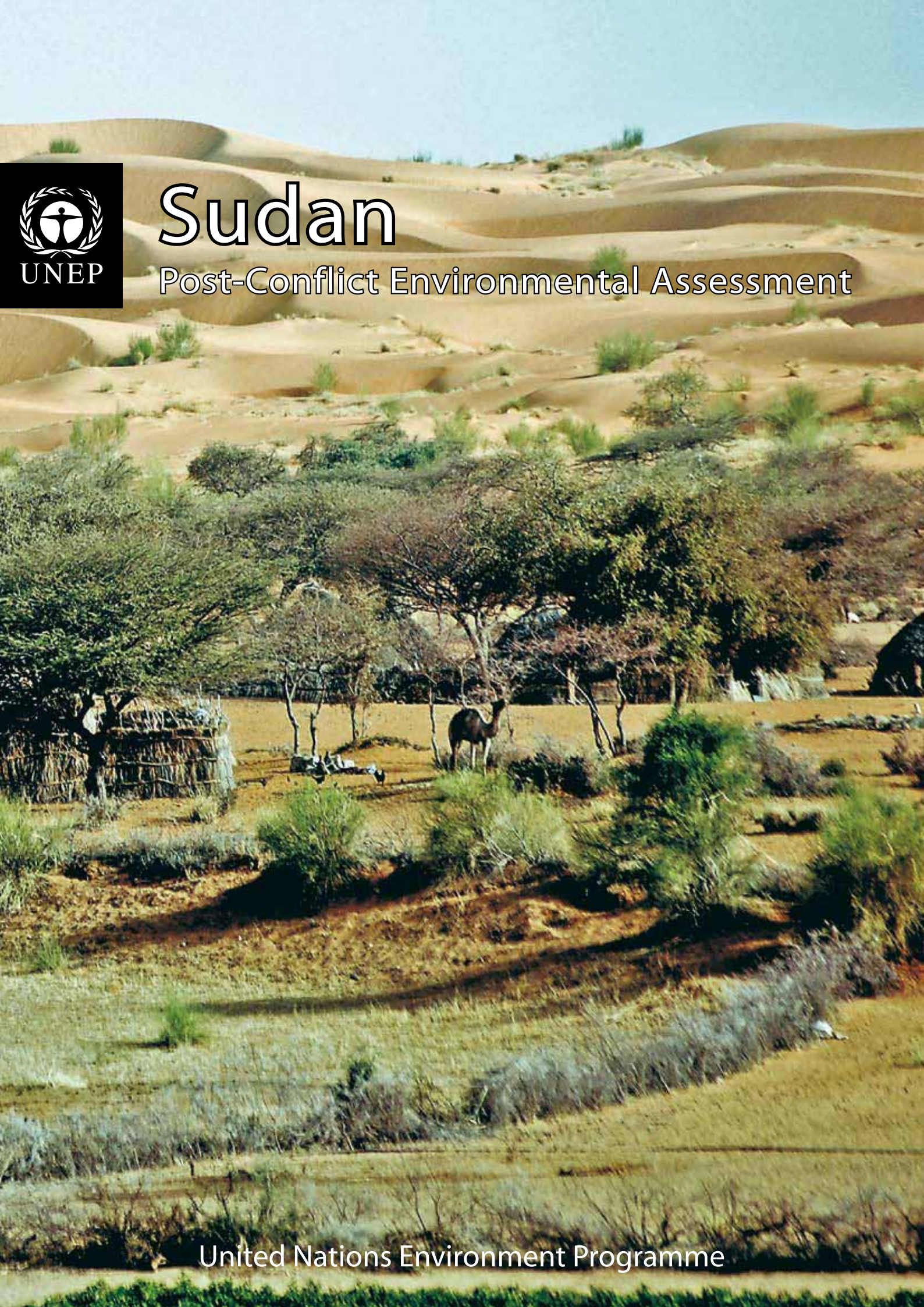
UNEP
Sudan
Post-Conflict Environmental Assessment
United Nations Environment Programme

Synthesis Report

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Synthesis report

Introduction

In January 2005, after more than two decades of devastating civil war, the Sudanese central government in Khartoum and the Sudan People's Liberation Army in the south signed a historic Comprehensive Peace Agreement. This landmark achievement – which was followed by the adoption of an Interim Constitution – brought peace to most of the country for the first time in a generation.

