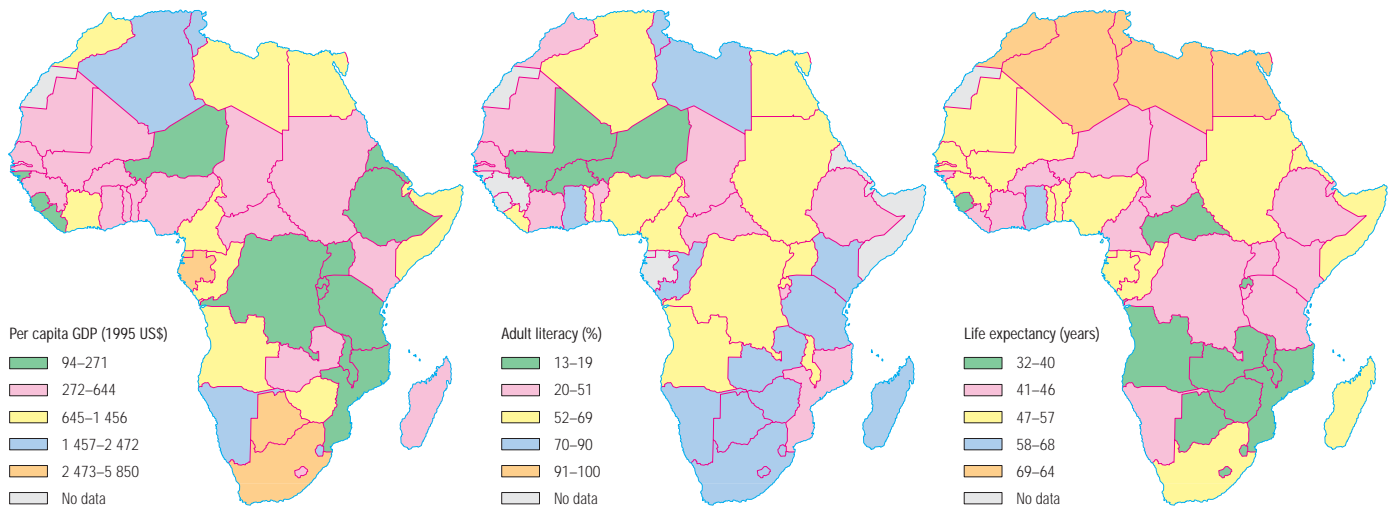
The Millennium Project identified the improvement of small-scale agricultural production, through the use of techniques which preserve natural assets, the restoration and improved management of desertified lands, and the protection of surrounding natural habitats, as an important strategy for addressing the MDG target 1 of halving the proportion of people living on less than US\$1 a day (UN Millennium Project 2005a). It also recommended actions in forest management, freshwater resources, fisheries and marine ecosystems, and climate change that could make a contribution to addressing this target (UN Millennium Project 2005a).



Woman using an improved energy cooking stove introduced by the Department of Women in Agricultural Development in Ghana.

Source: P.Cenini/FAO

Figure 4: The many measures of poverty



Well-being can be measured using indicators other than income poverty. Three maps of Africa show country-by-country variations in the indicators used by UNDP to annually measure human development: adult literacy, life expectancy at birth, and gross domestic product per capita. [Data sources World Bank 2004a and UNPD 2003, UNESCO 2004].

Source: WRI and others 2005

Across Africa, poverty is more prevalent in rural than in urban areas. The link between environmental resources and the livelihoods of rural people is widely acknowledged. Rural people rely on the environment for a range of goods-and-services. These services include provisioning (food, medicines and energy) and regulating services (such as water purification). Environmental goods may have important cultural and aesthetic values. Natural resources may serve as important safety nets during periods of stress. However, poor people are also more vulnerable to environmental disasters and risks, such as insect-borne diseases, including malaria, and unsafe water. Social and economic shocks from conflict, ill health, falling market prices and so on, exacerbate overall vulnerability.

Poverty may contribute to unsustainable resource use. Policies and institutions are major factors which limit the value poor people can obtain from a resource, effectively forcing them to harvest or use more in order to meet basic needs. Policies and laws that restrict use to subsistence, deny poor people access to value-adding activities which could generate significantly more income. Bureaucratic measures and inefficient economies may limit access to markets, financial resources and other support. Moving towards a regime which acknowledges natural resources as assets of poor people and which empowers people to use these resources efficiently and productively can have positive impacts on equitable growth and for sustainable development.

ECONOMIC CHANGE

Equitable and environmentally sustainable growth can improve human well-being and increase the range of opportunities available to people, including those who are most disadvantaged.

Africa has experienced its best economic performance in many years. In 2004 Africa grew at 5.1 per cent (OECD Development Centre and AfDB 2005), up from 3.7 per cent in 2003 (AfDB 2004). Between 1990 and 2003, Africa's economies grew at an average of 2.6 per cent annually. This improved growth has had a mixed bag of consequences, increasing opportunities to meet key MDG targets and improving human well-being, which can have positive spin-offs for the environment as options increase. However, SSA must grow on average at 7 per cent per year to reduce income poverty by half by 2015 (AfDB 2004). Only six African countries, mostly in north Africa, are likely to meet the MDG goal of halving the number of people living on less than a dollar a day. The MDGs remain underfinanced – by more than US\$40 000 million overall (OECD Development Centre and AfDB 2005). See Annex 1, Table 2: *Progress to meeting the MDGs*.

There is considerable variation between the economic achievements of countries in the region – with prices of oil and metals, low cotton and cocoa prices, dollar depreciation and euro appreciation, the locust plague in the Sahel region, rainfall, corruption, and political conflict and instability being important contributing factors (OECD Development Centre and

● Africa has experienced its best economic performance in many years – in 2004 it grew at 5.1 per cent.

● OECD Development Centre and AfDB 2005

AfDB 2005). Solid growth is expected to continue between 2005 and 2007 at an average rate of 4.7 per cent as the effect of new oilfields in Central Africa wears off. The high level of vulnerability to external shocks (such as prices and the loss of preferential treatment), environmental factors such as weather conditions, and conflict make these key areas for policy focus and collaborative initiatives (OECD Development Centre and AfDB 2005). This close relationship to the environment is indicative of the need for better environmental monitoring and, in particular, risk and disaster warning systems to support greater preparedness and more effective responses.

Production and consumption

Changing production and consumption patterns, globally and in Africa, and the way in which growth is achieved have direct implications for African livelihoods and their sustainability.

Global economic policy dealing with tariffs, import quotas and crop subsidies has direct impacts on the livelihoods and opportunities of people in Africa (WRI and others 2005). The relationship between global economic policy and practice and economies, livelihoods, human well-being and the environment in Africa is discussed in Chapter 8: *Interlinkages: The Environment and Policy Web*.



Fishermen pulling their nets in Cape Verde.

Source: M. Marzot/FAO

At the national level, growth of the economy can result in both positive and negative effects on well-being and environmental resources. For example, economic expansion may provide new livelihood opportunities to more people through job creation as well as through diversifying livelihood options. Growth must be equitable and specifically focus on delivering benefits to poor people. However, growth may endanger the sustainability of livelihoods depending on how it is carried out with respect to environmental integrity. For instance, when fishing is done in an unsustainable manner, short-run benefits will be accrued, but at the same time sustainability of catch will be impaired through depletion and, therefore, affect long-term benefits.

Although in 2000 Africa accounted for 13.6 per cent of the world population, its gross domestic product (GDP) was just under 1.7 per cent of the world's GDP (UNDP 2005). For SSA, GDP per capita, using purchasing power parity (PPP), amounted to US\$1 856 compared to the average for countries with high human development of US\$25 665 (UNDP 2005). This is significant for purchasing power, savings and investment growth rates as well as resources available to governments and individuals, making them more reliant on the natural resource base for their basic needs. The GDP per capita (PPP) across the region varies considerably, with Equatorial Guinea having an average GDP per capita of US\$19 780, South Africa US\$10 346 and Sudan US\$1 910 (UNDP 2005). Inequity within a particular country is clearly important for how this benefit is actually spread. Unequal growth remains a major challenge for Africa – income distribution is highly skewed, with 40 per cent of the population receiving only 11 per cent of income, while the richest 20 per cent gets 58 per cent of income (FAO 2003). Income inequality is particularly evident across the urban-rural divide (World Bank 2005b).

Export of natural resources remains a major factor in the economies of many countries. Instability and adverse price trends drive countries to exploit more resources to meet their domestic and foreign obligations, including debt servicing, at the expense of long-term sustainability of the resources.

Africa's economies are more reliant on agriculture than those of any other region, with around 70 per cent of Africans working in the agricultural sector (FAO 2003). About three-fifths of African farmers are subsistence farmers tilling small plots of land to feed their families, with only a minimal surplus that can be sold. Although agriculture is a major employer, employing 56.5 per cent of Africa's total labour force (FAO 2004), it contributes only 14 per cent of GDP,



The use of mobile sawmills give SMEs the opportunity to add value to timber logs and to increase their earning potential.

Source: P.Reidar/CIFOR

while industry and services contributed 29 per cent and 57 per cent respectively (see World Bank, Annex 2, Table 1b: *Sub-Saharan Africa Region Socioeconomic Indicators*). This table also shows that agricultural productivity, in terms of value-added per agricultural worker in 1995 dollars, declined between 1988-90 and 2000-2002 periods from US\$382 to US\$360. This means that, with high dependency on agriculture and falling productivity at the same time, poverty is increasingly entrenched in rural Africa. The contribution of natural resources to GDP is often undervalued.

In terms of mining and drilling, Africa's most valuable exports are its minerals and petroleum. These activities are concentrated in only a few countries. South Africa, Namibia, Botswana and the Democratic Republic of the Congo have substantial reserves of gold, diamond and copper. Nigeria, Angola, Gabon, Libya, Algeria and others export significant amounts of petroleum. These areas make up the vast majority of mineral and petroleum exports from Africa (OECD Development Centre and AfDB 2003). This has been the focal point

for foreign direct investment (FDI) which has been driven primarily by developed countries' needs.

With respect to manufacturing, Africa is the world's least industrialized region. Despite large local supplies of cheap labour, almost all of the region's natural resources are exported elsewhere for secondary processing. The lack of value-adding activities means that the full potential from natural resources is not being earned within African countries. Only about 15 per cent of employment is generated by the manufacturing sector. Industrial sector restructuring and reform measures have led to a collapse of industries in some countries and hence the declining share of manufacturing to total economy. While industrial development offers important opportunities, it also creates certain risks, particularly in the management of pollution and human health. There is evidence that developed countries are relocating their chemical industry to developing countries.

The 1980s and early 1990s witnessed serious economic decline or stagnation in most African countries. Agricultural productivity failed to keep pace with the growth of population and suffered particularly from falling productivity in the export sector and from declining markets and prices. Population growth rates in the period 1990-2003 were higher than the growth of GDP per capita in 2003 at 2.5 per cent and 1.3 per cent respectively (World Bank 2005b). Food imports were and still are essential in most countries to maintain an adequate total food supply and, in certain cases, to keep food costs down. Debt has mounted and pressures on resource use have increased.

In response to the economic hardships of the 1980s, many African countries undertook programmes of economic reform with guidance from the International Monetary Fund (IMF) and the World Bank. These reforms, spearheaded by the Structural Adjustment Programmes (SAPs), aimed at stabilizing the economies, liberalizing exchange rates, freeing the productive energies of the private sector and opening up to trade and investment. As the negative impacts of these policies were realized, new approaches to economic planning and development have been adopted, including the now widely used Poverty Reduction Strategies (PRS).

Impacts of economic change on livelihoods and the environment

Macroeconomic reforms in Africa, epitomized by the SAPs, have had mixed impacts on the environment, mainly through the processes of livelihood diversification and increased human mobility.

A key response to the poor performance of the formal sector has been the diversification into and intensification of informal sector activities as people try to make ends meet. Many of these activities are based on natural resources and include carpentry and craft production, charcoal manufacturing, collection and trade of NTFPs, artisan mining and metal works. Although entry into many such activities is easy, their profitability and efficiency is undercut by bureaucratic controls, lack of investment and inadequate support for market engagement. There is little incentive for users to invest in technologies and to manage resources sustainably (FAO 2003). Since the 1990s, there has been a growing focus on other livelihood activities that could more effectively combine conservation and development interests, such as ecotourism and community-based conservation initiatives.