Now, thanks to the rapid development of its oil industry, Sudan is one of the fastest-growing economies in Africa. Direct investment and international aid are starting to flow into the country on a large scale, and some parts of Sudan are undergoing brisk development.

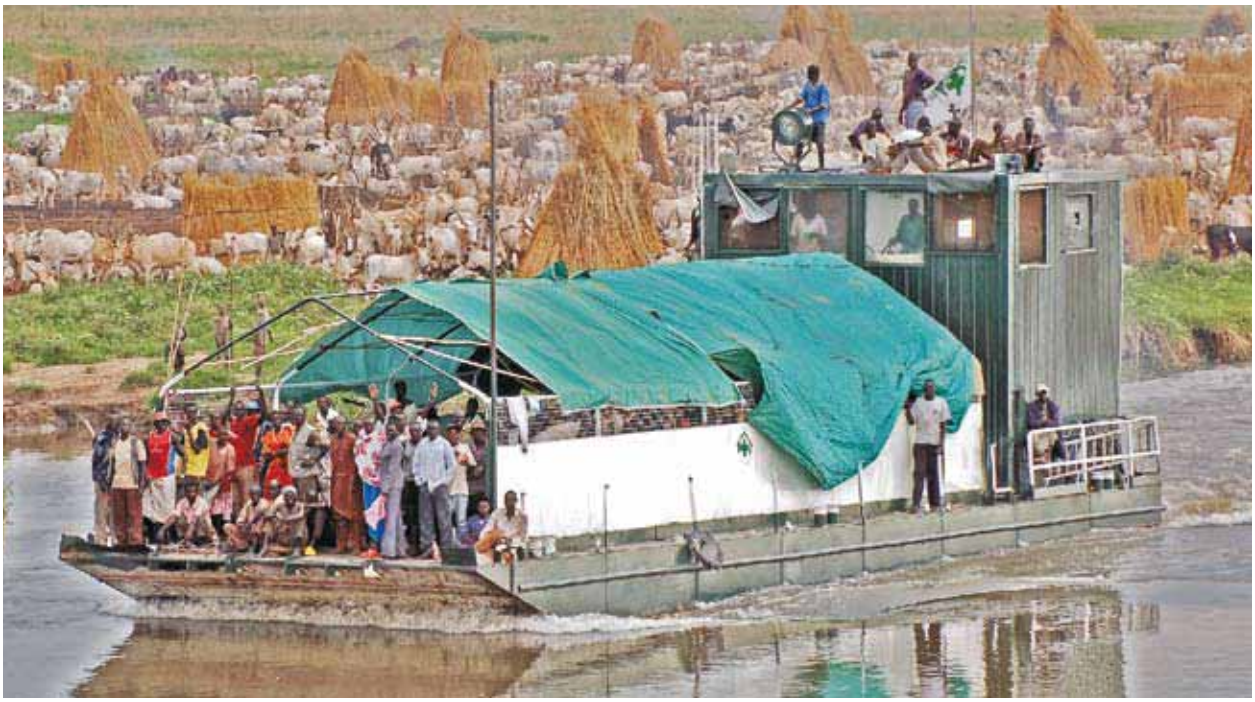
As it focuses on recovery and development, however, the country faces a number of key challenges. Chief among them are several critical environmental issues – such as land degradation, deforestation and the impacts of climate change – that threaten Sudan's prospects for long-term peace, food security and sustainable development.

In addition, complex but clear linkages exist between environmental problems and ongoing conflict in Darfur, where violence and insecurity continue to prevail despite the signing of a peace agreement in May 2006.

Not only are the adequate management and rehabilitation of natural resources fundamental prerequisites to peacebuilding in Darfur and the rest of Sudan – they must be considered national priorities if the country is to achieve long-term social stability and prosperity.