Livelihood diversification has always played some part in providing a “pathway” out of poverty for poorer groups of people (Barrett and others 2001). Since the mid-1980s, it has become evident that livelihood diversification has increased as a response to economic and social changes. These changes have led to a saturated agricultural labour market, reduced access to common property and increased mobility. In general, these programmes resulted in an increase in the number of people living in poverty and decreased access to social services, such as health and education.

Within the agricultural sector, many rural dwellers have sought to intensify their agricultural activities. Pastoralists in Tanzania, for instance, have adopted crop cultivation to supplement livestock keeping. Other activities include trading in a range of products including milk, firewood, animals and honey; wage



Agriculture is an important economic activity for many urban dwellers. Urban farmers in Nairobi, Kenya.

Source: Urban Harvest CIPSSA

employment, both local and outside the area, including working as a hired herder, farm worker and migrant labourer; renting property; and gathering and selling wild products, such as gum arabic, firewood, game trophies, bushmeat, live animals or medicinal plants. Market failures and the need for consumer items have become an important force pushing pastoralists into diversification using wildlife, ecotourism and consumptive utilization.

Good as these activities are in sustaining household livelihoods in the short run, if poorly managed they may have detrimental impacts on environmental resources. The indiscriminate felling of trees for agricultural expansion and timber products has laid watersheds bare, threatening the water catchment functions of forested watersheds. Pressure on water resources for various uses including domestic, livestock and industrial use, among others, has increased due to more extensive economic activities and population congestion in river basins, causing water allocation and use conflicts.

Other alternative income activities, such as artisan mining, have also been affected by economic changes. Artisan mining in Africa has been in existence for centuries, but its magnitude has increased since the mid-1980s as a result of livelihood diversification strategies and opportunities created by trade liberalization. An estimated 20 million people depend on artisan mining in Africa (Henriot 1998). In a number of countries, including Mali, Tanzania, Ghana, South Africa, Zambia and Mozambique, the role of artisan mining in improving livelihood for rural poor communities has been recognized and has accordingly been factored into national planning strategies. Artisan mining has been a major source of income, increasing the wealth of rural populations. This new income supports investments in agriculture and non-agricultural pursuits, and thus increases the options available to rural communities. Inadequate regulation and enforcement in the artisan mining sector has, however, led to serious environmental problems and risk to humans. Toxic chemicals are sometimes used in the extraction of minerals, such as gold, which end up in the rivers. Toxins bioaccumulate in fish and wildlife, which are sources of food for the same communities. Other environmental problems include deforestation, soil erosion, silting of rivers, landslides and mining accidents. It is estimated that the rate of occurrence of fatal accidents in small mining activities is six times higher than it is in larger operations (Gilman 1999).

Migration as a livelihood diversification strategy is important in providing much needed resources for investment in rural production through remittances

Box 1: Impact of mining on the environment and human health

Gold panners use an estimated six tonnes of mercury annually, of which half is lost during the amalgamation process. The extent of its impact is further spread since the panners dilute the mercury with water to increase quantities. When mixed with water, mercury is lethal to human beings and plants. The problem is that mercury has a long life – up to 30 years from the time of immersion. It is therefore active in water bodies for a long time, compounding the pollution and human health problems. A study of panners in Insiza District in Zimbabwe identified symptoms characteristic of occupational mercury poisoning: of those sampled, 60 per cent had general body weaknesses, 55 per cent had nausea symptoms, 50 per cent had lost teeth and 45 per cent had a history of respiratory diseases.

Source: Milne and Marongwe 1995

(Griffin 1976, IOM 2005a, IOM 2005b). In Ethiopia and Mali, for example, migration is widespread and in both countries it is linked to income generation strategies (McDowell and de Haan 1997). This is also the case for many countries in Southern Africa. Migration may represent a rational allocation of total household labour to maximize household utility (Bigsten 1996). In some communities, an increasing scarcity of traditional male labour, due to migration, has also promoted new roles for the women left behind. These women become the main decision-makers, particularly within the agricultural sector. The gendered division of family labour has in some instances changed as a result of the loss of male employment through urban job retrenchment, forcing women to seek additional income-generating activities to support the family (Adepoju 2004). The consequence has been that problems induced by environmental degradation, such as deforestation or decline in water quality, have far-reaching consequences on entire families as time spent on looking for wood or water directly affects the household incomes. Various policy responses seek to address these problems. Currently, several African countries are involved in the World Bank-initiated PRS, whose second phase includes the environment as an important aspect of poverty reduction. The PRS are discussed more fully in Chapter 8: *Interlinkages: The Environment and Policy Web*.

TECHNOLOGICAL CHANGE

Research and the development of new technologies can drive environmental change in positive and negative ways. They may increase the demand for natural resources, their application may impact on the integrity of ecosystems and they may offer an opportunity for more efficient use of natural resources, cleaner production techniques and improved environmental management. However, new technologies may also pose new risks to human and environmental health.

In the last 20 years, the advances in technology have been monumental. Key areas of development include more effective monitoring and assessment techniques, such as remote sensing, the transformation of ICT, biomaterial engineering, rapid advances in biotechnology and genetic modification, and more efficient and faster transportation. Technological innovation can offer important opportunities for responding more effectively to challenges in areas such as economic productivity, agriculture, education, gender inequity, health, water, sanitation, energy and participation in the global economy (UN Millennium Project 2005b).

The pace of technological change in Africa has been slow and is mostly linked to FDI; it has not contributed significantly to enhancing the availability of products and services required by Africa to promote development (FAO 2003). The Johannesburg Plan of Implementation commits the global community to making technological investments in Africa, particularly with a view to increasing the pace of industrialization, but also for



Mobile phones offer new opportunities for communications in remote areas.

Source: Y. Arslan/Still Pictures

improved management of resources, such as water and energy, and the improvement of service provision in these areas. Industrial growth without complementary investment in monitoring systems and health services is likely to create new levels of vulnerability for poor people.

Expenditure on research and development activities, as a percentage of GDP, is very low for African countries. However, there are inadequate statistics available for proper analysis. Developing country investment in research averages 0.9 per cent of GDP, compared to 2.5 per cent for OECD countries.

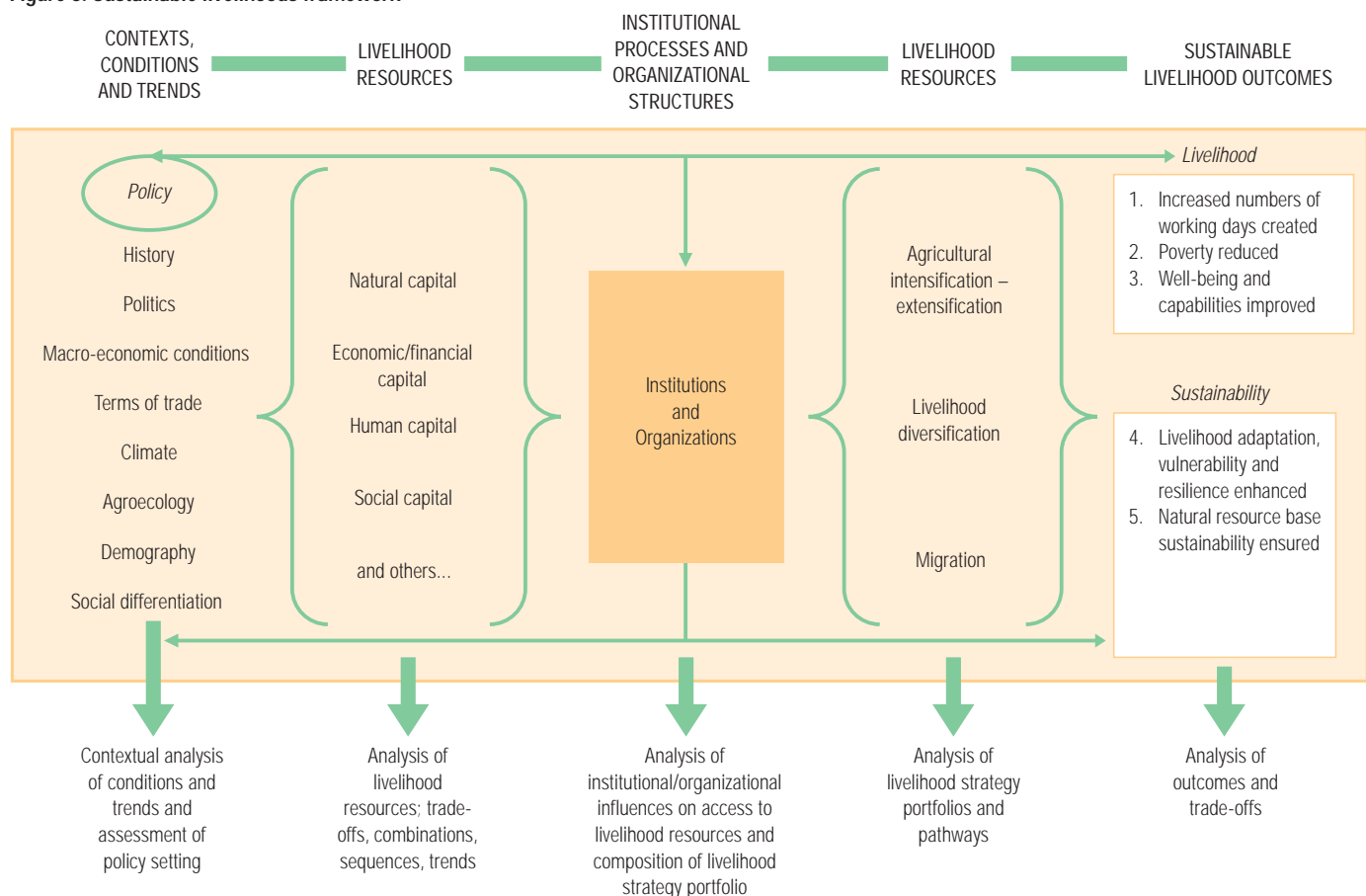
Information and communication technology at the global level have been significant drivers of economic change, but access to communication technology remains very low despite significant growth in this sector between 1990 and 2003, which increased economic opportunities and participation in global markets. In Burkina Faso, for example, in 1990 there were only two telephone main lines per 1 000 people, but by 2003 this had more than doubled to five lines per 1 000 people, compared to Equatorial Guinea where there was a 450 per cent increase over the same period from four lines per 1 000 people to 18 lines per 1 000 people (UNDP 2005). Other countries, such as

Zambia and Uganda, show no growth and Angola has experienced a decline (UNDP 2005). Levels of availability of main lines in 2003 varied significantly across the region, with 285 lines per 1 000 people in Mauritius, 156 lines per 1 000 people in Cape Verde and two lines per 1 000 people in the Congo (UNDP 2005). Access to cellular phones has increased dramatically, with an average of 54 subscribers per 1 000 people in SSA. Several countries, including Gabon, Morocco, Botswana, Tunisia and South Africa, have in the range of 200-400 subscribers per 1 000 people (UNDP 2005). The percentage of internet users is also very low (UNDP 2005).

HUMAN WELL-BEING AND LIVELIHOODS

Improving human well-being is at the core of sustainable development efforts in Africa. Environmental goods-and-services, including supporting services such as soil formation, provisioning services such as wood, regulating services such as water purification, and

Figure 5: Sustainable livelihoods framework



cultural services provide important opportunities for meeting human development goals (MA 2005a).

Human well-being is multidimensional. It is the ability of all people to determine and meet their needs and to have a range of choices and opportunities to fulfil their potential (Prescott-Allen 2001). It includes tackling a diverse range of challenges – environmental, social and economic – and widening the options available to people to make a living and to participate actively in society. Sustainable livelihoods that guarantee access and entitlement to a range of assets and opportunities are essential to achieving human well-being. Such livelihoods are not limited to, for example, a particular level of income, paid labour or ability to meet household food security, but must include opportunities for investment and business, national economic stability and reliable and accountable governance systems.

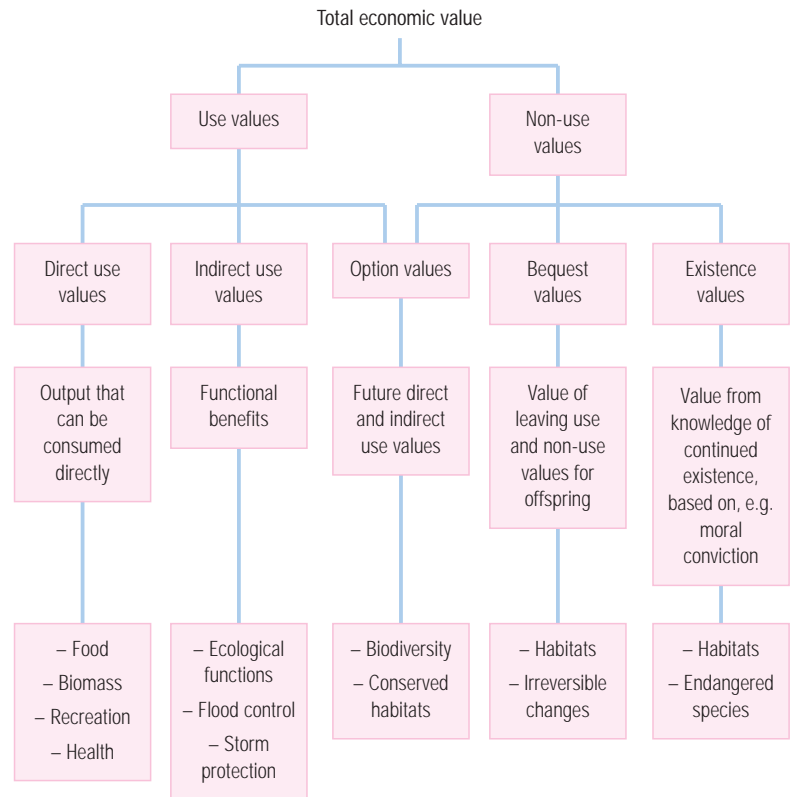
A livelihood comprises the capabilities, assets (including natural, social, human, physical and financial) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base (Scoones 1998). Figure 5 depicts the livelihood framework, illustrating the linkages between the various livelihood aspects.

Environmental and economic changes can introduce vulnerabilities to human well-being and undercut opportunities for development. Improved human well-being is critical to increasing the range of options, choices and responses people are able to make to mitigate and adapt to such changes.

Coping mechanisms, in poor communities, often include intensification of existing productive activity, diversification by adopting additional productive activities and migration to develop productive activity elsewhere.

Income and services derived from environmental resources, including land, forests and woodlands, freshwater and wetlands, coastal and marine resources, and wildlife (flora and fauna) are central to the livelihoods of many rural people and to Africa's economy as a whole. People derive multiple values from natural resources, including use and non-use values. Option values may include use and non-use aspects, and refer to the value placed on the resource as an option for further use. Existence value refers to the benefits derived from knowing the resource exists, such values often being associated with religious and cultural meaning. Bequest value is the value placed on being able to pass natural resource assets onto future generations. These values are reflected in Figure 6.

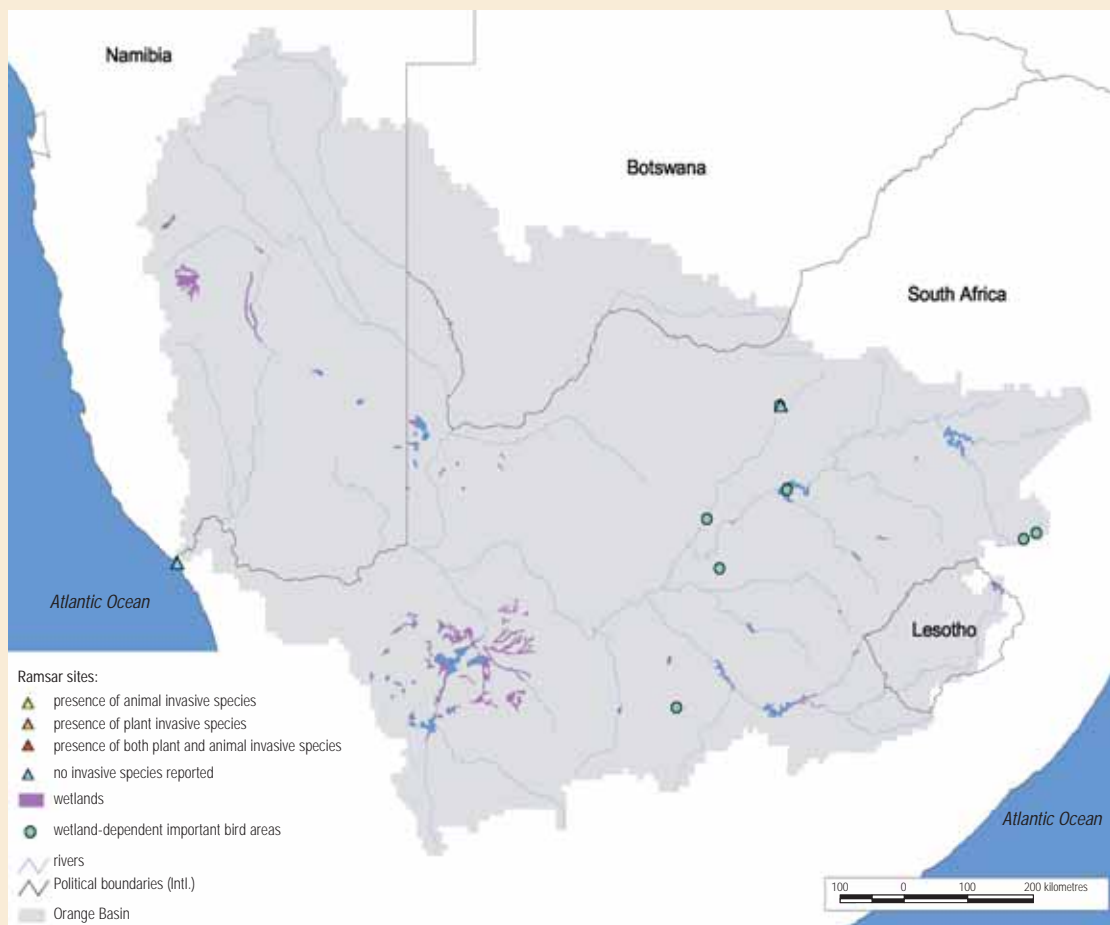
Figure 6: Total economic value



Source: Landell-Mills and Porras 2002. Derived from Munashinghe 1993

Poor people have not been able to effectively capture the full benefits associated with the use of natural resources. This is partly because resources are used primarily for subsistence and value-adding and marketing is neglected. Maximizing the opportunities requires moving beyond a subsistence framework which focuses on minimum or basic needs, to using the available resource in an efficient, equitable, productive and sustainable manner. Increasingly, livelihood approaches have focused on how this resource can be used as an asset for improved human well-being and promoting development. Options for increased investment, employment creation in processing, trade and related services, and small and micronatural resources-based entrepreneurship are increasingly considered. The commercialization of wild resources offers important opportunities for improving income and other aspects of well-being. Widening the options for poor people requires promoting opportunities for them to capture a greater share of the value generated through, among other things, better market access, less bureaucratic restraints on trade and better access to capital and other resources. Achieving better opportunities requires complementary policy development in other areas including good governance, tenure regimes and global trade.

Box 2: Natural resources as key assets



Arable land is an important asset, as most people in Africa rely on agriculture directly and indirectly for their well-being. Agriculture contributes more than 50 per cent to most African countries' economies, and in most countries is the basis for at least 70 per cent of livelihoods, whether through employment, income generation or subsistence food production (WRI and others 2005).

Forests provide a wide variety of highly valuable ecological, economic and social services, including: the conservation of biological diversity; carbon storage; soil and water conservation; and provision of employment, enhanced livelihoods and agricultural production systems (FAO 1999). Important non-timber forest products include edible products (such as mushrooms, wild fruits, wild vegetables, bushmeat and bee products) and livestock fodder, as well as goods-and-services (FAO 2005). Medicinal plants used in traditional medicine may be collected directly by the user or the traditional healers, while some are obtained through local markets. There is a growing export market for NTFPs as ingredients for other products, as unprocessed or processed materials.

http://pdf.wri.org/watersheds_2003/af20.pdf

Number of fish species:	24
Number of fish endemics:	7
Number of amphibian species:	42
Number of Ramsar sites:	2
Number of wetland-dependent IBAs:	7
Number of endemic bird areas:	2
Per cent protected area:	4.7

Wetlands have a multiplicity of benefits for people living in and outside their proximity. They are most important for dry season farming and grazing, inland fisheries, and regulation of stream flows and floods and in treating effluents. These uses of wetlands provide an effective strategy for risk diversification. Other values include fishing, crop cultivation, livestock grazing, grass for domestic use, natural products and medicine, water treatment and purification.

Table 2: Wetland economic values in selected African countries



The Zambezi basin is one of Africa's most productive freshwater resources.

Source: IUCN ROSA

Wetland Goods or Service	Economic Values per Wetland (2002)	
	US\$/yr* 1 000)	Wetland
1 Crop cultivation/Agriculture	59.8	Nakivubo
	10 652.6	Hadejia-Jama
	1 293.8	Lake Chilwa
	49 655.2	Zambezi Basin
2 Papyrus harvesting	9.5	Nakivubo
3 Fuelwood	1 601.7	Hadejia-Jama
4 Doum Palm	130.2	Hadejia-Jama
5 Potash	0.89	Hadejia-Jama
6 Vegetation (reeds, bamboo, grass)	13.5	Lake Chilwa
7 Brick-making	17.4	Nakivubo
8 Fishing	3 465.1	Hadejia-Jama
	18 675.5	Lake Chilwa
	78 620.7	Zambezi Basin
9 Fish farming	3.3	Nakivubo
10 Grassland/Livestock farming	638.0	Lake Chilwa
	70 620.7	Zambezi Basin
11 Water treatment and purification	968.9	Nakivubo
12 Water transport	435.7	Lake Chilwa
13 Wildlife services and goods	-1 144.8	Zambezi Basin
14 Ecotourism	813.8	Zambezi Basin
15 Biodiversity	67.6	Zambezi Basin
16 Natural products and medicine	2 620.7	Zambezi Basin

Source: Schuijt 2002

POLICY AND LEGAL RESPONSES FOR SUSTAINABLE DEVELOPMENT

Africa has responded to the challenges posed to sustainable development by committing to and establishing policies for creating an enabling environment at the regional, sub-regional, national and local levels that support sustained economic growth, environmental integrity, efforts for peace, stability and security, democracy and good governance, respect for human rights and fundamental freedoms, including the right to development and gender equality. Although much remains to be done to make this policy objective a reality, Africa (both governments and its people) are committed to and share the Brundtland Commission's vision for a future that is more prosperous, more just and more secure (WCED 1987).

The relationship between human society and the environment is complex and multidimensional, with changes in one domain affecting the other. Although the

world has more resources and capacity than ever before, it has not managed to use these in a way that maximizes human opportunity and simultaneously protects the resources that sustain humanity. It is increasingly evident that many of the environmental changes people are setting into motion have fundamental consequences for human well-being and the range of sustainable development options available. A critical message from the Millennium Ecosystem Assessment (MA) is that nearly two-thirds of the services provided by nature are declining worldwide (MA 2005b). Resolving this and moving towards a more sustainable and just future requires not only better management systems but also a need to address the key issues that undermine sustainable development.

Across Africa, there has been a rich and varied response to these challenges at multiple levels, from the regional to the community level. Governments, non-governmental organizations, community groups, scientists and other experts have all been important

contributors to developing policy and defining practical responses to implement such policies. Since the Brundtland Commission put forward its vision for sustainable development in 1987, there have been other key policy responses which reinforce its messages and which seek to make sustainable development a reality. Landmarks on this trajectory of responses include:

- The United Nations Conference on Environment and Development (UNCED) in 1992 with its broad policy consensus reflected in the Rio Declaration and a defined programme of action in Agenda 21;
- The WSSD and its Johannesburg Plan of Implementation;

- The globally agreed time-bound development goals and targets in the MDGs;
- The creation of the AU to succeed the Organization of African Unity (OAU);
- The NEPAD-EAP; and
- The AU's Africa Convention on the Conservation of Nature and Natural Resources (ACCNNR).

Through these policy initiatives, African governments have taken a comprehensive approach to the issue of sustainable development. They have emphasized the following, as well as the links between these aspects:

- An explicit recognition that the environment is integral to sustainable development. In particular there is an increasing shift to seeing the environment as an opportunity for development rather than a constraint;
- A renewed determination to harness the opportunities the environment provides for economic growth and human well-being;
- A commitment to building a more just future based on the recognition that inequity (at multiple levels, including global trade relations and gender) and poverty are important drivers in unsustainable environmental management and are at the core of the growing vulnerability of Africa's people;
- An acceptance that an integrated approach to environmental management is the basis for sustainable development. Such an approach requires understanding the relationship between different aspects of the environment and developing a holistic approach to management, as well as acknowledging the linkages between environment and other areas of human activity, such as trade, science and technology;
- A resolve to build partnerships and promote collaboration, at multiple levels, to address and find solutions to the challenges of sustainable development. This includes not only political collaboration, but also building partnerships in science and technology, capacity-building, trade, human and financial resources;
- An acknowledgement that strengthening national institutions and empowering people is key to effective and sustainable resource management, human development, eradicating poverty, and creating a more equitable society and in addition is consistent with human rights;
- A commitment to enhance human capacity, including scientific and technological capability, so as to be more able to respond to the environmental and development challenges effectively;

Box 3: The African Ministerial Conference on the Environment (AMCEN)

The African Ministerial Conference on the Environment was established in 1985 to strengthen cooperation between African governments on economic, technical and scientific activities to halt the degradation of Africa's environment and satisfy the food and energy needs of its people. It is mandated to:

- Provide information and advocacy for environmental protection in Africa.
- Ensure that the basic (material) human needs are met adequately and in a sustainable manner.
- Ensure socioeconomic development is realized at all levels.
- Ensure that agricultural activities and practices meet the food security needs of the region.

The African Ministerial Conference on the Environment:

- Provides continent-wide leadership on environmental issues.
- Promotes awareness and consensus on global and regional environmental issues, especially those relating to international conventions on biodiversity, desertification and climate change.
- Develops common positions to guide African representatives in negotiations for legally binding international environmental agreements.
- Promotes African participation in international dialogue on global issues of crucial importance to Africa.
- Reviews and monitors environmental programmes at the regional, sub-regional and national levels.
- Promotes the ratification by African countries of multilateral environmental agreements relevant to the region.
- Builds African capacity in the field of environmental management.
- Gives strategic guidance in the implementation of Multilateral Environment Agreements.

Since 2000, AMCEN has also initiated environmental assessment and reporting to keep the regional environment under review in order to provide early warning on emerging environmental issues.

Conference circle.

Source: M. Chenje



- An appreciation of the importance of linking policy objectives to clear implementation plans and objectives and a growing commitment to do this; and
- A desire to build and sustain societies based on peace and cooperation, to rid the region of conflict.

Multilateral environmental agreements (MEAs), at the global, regional and sub-regional levels, are an important response to these broad policy positions. They seek to take the challenges identified in policies on board and provide for practical responses. Multilateral environmental agreements may establish clear rules or suggest managerial frameworks to resolve problems. African countries are party to at least 30 conventions at the global level, dealing with various aspects of environmental management, and related areas, such as trade, that impact directly on environmental sustainability.

Most African countries have signed the three international conventions adopted at the UNCED in 1992 – the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Convention to Combat Desertification (UNCCD) – as well as the United Nations Convention on the Law of the Sea (UNCLOS). Other MEAs to which African countries are party include those dealing with international trade in endangered species, the management of migratory species, hazardous waste management, cultural heritage, ozone depletion, biosafety, invasive alien species and forest management. Also of critical importance are agreements reached in the trade area,

especially the World Trade Organization (WTO) and related agreements on Trade-Related Aspects of Intellectual Property Rights (TRIPS), and sanitary and phytosanitary provisions. Several agreements in agriculture, such as the International Convention for Protection of Plants, have important implications for biodiversity and the sharing of benefits arising from its use. Human rights and development agreements adhered to set the framework for addressing these environmental issues. Additionally, Africa has a growing number of regional and sub-regional MEAs which promote collaboration by establishing an agreed approach to a given issue, which in turn sets the basis for harmonized and coordinated national law. Foremost among these is the ACCNNR adopted by the AU in 2003. This policy and legal approach is reinforced through the establishment of regional and sub-regional organizations. Many sub-regional organizations have spearheaded the development of environmental management policy and law at the sub-region level. In critical areas of sub-regional concern, there have been important multilateral agreements; these include cooperation in the management of shared river basins, wildlife and forests.

These policy and legal initiatives have been complemented by the development of institutions at the regional and sub-regional levels. The African Ministerial Conference on the Environment (AMCEN) is one such initiative which increases opportunities for the development of collaborative approaches to environmental management. Box 3 provides more information about AMCEN. Crucial too is the

strengthening and reorganization of the African Union. Its Constitutive Act provided for the establishment of a specialized technical committee on natural resources and the environment. The Pan-African Parliament, established in 2004, has a permanent standing Committee on Rural Economy, Agriculture, Natural Resources and Environment. In 2005, the AU launched the Economic, Social and Cultural Council of the AU (ECOSOCC) to facilitate and promote civil society participation in the affairs of the AU. See Box 7.

INCREASED ROLE OF CIVIL SOCIETY

In the last 20 years, the role of civil society in environmental policy development has changed significantly. Today, African governments recognize that civil society must be consulted in environment and development initiatives. Increasingly, civil society organizations are demanding to be more actively included in policy-making processes, including those at a national, sub-regional and regional level.

Civil society is often thought of as a third sector in a tripartite relationship with the state and business. This is the arena in which citizens collectively exercise social and political values to promote various aspects of community well-being. Civil society organizations (CSOs) include religious, traditional, farmers', women's, academic and professional, civic, microfinancing, rights claiming, and non-governmental organizations (NGOs) as well as trade unions. CSOs do not equate with civil society as a whole and they may have diverse or even

contradictory interests (Chaplowe 2002). The number of CSOs participating in environment and development issues has grown considerably since the beginning of the 1980s and these organizations vary in scope and scale. There are those that operate primarily at a local level, including community-based organizations (CBOs) and those with national, sub-regional, regional and global mandates. Although the number of CSOs has grown across Africa, there is considerable variation between countries and between urban and rural settings.

In the 1980s, CSOs began to engage more actively in development issues as illustrated by their roles in fighting apartheid, advocating an international code of conduct for the marketing of breast-milk substitutes, improving and increasing official aid (including food aid) following the African famine of the mid-1980s, and working with UNICEF and others to reform SAPs given the negative social impact of these programmes (UN 2003). The activities of African NGOs concentrated on development tasks in the economic, social, cultural and environmental sector. Most African NGOs were not actively engaged in defining policy but had a strong programmatic focus that sought to improve human well-being through improved agriculture, more efficient energy management, water purification and the development of microenterprises among other things. During this period, science and particularly government science-based institutions played a central role in explaining problems and defining solutions and, because the environment was seen as a public good, a government lead was believed to be warranted (Berkhout and others 2003). There was a proliferation of laws and policies that sought to increase controls over environmental use. At the regional as well as the national level, NGOs worked to complement the activities of governments and international agencies in humanitarian areas, such as food crises, but also in environmental management areas including water, wildlife, forest and energy management. The increasing role of community-based organizations, and in particular NGOs, during the 1980s, was linked to a reassessment by donor agencies on the states' ability to act as vehicles for development (Chaplowe 2002). Structural Adjustment Programmes introduced in the 1980s forced many African governments to withdraw or reduce many development and public services, which created a space for the growth of CBOs.

By the 1990s, the role of CBOs began to widen, particularly in the environment and development sector. In 1990, the Arusha Charter on Popular Participation recognized the need to fully integrate African civil society in various governance structures of



Women teaching and learning about food groups in a nutrition education class in Madagascar.

key institutions in order for them to fully participate in defining the long-term development policies of Africa (UN 2003). CSOs began to actively carve out a role that went beyond being service providers to being more active participants in policy making. Success in this has varied from country to country and institution to institution; in many places this role has remained superficial. At the same time there were important shifts taking place in how the environment was perceived. A more complex understanding of the environment that acknowledged its role in local livelihoods and human well-being was beginning to emerge. Although the framing of solutions to environmental problems still tended to be externally focused or driven, concentrating for example on the role of international environmental law, markets and incentives, the role of local users was becoming more prominent. NGOs took on active advocacy roles, often focusing on the subsistence needs of poor people. Increasingly, NGOs were present at hearings, panels and briefings and in dialogues with governments (UN 2003). In global policy processes, there was a gradual increase in the prominence of Southern NGOs (UN 2003).

At the global level, various initiatives to increase opportunities for participation in environmental policy development were also adopted. The United Nations made direct provision for CBO participation at the 1992 UNCED. Since then, CSOs have played an active role in UN conferences concerned with development issues and which have a bearing on the environment, including ones on Small Island Developing States (SIDS), human rights, women, social development, racism, least developed countries, food aid, and communication and information, as well as the Millennium Summit. Although such approaches were adopted, they fall short of a concerted and formalized approach to bring all sectors together (Reinicke and others 2000). The UN conferences and other processes seek to deal with issues that cannot be treated purely from a national perspective – environmental issues, for example, traverse national or regional boundaries (Tabbush 2005). Participation has given CSOs the opportunity to engage with CSOs from other countries and regions, as well as with governments other than their own. More recently, initiatives by various UN agencies have been adopted to increase CSO participation in UN-led development activities. For example, UNEP's Global Civil Society Forum and Global Women's Assembly on Environment provide new opportunities for civil society participation in its programmes. These initiatives have played a key role in widening the influence of CSOs, including those from Africa.

Box 4: Women negotiating for peace

Although women are often better equipped than men to prevent or resolve conflict, they face formidable obstacles to participating in peace negotiations.

The contribution from Femmes Africa Solidarité (FAS) demonstrates how effective organizing and collaborating with other CSOs can enhance women's advocacy and role in peace negotiations. Femmes Africa Solidarité has successfully employed a multidimensional approach to advocacy. First, the women made their voices heard through international conferences, such as the Pan-African Women's Conference on a Culture for Peace in 1999. Second, the women successfully mobilized for the women of Burundi to attend the third round of inter-Burundi peace negotiations in Arusha. Third, the women built a common platform – the Mano River Women's Network (MARWOPNET) – to resolve the crisis between Guinea and Liberia. Subsequently, MARWOPNET received international acclaim for its key role in rebuilding diplomatic relations between Liberia, Guinea and Sierra Leone. Fourth, the women built partnerships across national boundaries – MARWOPNET was the result of collaboration between women from three countries. Fifth, the negotiation strategies included unified voice, persistence and image-making via the media. Through these approaches, FAS helped women develop more comprehensive, gender-specific policies and practices for addressing conflict that were incorporated in the conflict resolution process.

Source: Tabbush 2005

Although there were many successes after UNCED, the following decade revealed the need for users and managers of natural resources to be more actively involved in shaping their own futures. It has also drawn attention to the complex links between human-driven change and the environment (Berkhout and others 2003). From this emerged a new understanding of the need for integrated approaches focusing on multiple and cross-dimensional linkages. Increasingly, there is a shift to policy processes that bring together not only the different environmental sectors but also other sectors which impact on the environment, such as health, technology and finance, with intellectuals from different disciplines, including the biophysical and social sciences, in partnership with civil society in formulating responses. These approaches are discussed in depth in Chapter 8: *Interlinkages: The Environment and Policy*

Women collecting *Piliostigma reticulatum* pods, Burkina Faso. They will sell these as high quality animal feed.

Source: D.Tiveau/ CIFOR



Web. Rights claiming and advocacy by civil society have been important in bringing about this shift. NGOs became key players in putting forward public concerns, interests and priorities.

By the end of the 1990s, CSOs had come to engage more actively in analysing problems, defining solutions and framing policies. There has been a notable growth in civil society organizations across the board and the kinds of roles they have taken on. They have successfully negotiated a place in regional and sub-regional intergovernmental organizations, including the AU and NEPAD, as discussed later in this chapter. Civil society organizations have played an important role in the development of AU protocols in critical issues of environment and development concern, including biosafety, genetic resources and the rights of women. Partnerships with governments and the business sector have also become increasingly important. This includes partnerships establishing transboundary natural resource management areas, protected areas management and implementing environmental impact assessments. They have also become more critical development partners, raising concerns and drawing attention to some of the potential difficulties associated with new state initiatives. For example, in January 2001, some 200 CBOs from 45 African countries met at the African Social Forum and rejected a neo-liberal approach to globalization (Chaplowe 2002). New kinds of CSOs have begun to emerge: of particular importance has been the development of networks, bringing together different types of CSOs for a common purpose, sometimes in partnership with business, governments and multilateral organizations. Some of

these have been local or national in focus, addressing for example HIV/AIDS, land claims, and participation in PRS. Others have taken regional or sub-regional approaches, focusing on a growing range of issues that require cooperation including water resource management, malaria, chemical management, peace-building and food security. These include networks such as the Global Water Partnership (GWP) and the African Stockpile Programme.

ENVIRONMENT FOR DEVELOPMENT

Africa has come to approach the environment in a fundamentally new way – it has moved from seeing environmental issues as a constraint to development to seeing the environment, if properly managed, as an opportunity for development. Chapters 2-7, of Section 2: *Environmental State-and-Trends: 20-Year Retrospective*, discuss the opportunities for development from different environmental goods-and-services.

African governments have adopted new, more encompassing and forward-looking environmental policy and legislation. Beginning in the 1980's, following the Stockholm Human Environment Conference of 1972 and the Lagos Plan of Action of 1980, African countries began to refocus on how to manage the environment and why it was important from a development perspective. By the 1990s, the Brundtland Commission, the UNCED conventions, and Agenda 21, as well as advocacy and actions of civil society, motivated African countries to make a fundamental break with the environmental approaches that had developed during the colonial era and had persisted since then.

● The New Partnership for Africa's Development commits Africa's leaders to place their countries, individually and collectively, on a path of sustainable growth and development, and at the same time to participate actively in the world economy, enlarging Africa's economic prospects.

●

In 2002, with the launch of the African Union, a fundamental shift was made from predominantly political cooperation to a joint Africa-wide commitment to promote socioeconomic development. Environmental resources were, and are, seen as a key part of this. The AU's Constitutive Act provides for coordinated policy development in the important environmental areas of energy, mineral resources, food, agriculture and animal resources, forestry, water and environmental protection. The ACCNR, adopted by the AU in July 2003, revised the original convention adopted in Algiers in 1968. The Convention commits Africa to development that is based on the achievement of ecologically rational, economically sound, and socially acceptable policies and programmes which recognize the human right to a satisfactory environment as well as the right to development.

The New Partnership for Africa's Development commits Africa's leaders to place their countries, individually and collectively, on a path of sustainable growth and development, and at the same time to participate actively in the world economy, enlarging Africa's economic prospects. It seeks to address environmental challenges while reducing poverty, and recognizes that the range of issues necessary to nurture the region's environmental base and promote the sustainable use of natural resources is vast and complex, and thus that a systematic combination of initiatives is necessary to develop a coherent environmental programme.

POVERTY AND INEQUITY

Eradicating poverty is the greatest challenge facing Africa and the world today, and an indispensable requirement for sustainable development.

Since the Brundtland Commission, there has been growing recognition of the close relationship between poverty and environmental problems, as both cause and effect, and thus the futility of approaches that do not take a broad perspective and address the factors underlying world poverty. The WSSD refocused attention on this relationship and the need to improve opportunities through increased investment in human capacity, technology and industrial development, as well as the need for equitable and adequate access to water and energy (UN 2002).

Many policies now deal directly with the relationship between environmental use and equity at the global and national level. UNCED, for example in the CBD, links the issues of sustainable use and conservation closely to the fair and equitable sharing of benefits. Agenda 21 focuses on the need to combat poverty, with the long-term objective of enabling all people to achieve sustainable livelihoods. This requires policies to address issues of development, sustainable resource management and poverty eradication simultaneously (UN 1992). The 2005 World Summit in New York emphasized the importance of peace and security, development and human rights as the basis for human well-being.

It is widely acknowledged that better environmental management systems which promote human well-being



Loading timber logs onto a train in Gabon.

can be an important tool for eradicating poverty. Poverty has many facets and is not restricted to income levels and includes, among other factors, health and education dimensions. Addressing poverty requires actions in multiple areas as identified in the MDGs. Inequity at multiple levels, including in gender, has implications for successfully addressing poverty.

Global inequity has important ramifications for the economies of Africa and the opportunities available to it, and thus its ability to eradicate poverty. Trade and increased local entrepreneurship are widely seen as essential to stimulate Africa's economy, and it is acknowledged that natural resources can be used to extend trade opportunities internationally and domestically (Katerere and Mohamed-Katerere 2005). However, as the Brundtland Commission stressed nearly 20 years ago, the international economy will only promote growth if the sustainability of the resource basis is guaranteed and if trade is equitable. Growth was then, and continues to be, stifled by depressed

commodity prices, protectionism, intolerable debt burdens and a declining flow of investments (WCED 1987). For example, the European Union's (EU) and United States' agricultural subsidies make it difficult for farmers in developing countries to compete effectively. The EU, while demanding African countries liberalize 90 per cent of their markets over ten years, refuses to reform its highly protectionist Common Agricultural Policy (Griffith and Stuart 2004).

At the regional and sub-regional level, policy and programmes have also been developed to take these concerns on board. The Southern African Development Community's (SADC) policy for environment and natural resource management, for example, linked the need for growth with equitable sustainable development within the sub-region. The empowerment of the poor, including women, through increased access to resources fosters social inclusion and promotes growth. This cannot be achieved without taking on board the environment dimension, especially in Africa where most countries' economic mainstay is the natural resource base.

HARNESSING OPPORTUNITIES FOR DEVELOPMENT

To meet economic growth targets and the MDG targets, to realize regional and national environmental goals, to decrease poverty and to improve overall well-being requires that Africa maximize the opportunities available to it.

The New Economic Partnership for African Development seeks to position Africa to take advantage of the opportunities presented by changing global trade by promoting good governance, allocating resources efficiently and exploring partnerships with the private sector and within key political fora (Katerere and Mohamed-Katerere 2005). It seeks to balance the neo-liberal economic reforms it is promoting with support for social services, particularly health and education.

At the sub-regional level, economic communities have been developed, including the Southern African Development Community (SADC), the Economic Commission of West African States (ECOWAS), the East African Community (EAC), the Economic Community of Central African States (ECCAS), the Intergovernmental Authority on Development (IGAD) and the Arab Maghreb Union (AMU). Many of these initiatives focus on increasing opportunities the natural resource basis offers and stimulating inter-African trade by reducing restrictions on the movement of people, goods-and-services. Some initiatives, such as the Spatial Development Initiatives (SDI) in Southern Africa, provide for joint development and planning in contiguous regions, some of which straddle

Box 5: Aquaculture in Zanzibar, Tanzania

Diversifying livelihood options and increasing values of natural resources may improve the socioeconomic status of small-scale fisheries and reduce pressure on fish resources. In Tanzania, various initiatives are geared towards doing this, including coastal aquaculture development. Seaweed has a high carrageenan content which is extracted for use in cosmetics and in the pharmaceutical industry.

Wild seaweed, of the red algal species of *Eucheuma denticulatum* and *Kappaphycus alvarezii*, used to be collected from the intertidal zone of coral reefs around Zanzibar and dried for export to France and Denmark. This practice was replaced in 1989 with seaweed farming, mainly carried out by women. This form of aquaculture is relatively harmless to the environment as it does not pollute the environment with feeds, wastes or other chemicals. Although there are some negative interactions causing inhibition of surrounding biota, these appear to be relatively mild.

The socioeconomic impacts of seaweed farming were initially overwhelmingly positive. Annual production reached 7 000 tonnes, providing income to the women involved and constituting an important earning of foreign exchange. However, over time, monopoly control by a few international corporations has led to reduced prices being paid to producers, despite recent trends showing that the demand and market price for carrageenan is increasing.

Seaweed farming represents an opportunity for prosperity and increased food security for coastal communities, and especially women, to improve their incomes and is thus important for poverty eradication. If production is planned and managed to a greater degree, and policies implemented to ensure equitable access to markets, training and capacity-building, it has the potential to provide a sustainable livelihood for the people involved.



Producers load a boat with *Gnetum spp.* for export from Idanao to Orion, Nigeria.

Source: R. Perezim/CIFOR

international borders. Several SDIs seek to harness the under-utilized potential for economic growth by promoting tourism, and other natural resource-based activities, thus increasing investment and lending, infrastructural development and opportunities for local livelihoods, particularly the development of local small and microenterprises (Mohamed-Katerere 2001).

In addition, policies have clearly identified the need to look at the opportunities industry and technological development can bring. The WSSD focuses specifically on the need to strengthen the contribution of industrial development to poverty eradication and sustainable natural resource management. This includes actions, at all levels, to mobilize resources to enhance productivity, increase income-generating employment activities, financial and technical support to rural communities, the development of small and microenterprises, and the support for natural resource management to create sustainable rural livelihoods. The commercialization of wild resources, such as medicinal plants, fruits and resins, can offer important livelihood opportunities. Box 5 looks at the benefits the commercialization of seaweed has brought to poor people in Tanzania. Intellectual property rights of those engaged in product development and poor control of genetic resources potentially undercut the extent of benefits that can be earned.

INTEGRATED APPROACH

Sustainable environmental management requires recognizing the interlinkages between different aspects

of the environment, as well as the complex interactions between factors in human society causing change to the environment. Given this, there is a need to deal with environment and development issues in a holistic, comprehensive and integrated manner.

The need for integrated approaches has been recognized in the Stockholm Convention, and in 1987 the Brundtland Commission identified it as the basis of sustainable development strategies. This approach was further developed in the Rio Declaration, Agenda 21 and the UNCED conventions. The WSSD Johannesburg Plan of Implementation draws attention to the ways in which such an approach may create better opportunities for water resource and energy management as well as for the identification and development of alternative technologies.

In the 1990s, many African countries broke with the narrow sectoral approach that had been inherited from the colonial era and which was founded on command-and-control rule-based systems and were the forte of their environmental management systems, to develop more integrated approaches. In this period, most countries adopted national environmental action plans; many also began to reform the natural resource management legislation, giving it a stronger rights and opportunities content. Most African countries also adopted environmental provisions in their constitutions, in many cases echoing the commitment in the African Charter on Human Rights and Peoples Rights recognizing environmental rights.

The NEPAD-EAP, adopted in 2003, takes an integrated approach to the environment and development with full consideration of economic growth, income distribution, poverty eradication, social equity and better governance as part and parcel of Africa's environmental sustainability agenda (NEPAD 2003). The ACCNR also commits to such an approach and calls on parties to integrate development and environmental concerns by treating both as an integral part of national and local development plans, and to give full consideration to ecological, social, economic and cultural factors in their development.

COOPERATION AT MULTIPLE LEVELS

A striking feature of recent policy initiatives is the priority given to improving opportunities for cooperation at the global, regional, sub-regional and national levels.

Regional initiatives which create new levels of cooperation have taken place: many of these emphasize the commonness of Africa's problems and the opportunity collaboration brings to solving these problems. The NEPAD-EAP is one such initiative. It was prepared through a consultative and participatory process under the leadership of AMCEN. It sought to identify the root causes of environmental degradation and the most effective projects from an environmental, institutional and financial perspective. The plan takes a long-term perspective and identifies eight programme

areas and actions that African countries should adopt to maintain the integrity of the environment and ensure the sustainable use of their natural resources. It responds to some of the challenges of the MDGs – particularly goals Number 1 on eradicating poverty, Number 7 on environmental sustainability and Number 8 on developing a partnership for development, as well as to the general principles of Agenda 21.

At the sub-regional level, collaboration has also been an important policy focus. In some instances this is between countries, whereas in others it focuses on cooperation within a given country. Sub-regional cooperation is evident in a range of areas, from transboundary natural resource management to disaster responsiveness and early warning systems. The EAC Development Strategy emphasizes economic cooperation and development with a strong focus on the social dimension, and the role of the private sector and civil society is considered as central and crucial to regional development (EAC 2001).

There are several sub-regional initiatives that deal with monitoring and early warning. In the EAC the Regional Environment Assessment Guidelines for Shared Ecosystems of East Africa has been initiated. This builds on an earlier initiative by the then East African Cooperation, where the Committee on Environment and Natural Resources made specific recommendations on shared ecosystems, including developing regional environmental assessment

Ruhakana Rugunda, Minister of Water, Lands and Environment of Uganda, at the 8th RAMSAR Conference of the Contracting Parties. Uganda has long been a pioneer in putting Ramsar principles into practice, policy and law.

Source: RAMSAR



Box 6: Western Indian Ocean (WIO) islands: vulnerability to sudden disaster

The Western Indian Ocean islands have a high level of vulnerability to sudden disaster. Such disasters include tropical cyclones (Comoros, Madagascar, Mauritius and Réunion); land-based volcanoes (Comoros and Réunion); flooding from torrential rain (Comoros, Madagascar, Mauritius); droughts (Madagascar, Mauritius); plagues of locusts (Madagascar); epidemic disease (Comoros and Madagascar), coral bleaching (Seychelles), and throughout the region, transport accidents and marine oil spills. The principal impact of the tsunami of December 2004 in the Western Indian Ocean fell upon the Maldives and the Seychelles, with some damage occurring in the outer islands of Mauritius.

While the Western Indian Ocean countries have well-developed and effective early warning and response systems for the more common tropical cyclones experienced every year, the tsunami of December 2004 demonstrated the weaknesses of certain aspects of the existing systems of disaster management and the need for reassessment and development. Review is now being made of the future risks arising from tsunamis, the cost of protective measures and the value of investing in improvements that need to be made for better protection against the more common disaster risks in the region.

While sometimes the impact of a disaster is irremediable and the event often inescapable, intervention to reduce the risk of the events and damage has been the focus of long-standing national and regional

review and action. Reports available since 1951 show that the top ten disasters in the islands of Comoros, Madagascar and Mauritius, covering 96 per cent of the population of the region, resulted in 2 632 deaths and affected the lives of 10.5 million people. These disasters were principally from tropical cyclones, flooding from torrential rain, famine, disease epidemics and transport accidents.

At both the national and international level, the follow-up to the event of the tsunami of 26 December 2004 is still unfolding. Plans for improving the early warning systems are being integrated with building the capacity for emergency relief in the region which can be turned to respond to risks of the wide variety of natural and other disasters to which the island countries may be subjected. These have a grave impact on Madagascar with its population of 17 million (over 90 per cent of the population of the sub-region) where most people live in poverty, where one-third of the children suffer from malnutrition and widespread famine is not uncommon in years of poor harvests.

Long-term plans for monitoring sea level rise and sea surges are at the stage of pilot projects and isolated research exercises. The priority given to these, supported by the Indian Ocean Commission, is likely to be increased, but the need for routine monitoring of tsunami risks has to be considered in the light of other relative risks of disaster and the capacity of each country to respond to them, within the context of comprehensive hazard and risk management.

Source: IOC 2005

procedures and guidelines for shared ecosystems. These assessment guidelines will form a basis for valuating activities in or near shared ecosystems that are likely to cause significant ecological, environmental, health and social impacts. Collaborative initiatives around food security and drought warning have been other areas of sub-regional collaboration, particularly in the SADC region. Box 6 looks at the importance of cooperation in developing early warning for the WIO Islands.

Partnerships with the global community

Although sustainable development is primarily a national responsibility, many of the major challenges facing African countries have a global dimension. Thus, developed countries have some responsibility in the international pursuit of sustainable development, particularly in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.

The WSSD noted that Africa's efforts to achieve sustainable development have been hindered by conflicts, insufficient investment, limited market access

opportunities and supply side constraints, unsustainable debt burdens, historically declining levels of official development assistance and the impact of HIV/AIDS. The developed world has, through private enterprise, benefited from the use of natural resources, particularly diamonds and forest resources, in conflict areas. For example, in the Democratic Republic of the Congo, the United Nations Security Council found that over 100 private companies, foreign and multinational, were involved in illegal extraction (UN Security Council 2002). Such conflicts have displaced hundreds of thousands of people and had a negative impact on forest resources as a result of settlement, uncontrolled logging and fire. At the WSSD, developing countries reiterated their acknowledgement of the responsibility they bear in the international pursuit of sustainable development.

However, Africa must be the driver of its own future. Africa recognizes, as the WSSD did, that effective global cooperation requires the creation of an enabling environment at the regional, sub-regional, national and local levels which supports sustained economic growth and sustainable development, promotes peace,



EPZs offer new opportunities for business. Here fishnet production in an Indian enterprise operates from Dar es Salaam.

Source: M. Crozet/ILO

stability and security, and establishes good governance, respect for human rights and fundamental freedoms. The New Partnership for Africa's Development seeks to create such an environment and sets the basis for global collaboration. Among other things, it has developed a peer review process. A meeting of the AMCEN Inter-Agency Technical Committee (IATC) in 2004 called for the peer review mechanism process to be expanded to include environmental criteria.

There are a number of areas in which global collaboration is seen as important. Numerous policy agreements have acknowledged the vital role developed countries can play in creating access to new technologies, enhancing technological and other capacities, securing access to new financial resources and creating a fairer global trade system. The WSSD commits parties to implement the outcomes of the Doha Ministerial Conference of the World Trade Organization, further strengthen trade-related technical assistance and capacity-building and ensure the meaningful, effective and full participation of developing countries in multilateral trade negotiations by placing their needs and interests at the heart of the WTO work programme. At the WSSD, the developed countries specifically committed to supporting Africa in a number of areas including

industrial development and opportunity, water and energy management, health and technology.

In various fora the global community has agreed to development goals, including those in Agenda 21, WSSD and the MDGs. These global policy processes have also acknowledged that realizing these goals will require access to new and additional financial resources, improved trade opportunities, access to and transfer of environmentally-sound technologies, education and awareness-raising, capacity-building, information for decision making and improved scientific capabilities. In the case of the MDGs, defined targets in these areas need to be met within the agreed time frame. Eradicating the debt burden, as well as improving flows of FDI and development aid, will create new opportunities for developing countries.

PEACE, DEVELOPMENT AND ENVIRONMENTAL COOPERATION

Conflict situations have negative impacts on the environment and consequently on human well-being. The 2005 World Summit drew attention to the need for peace as the foundation for human well-being.

Over 30 African countries have been involved in wars in the last five years, and many more experience local resource conflicts. Despite this, Africa has an impressive record on the collaborative management of environmental resources. This cooperation has promoted peace and stability in most parts of the region. Important areas of collaboration include the management of water resources and shared river basins as well as more general transboundary natural resource management. Chapter 12: *Environment for Peace and Regional Cooperation* provides a more comprehensive analysis of these issues.

In many parts of Africa, river basin organizations have been established to regulate the rights and responsibilities of the different riparian states (Turton 2003). The SADC region has adopted a Protocol on Shared Watercourse Systems which creates a regional approach to management based on river basins. In the Northern and Eastern Africa sub-regions, the Nile Basin Initiative (NBI) seeks to enhance management and to take concrete steps to realize the development potential of the Nile. Launched in February 1999, the NBI provides a basin-wide framework to fight poverty and promote socioeconomic development through the equitable utilization of and benefit sharing from the Nile Basin water resources (Uganda 2002). Over the past 30 years, various groupings of countries in the Nile Basin have engaged in cooperative activities. However, the inclusion of all countries in a joint dialogue opens up

new opportunities for realizing win-win solutions. It also holds the promise for potential greater regional integration, economically and politically, with benefits far exceeding those derived from the river itself.

The ECOWAS action plan seeks to promote a regional cooperation framework for integrated water resource management, including harmonizing policies and legislation on water resources, facilitating the exchange of experiences, reviving consultation between riparian countries on coordinated management of shared or transborder water basins, and strengthening partnership with all stakeholders. Similarly, the EAC has cooperative water management initiatives, including the revitalized Lake Victoria Development Programme (LVDP), which has developed a common vision for the Lake Victoria Basin development, agriculture, food security, energy, tourism, civil aviation safety, lake resource conflict management, telecommunications and meteorological and inter-university cooperation.

Policies and laws have been developed in several sub-regions to support sustainable transboundary natural resource management including for wildlife, forests, marine resources and mountainous environments. The EAC has transboundary ecosystem management on Mount Kilimanjaro and Mount Elgon. The East Africa Cross Border Biodiversity Project, funded by the Global Environment Facility (GEF) through the United Nations Development Programme (UNDP) and executed by the three governments in the

Eastern African sub-region, sought to identify and promote systemic national and regional policies and administrative measures to ensure sustainable management of cross-border biological diversity (ecosystems) and to reduce biodiversity loss at cross-border sites in east Africa. The project has generated information on the status of the cross-border sites and detailed policy analyses of forest policies in the three countries, identifying convergences and divergences, which can be used to inform interventions within the EAC strategy.

Social conflict and wars have had a high human and environmental cost. Large numbers of people have been displaced as a result of war, placing new burdens on the natural resource base. In conflict situations, effective management, monitoring and enforcement are not always possible. Such conflict also has adverse consequences for natural resources management, as the collapse of effective government results in indiscriminate harvesting and utilization of natural resources. The revival of ECCAS will hopefully help strengthen environmental governance in Central Africa. This underscores the linkage between environmental resource management and conflict. As long as there is conflict, environmental resource management initiatives, such as those anticipated in the treaty establishing ECCAS, will remain unimplemented as the member states concentrate on the more immediate issues relating to the conflict.



Conflict Logs: abandoned roundwood logs as a result of the imposition of a timber exporting embargo on Liberia, May 2005.

STRENGTHENING INSTITUTIONS AND EMPOWERING PEOPLE

The lack of capacity, in terms of skills and opportunity, to manage environmental resources undermines the potential for sustainable development – consequently, strengthening institutions and empowering people are important strategies.

The UNCED conventions recognized this and these, along with the ACCNNR, have focused on the value of procedural rights, research, education and information, as well as respect for local knowledge and value systems to achieve this. The WSSD has also drawn attention to the close relationship between well-being and empowerment. It is increasingly recognized that in enhancing capabilities and opportunities for people to participate in decisions that affect their well-being and livelihoods, health services and education must be improved, and sufficient and potable water, shelter, and adequate and nutritious food ensured. WSSD looks specifically at how these aspects of human well-being

can be improved, and the MDGs set out targets related to these aspects, to be achieved by 2015.

Most policy initiatives recognize that rights of access to environmental information, participation, recourse to a court of law as well as fair, transparent and accountable processes are important procedural rights needed to support people as effective players in environmental policy and decision making. The United Nations Conference on Environment and Development recognized the potential of users to be effective resource managers – by giving users a direct stake in the resource, the incentive to manage efficiently is increased. Achieving this includes strengthening tenure rights and promoting civil participation in policy development, decision making and environmental management. In addition, the WSSD's Johannesburg Plan of Implementation identified the need to specifically promote women's equal access to and full participation in decision making, on the basis of equality with men (UN 2002). It recognized that this needs to be complemented by mainstreaming gender perspectives in all policies and strategies, eliminating all forms of violence and discrimination against women and improving the status, health and economic welfare of women and girls through full and equal access to economic opportunity, land, credit, education and health-care services (UN 2002).

At the regional and sub-regional levels, empowerment has also been identified as key for sustainable development, although in many countries the development of laws and programmes to make this a reality are still lacking. The AU has, through the creation of the ECOSOCC, sought to increase opportunities for meaningful dialogue with civil society, as discussed in Box 7. At the sub-regional level, economic and development communities are also trying to empower the public. In 2001, the EAC launched the EAC Court of Justice and the EAC Legislative Assembly. The Legislative Assembly has seven standing committees, which include one on Agriculture, Tourism and Natural Resources.

In most policy initiatives, developing skills and capacity of resource users, as well as of national institutions, is seen as essential. This issue is an important focus in the Rio Declaration, Agenda 21, several MEAs including the CBD and WSSD, and the NEPAD-EAP. The NEPAD-EAP focuses on building Africa's capacity to implement global and regional MEAs. In order to achieve this, eight activities are identified, including human resource development, public education and awareness, strengthening institutions and improving coordination, supporting the

Box 7: African Union initiative to promote public participation

Several regional and sub-regional organizations create opportunities for public participation in policymaking processes. One of the most encompassing is the AU's initiative.

The AU's ECOSOCC seeks to promote dialogue between all sections of African society on issues concerning the continent and its future. To this end, it aims to:

- Forge strong partnerships between governments and all segments of civil society, in particular, women, the youth, children, the diaspora, organized labour, the private sector and professional groups.
- Promote the participation of African civil society in the implementation of the policies and programmes of the Union.
- Support policies and programmes that promote peace, security and stability and foster continental development and integration.
- Promote and defend a culture of good governance, democratic principles and institutions, popular participation, human rights and social justice.
- Promote, advocate and defend gender equality.
- Promote and strengthen the institutional, human and operational capacities of the African civil society.

Source: AU, undated

development of information systems, mobilizing and strengthening the role of scientific and technical communities, and promoting south-south cooperation and sharing of expertise (NEPAD 2003).

HARNESSING THE OPPORTUNITIES FOR ENVIRONMENT AND DEVELOPMENT

Sustainable economic growth is essential for improving human well-being. However, the tendency to push production and consumption beyond the Earth's ability to support them makes such an achievement impossible and, if this trend is not stopped, it could herald a disastrous tomorrow for Africa. Sustainable development is only possible where economic growth, social justice and equity, and environmental integrity are achieved.

These three pillars of sustainable development need to be addressed in an integrated manner in order to achieve the desired outcome. Peace and stability are necessary for development, and the environment can create important opportunities for collaboration. An equitable society in which people are empowered to participate effectively in policy making and decisions that affect their well-being is essential. Fairness and equitable distribution of natural resources, as well as other local, national, regional and global wealth and benefits, the rule of law, and respect and tolerance of differences in culture, religious beliefs and traditions are essential for harmonious and sustainable development.

Most economic activities in Africa are based on the natural resource endowment; the depletion of natural resources beyond their regeneration rate, their pollution and reduction of their waste assimilation capacity will impede growth. The social and cultural aspects of use need to be considered as well, and in particular the issue of equity needs to be more effectively addressed. Africa can create new opportunities for growth and well-being through the effective implementation of policies by developing appropriate strategies, project planning and sustainable practices. Incorporation and operationalization of sustainable development principles, including intergenerational and intra-generational equity, the polluter pays principle, the precautionary approach, community participation and the mainstreaming of environment and gender into development planning and decision making will go a long way to achieve sustainable development.

Growth in Africa in the 1990s became associated with income inequality and this trend has continued



Farmers spreading cattle manure to improve soil fertility, northern Namibia.

Source: T. Cunningham/CIFOR

since then. It is now widely accepted that inequality in access to assets, and especially productive assets, such as land, are critical factors driving inequitable growth and poverty (World Bank 2005b). The Gini index measures the extent to which the distribution of income (or consumption) among individuals or households within a country deviates from a perfectly equal distribution: a value of 0 represents perfect equality, a value of 100 perfect inequality. Many countries in Southern Africa have high values due to the unequal land and natural resource distribution that forms the basis of their economies. Zimbabwe, for example has a value of 56.8 (UNDP 2005). A similar pattern is evident in Nigeria, with a value of 50.6 as a result of an economy based largely on mineral and oil exports and poor local benefit distribution. A reduction in inequality can add a "redistribution component" to growth, leading to faster overall poverty reduction (World Bank 2005b).

The World Development Report 2003 points out that, with the global economy growing at a projected rate of 3 per cent per year over the next 50 years, there will be a fourfold increase in world gross domestic product (GDP) (World Bank 2002). This growth will require major investments in new human-made capital to expand capacity and to replace existing capacity as it ages. It is projected to generate more environmental and social stress. Increased income can facilitate better social and environmental outcomes if countries adopt more equitable and pro-poor strategies (WRI and others 2005). Countries should take pre-emptive action

to deal with impending social, economic and environmental catastrophes, such as energy and water crises among others. Adopting an approach to investment and development that incorporates sustainability criteria is critical in avoiding adverse impacts (World Bank 2002). Development paths in Africa can be shifted, provided institutions for implementing the constructive policies are developed.

In order to achieve sustainable development in Africa, financial and other resources, both local and global, have to be mobilized as pledged in many world fora including UNCED in 1992. Investment strategies need to focus more directly on creating opportunities for growth that favours poor people. The downward trend in FDI and development aid needs to be reversed. Technology is potentially an important tool for achieving sustainable development, therefore its transfer and accessibility should be improved. Technologies may be useful in promoting more efficient utilization of resources as well as cleaner production and consumption. The developed world, through the WTO, needs to facilitate the achievement of fairer international trade. This will give developing countries better access to international markets and thus boost

their production and economic growth. Poverty Reduction Strategy (PRS) can also provide an opportunity to tackle poverty through improved health and education, and also through mainstreaming the natural environment into everyday decision-making processes for management and utilization of environmental resources. The potential value of PRS is discussed in Chapter 8: *Interlinkages: The Environment and Policy Web*.

OPPORTUNITIES FROM THE ENDOWMENT VALUE OF NATURAL RESOURCES

To enhance the opportunities available from Africa's natural resource endowments, current patterns of unsustainable resource management must be changed. Development now, environment later is not a sustainable option for Africa.

Harvesting of natural resources that has limited regard for regeneration capabilities and focuses primarily on meeting growing demand and ensuring continued supply will have long-term implications for economic growth and the ability to reduce poverty. Agricultural land is being degraded due to overutilization and hence productivity is generally going



Niger: tree planting along crevices caused by floods in seasonal waterways, known locally as *koris*.

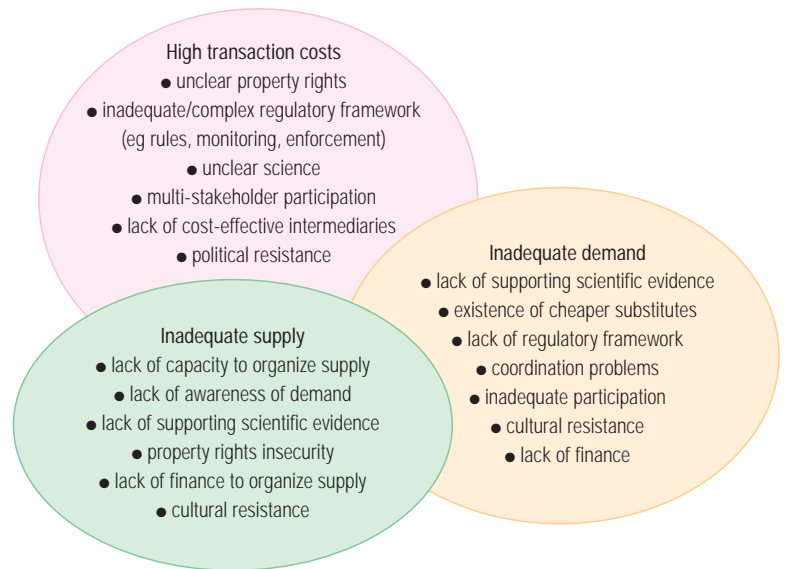
down, demanding more use of inorganic fertilizers and pesticides which pollute the environment. Chapter 3: *Land* discusses the state-and-trends related to land and its management.

Many extractive activities of non-renewable natural resources, such as mining, are done in an environmentally damaging manner through, for example, the clearing of vegetative cover in sensitive water catchment areas and forests. These activities can be undertaken in a more environmentally responsive way, through the use of environmental impact assessment (EIA) systems which give greater attention to restoration and rehabilitation. Chapter 8: *Interlinkages: The Environment and Policy Web* discusses the value of EIAs. Many human activities are also polluting the environment through the use of hazardous chemicals, such as mercury and cyanide in the case of gold mining. These heavy metals and chemicals respectively go on to contaminate the water, which is a habitat for aquatic life and enters the human food chain with deadly effect. Chapter 11: *Chemicals* discusses the challenges related to the increased use of chemicals. Forest clearing for either farm expansion or other development also harms the environment through habitat destruction, which in turn contributes to biodiversity loss. The conflicting objectives and uncoordinated strategies by different sectors contribute to the degradation of natural resources. Revising management and utilization strategies and practices, and bringing them in line with sustainable development objectives, is a good starting point for realizing Africa's development objectives.

The equitable sharing and use of water resources and its efficient and sustainable management present numerous challenges as Africa tries to meet growing demand from industry, agriculture and human use in managing the available water resource, issues of its efficient allocation and use must be considered. The existing situation is that in some quarters water is inefficiently allocated and utilized, potentially leading to increasing water-use conflicts across the region. Chapter 4: *Freshwater* discusses Africa's freshwater resource. Environmental impact assessment is one tool that can be used to effectively include the environment in this and other spheres of and planning.

The valuation of environmental goods-and-services is another opportunity to understand the value of the natural environment outside the conversional markets, which may not fully be able to access the rate of and consequences of degradation. Creating markets for environmental services could create new opportunities for enhancing the value attributed to such resources. In

Figure 7: Constraints to market development



Source: Landell-Mills and Porras 2002

the forest sector, markets could also be used for biodiversity conservation, watershed protection, and landscape beauty. The Kyoto Protocol, which introduced carbon markets and trading, creates opportunities for countries and their inhabitants to engage in forest conservation and/or reforestation, providing a carbon sink function of forests.

Although entry into the market can create new opportunities, the high levels of inequity in global markets potentially undercut the opportunities available to poor people. Markets may also place new threats on assets and the range of values available at the local level. A major challenge in developing environmental markets is how to ensure that such development is pro-poor and contributes to growth with equity objectives. Markets transform environmental services into private commodities, creating new sources of income for sellers, improved service delivery for buyers, improved efficiency of resource use and allocation and new investment (Landell-Mills and Porras 2002). To ensure poor people benefit from market access is essential, and support may be necessary to help poor people participate effectively. This can be supported through secure tenure, skills development and education, access to finance and market information, better commodity design (Landell-Mills and Porras 2002), and improved transportation and communications infrastructure. Since markets are multi-stakeholder – incorporating the public and private sectors, communities, non-governmental and local organizations, donors and individual entrepreneurs – it is important for there to be clear governance systems.

Table 3: Impacts of markets on environmental services**Economic benefits**

- Income/profits from sale of environmental service
- Diversified production base – lower risks of shocks
- Employment gains – new jobs associated with emerging markets
- Efficiency gains associated with removal of market failure
- Improved infrastructure associated with market development eg research facilities, transport, communications
- Technological transfer
- Achievement of environmental target at least cost – cost savings vis-à-vis command-and-control approaches

Social benefits

- Increased land/resources tenure security – where deals result in the formalization of land tenure to minimize risks to buyers
- Improved health – investments in medical facilities, environmental improvements (eg reduced water and air pollution), more diverse diets, etc.
- Social institution strengthening – eg local cooperative arrangements to support evolving markets may provide a basis for cooperation in other areas
- Knowledge and research – environmental research and education through support for local schools, universities and research bodies
- Skill development – in related fields, eg sustainable forestry, forest-based industries, ecotourism, carbon monitoring, certification, global warming, project management
- Improved recreational and cultural opportunities – more pleasant environment for recreational activities and protection of cultural heritage and religious sites

Environmental benefits

- Improved supply of marketed services: biodiversity conservation, carbon sequestration, watershed protection services and landscape beauty
- Positive spin-offs for the non-marketed services

Economic costs

- Costs of supply – forest protection, certification
- Transaction costs – searching for buyers, negotiations, contracting, establishing new intermediaries, monitoring and enforcement
- Opportunity costs – eg markets replace existing payments, lost agricultural output when forests planted in agricultural land, lost values when protected, eg timber and NTFPs

Social costs

- Loss of rights to forest resources, especially for poor people – where projects involve forest protection or lead to privatization of rights to common lands
- Reduced health – where loss of access to forest-based foods that provide variety in local diets. Also where projects involve fast-growing plantations and reductions in water supplies
- Risks of domination by the wealthy since they have highest weight in a system based on ability to pay
- Land acquisition schemes may push up local land prices and undermine local communities
- Negative cultural impacts associated with monetizing environmental services

Environmental costs

- Negative spin-offs for non-market services – eg reduced biodiversity or water supplies where monoculture plantations for carbon sequestration

Source: Landell-Mills and Porras 2002

PEACE, GOOD GOVERNANCE AND DEMOCRACY, AND COOPERATION AS AN OPPORTUNITY

More equitable distribution of Africa's wealth will promote harmonious coexistence among people, while polarized benefit sharing brings with it deprivation, insecurity and unrest. Peace and cooperation are crucial for any kind of economic activity leading to economic growth to prevail, and for equitable benefit sharing. Addressing these issues requires multidimensional responses.

Even with good knowledge and understanding of the environmental processes, there can be unsustainable

use of the natural resource and a high rate of degradation of the natural environment. Deficiencies in governance are key contributory factors. Corruption, which is a growing scourge in Africa, undermines people's rights and fair distribution and access to resources and national wealth.

In countries with weak governance systems, the values and aspirations of important but not powerful sections of society may be under-represented. In such instances, a small group of interests become dominant, resulting in benefits accruing to a few. In "effective"

democratic processes, the participation of communities in decisions which affect their well-being and livelihoods creates an opportunity for multiple interests, views and knowledge (including indigenous knowledge) to be incorporated in planning and in the decision-making processes. This ensures ownership of the processes, costs and benefit sharing, and inculcates a sense of responsibility in all involved and is thus preferable to a top-down process.

Furthermore, in order to facilitate changing the current situation, environmental management, and legal and institutional reforms should take on board new initiatives, including market economic instruments for allocation and demand management of environmental resources. The operationalization of the polluter pays principle and precautionary approach requires the backing of enforceable legal provisions, which are still largely non-existent. In Africa, these processes are beginning to take root in many countries and therefore there is an opportunity to strengthen these efforts. It should, however, be noted that change dynamics are not linear or evolutionary. This means they differ from area to area and therefore require specific policies and solutions (Scoones and Wolmer 2003) which take account of sub-regional, national and local specificities.

Weak and inappropriate institutions and practices undermine sustainable development. This is the case particularly when institutions lack capacity or are highly bureaucratic. In Malawi, Tanzania and Uganda, public sector institutions are often seen to be constraining rather than enabling people to construct their own livelihood paths out of poverty. In Tanzania, it was found that a combination of poorly functioning markets and disabling institutional set-up procedures, including high taxation and rent-seeking behaviour, made it difficult for people to sustain their livelihoods. In Malawi, access to natural resources was difficult for most due to non-supportive property rights regimes for land, forest and aquatic resources. Local government decentralization was found to create new business opportunities, although licences and imposition of taxes act as barriers to trade and enterprise development. In Uganda, as in Tanzania and Malawi, rural taxation was found to be a barrier to poverty reduction goals (Ellis and Bahiigwa 2003, Ellis and Mdoe 2003, Ellis and others 2003).

TECHNOLOGICAL CHANGES AND RESEARCH

Technology is a key factor in improving productivity and efficiency in the utilization of natural resources and for improving human well-being.

Technology affects human development in two important ways (UN Millennium Project 2005b). First,

innovation can directly increase the ability of existing science, technology and innovation programmes to reduce poverty and expand human capabilities, as is evident through technological innovations in public health, agriculture, energy use, and ICT. Second, technology can indirectly affect human well-being by enhancing productivity and increasing economic growth and incomes through, among other things, promoting economic growth.

The adoption of technologies for more efficient and cleaner production activities, as well as for value-adding activities by small entrepreneurs, is severely constrained by the lack of adequate income as well as inadequate information. Ensuring the uptake of technologies will thus need multidimensional responses that improve the overall capabilities of people.

Unfortunately, local development of technology in Africa related to natural resources has been very slow, leading to over-reliance on technology developed elsewhere (FAO 2003). In most cases, this technology is linked to FDI, with a principal focus on maximizing profits. The development of appropriate technologies that address African priorities and that are responsive to local conditions has not been a focus of research. Nevertheless, new technologies, developed globally, particularly in the areas of ICT, biotechnology (or genomics), nanotechnology, materials science, and spatial information technology potentially offer important opportunities for development, improving human well-being and sustainable environmental management (UN Millennium Project 2005b).

Increasingly, African countries are exploring the opportunities and risks posed by these new



Sudan. Solar power provides electricity for a field hospital in the rebel-held Nuba Mountains (quickly covered when government bombers appear). February 2000.

Source: D. Connell/The Image Works TopFoto

Box 8: Using traditional knowledge for diet drug development

Hoodia gordonii (hoodia) is a cactus plant found in Southern Africa. The San people of the Kalahari, one of the world's oldest indigenous peoples, are reputed to have been eating the hoodia plant for thousands of years, to stave off hunger during long hunting trips. The South African Council on Scientific and Industrial Research (CSIR) identified the P57 substance in the plant, a group of steroidal glycosides, which is an active appetite suppressant. Given high levels of obesity, particularly in developed countries, there has been considerable interest in the potential economic value of this plant.

In 1995, a patent application was filed in Europe, and on 27 January 2005 the patent was granted in an appeal of the European court. In 1997, the CSIR licensed the UK-based Phytopharm, which in turn licensed drug giant Pfizer the following year, for P57 development and global marketing. Unilever has since acquired the rights to develop and market hoodia as an ingredient in its weight-loss products.

The South African San Council, set up in November 2001 and representing the Khomani, the Xun and the Khwe, demanded recognition of their knowledge and a share of benefits arising from product development. After protracted negotiations – spanning three years – a benefit sharing agreement was reached in 2004 between the South African San Council and CSIR. The CSIR will pay the San 8 per cent of milestone payments made by its licensee, Phytopharm, during the drug's clinical development over the next three to four years. The San could earn 6 per cent of all royalties if and when the drug is marketed, possibly in 2008.

Establishing this agreement faced various challenges:

- Traditional knowledge, being community-owned and handed down through generations, clashes with international property rights, which view knowledge as owned by an individual or a company.
- Indigenous knowledge is often held by communities who live in different countries. In this case, the San Councils of Namibia,



Hoodia gordonii (hoodia).

Source: E. Powell

Botswana, Zambia and Angola will share the monies in percentages to be decided at their next general meeting.

Income will go into a San Hoodia Benefit Trust set up by the CSIR and the San. The Trust includes representatives of the CSIR, the regional San Councils, the Working Group of Indigenous Minorities in Southern Africa (WIMSA), and an observer from the South African Department of Science and Technology.

Source: Wynberg 2004

technologies. Chapter 9: *Genetically Modified Crops*, for example, considers the diverse claims made about opportunities for development of biotechnology. Many African countries recognize the value of ICT, not only for stimulating the economy, but also for environmental management. Some African countries are investing in the application of ICT for planning, management and monitoring of environmental resources. Ghana, for instance, is using ICT to facilitate the mainstreaming of environment in its Poverty Reduction Strategy Paper (PRSP) and development plans in its district assemblies. A novel aspect of this ICT application is the intricate networking that involves the presidency, the national parliament, the ministry of finance, ministry of local

government, and the national development and planning commission: this enhances access and utilization of a common pool of information for decision making (Opio-Odongo and Woodsworth 2004).

In most African countries there is relatively low investment in research activities as a percentage of GDP. However, research is important for improving responses and enhancing capabilities and thus this needs to be urgently addressed through the development of partnerships, stable investment environments, and legal and policy frameworks that provide for fair and equitable intellectual property rights. Research into various environmental goods-and-services, such as wetlands and forest lands, can make a

difference in how they are used and the extent to which value is added to them. Apart from research based on modern knowledge, the value of traditional or indigenous knowledge needs to be acknowledged within Africa. There are various initiatives, particularly in the NGO sector, which seek to apply this knowledge to product development. In the pharmaceutical and cosmetic sector, industry has had a keen interest in how to use this knowledge, as shown in Box 8. The existing genetic and intellectual property regimes do not offer sufficient protection of these assets, thus allowing the benefits associated with their use to be externalized.

Increased investment in research by Africa will need to be complemented by a greater global commitment to the transfer of technology and the more equitable sharing of the benefits associated with this.

Traditional knowledge and cultural practice in natural resources management

Traditional natural resource governance systems are important in environmental management, often informing or complementing contemporary management regimes.

Communities in Africa have relied on traditional knowledge to manage natural resources since time immemorial. Traditional knowledge transcends all aspects of life (such as food, health, housing, communication) and the environment (relations between biodiversity and ecological factors, identification criteria of biodiversity elements).

Traditional cultural practices can make a significant contribution to sustainable development. Most

indigenous and local communities are situated in areas where the vast majority of the world's plant genetic resources are found. Many of them have cultivated and used biological diversity in a sustainable way for thousands of years. The abundance of wildlife species, especially in the savannahs of east Africa, is due in great part to the grassland management strategies of pastoralists.

Observations and experimentations in the environment lead to the selection of plant varieties as crops, medicines and timbers for various uses (Andriantsiferana 2003). The role of trees in nutrient recycling, soil organic matter build-up and erosion control has been recognized by traditional farmers, who have identified and have been encouraging the most effective tree species in the fallow. For example, in south-western Nigeria, especially around the city of Ibadan, farmers claim *Gliricidia septum* to be an effective fallow species which restores land productivity for food crops after a fallow of only two years (Getahun and others 1982). When land is abundant, the bush fallow system provides the traditional farmers with an efficient, balanced and stable system for maintaining soil productivity. Problems only arise when land becomes limited due to increasing population and land alienation.

The Barbaig of Tanzania used their land communally by moving their livestock in a seasonal grazing rotation. Although access to land was free to everybody, control was exercised and maintained through customary rules and traditional institutional procedures. Mobility and knowledge of different kinds of fodder is a strategy that



Cameroon's forests provide valuable grazing land.

can increase productivity of rangelands. Using milk as the main product also increases the number of people who can be supported on livestock. Also, Barbaigs, Maasai and Kurya split herds of cattle during shortage of grazing pastures taking account of the environment's diminished carrying capacity.

Traditional knowledge has been overlooked in the recent past and, in some cases, is being lost.

INFRASTRUCTURE DEVELOPMENT

Infrastructure development, including transportation, telecommunications and energy networks, is essential for improving economic opportunity as well as human well-being.

Infrastructure development may generate substantial positive and negative externalities. Infrastructural development creates opportunities to reduce the isolation, and lack of access to essential services, that many rural people experience. It is essential for enhancing the creation and application of science, technology and innovation in development (UN Millennium Project 2005b). It may also exacerbate resource extraction, especially where weak governance regimes exist.

Many African countries inherited transport and communication systems that were designed to serve the interests of former colonial masters, focusing on the movement of goods to ports without facilitating cross-border trade and regional integration (Katerere and Mohamed-Katerere 2005). One consequence of this is high transport costs. In SSA, freight costs are about 20 per cent higher than those of their competitors (AfDB 2004).

Infrastructure affects patterns of production and consumption by firms and individuals (UN Millennium Project 2005b). High transport costs, long distances from the point of sale and the lack of transport

infrastructure undermine the market opportunities for natural resources. These factors coalesce to undermine the incentive to engage in value-adding activities that could result in the more efficient and productive uses of resources which may counter tendencies towards overexploitation. Access to electric power is crucial in terms of productive options, and telecommunications are essential for the flow of information.

African countries need to adopt strategies to improve their infrastructure in ways that address these challenges. Infrastructure is one of the eight priorities of NEPAD. Policymakers need to recognize the dynamic role that infrastructure development can play in economic growth, development and conservation. For infrastructure to become more effective, developing countries need to adopt and enforce infrastructure standards (UN Millennium Project 2005a). From the early design stages, they need to promote the interoperability of infrastructure systems, not only nationally, but also regionally and internationally. Standards should be drawn up and implemented so that they do not create barriers to innovation.

CONCLUSION

The future of Africa's development is closely tied to the integrity of its natural resources base. How the region benefits from its stock of natural resources will depend on how strategically it places itself at the global negotiating tables, how it markets these assets and the extent to which it is able to maximize benefits and opportunities for its people.

There are improved opportunities on all these levels. Viable fora for meeting these challenges have been created through NEPAD and AU. The different



Liberia: the road to Greenville from Monrovia. In the absence of financial resources and infrastructural development, the natural environment poses many transport and communications challenges for people trying to develop sustainable livelihoods, May 2005.

initiatives being pursued by Africa underscore the interconnectedness of the development process and the need for holistic development planning. Indeed a sector by sector approach to environmental resources management is being replaced by integrated management policies. Similarly, territorial boundaries no longer bar sustainable management of resources, and transboundary cooperation is becoming more common. On another level, there is also growing recognition that human well-being depends on ecosystem services. Governments and development partners are increasingly involving civil society and the private sector in the fashioning and implementation of the different initiatives. What now needs to be urgently addressed is the commitment of adequate resources for the institutions mandated to implement the initiatives to carry out the tasks effectively.

It is important for Africa to comprehensively take stock and value of what it has in terms of natural resources and use them optimally to sustain decent livelihoods. This is the focus of Section 2: *Environmental State-and-Trends: 20-Year Retrospective*.

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