Post-conflict environmental assessment

With a view to gaining a comprehensive understanding of the current state of the environment in Sudan and catalysing action to address the country's key environmental problems, the Government of National Unity (GONU) and Government of Southern Sudan (GOSS) requested the United Nations Environment Programme (UNEP) to conduct a post-conflict environmental assessment of Sudan. The goal of the UNEP assessment was accordingly to develop a solid technical basis for medium-term corrective action in the field of environmental protection and sustainable development.



A group of southern Sudanese travels down the White Nile aboard a ferry, returning to the homeland after years of displacement due to the civil war.

Sudan general map

Consultation with local stakeholders formed a large and continuous part of UNEP's assessment work, as here in the small village of Mireir, Southern Darfur

Assessment process

The post-conflict environmental assessment process for Sudan began in late 2005. Following an initial appraisal and scoping study, fieldwork was carried out between January and August 2006. Different teams of experts spent a total of approximately 150 days in the field, on ten separate field missions, each lasting one to four weeks. Consultation with local and international stakeholders formed a large and continuous part of UNEP's assessment work, with the total number of interviewees estimated to be over two thousand. Parties consulted include representatives of federal, state and local governments, NGOs, academic and research institutions, international agencies, community leaders, farmers, pastoralists, foresters and businesspeople.

The assessment team was comprised of a core UNEP team and a large number of national and international partners who collaborated in a range of roles. These partnerships were crucial to the project's success, as they enabled the fieldwork, ensured that the study matched local issues and needs, and contributed to national endorsement of the assessment's outcomes. UNEP also worked closely with the Government of National Unity and the Government of Southern Sudan, and specific efforts were made to align UNEP activities with a government initiative known as the National Plan for Environmental Management.

Summary of the findings

The assessment identified a number of critical environmental issues that are closely linked to the country's social and political challenges.

Strong linkages between environment and conflict: a key issue in the Darfur crisis

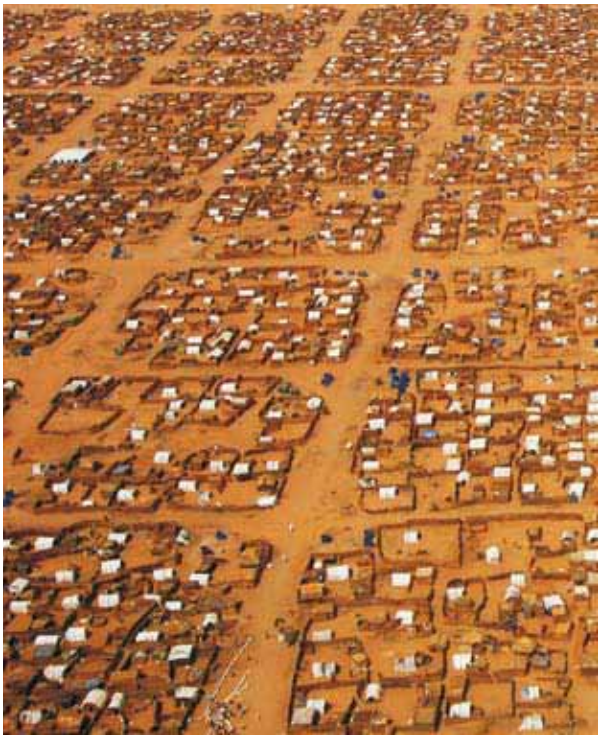
The linkages between conflict and environment in Sudan are twofold. On one hand, the country's long history of conflict has had significant impacts on its environment. Indirect impacts such as population displacement, lack of governance, conflict-related resource exploitation and underinvestment in sustainable development have been the most severe consequences to date.

On the other hand, environmental issues have been and continue to be contributing causes of conflict. Competition over oil and gas reserves, Nile waters and timber, as well as land use issues related to agricultural land are important causative factors in the instigation and perpetuation of conflict in Sudan. Confrontations over rangeland and rain-fed agricultural land in the drier parts of the country are a particularly striking manifestation of the connection between natural resource scarcity and violent conflict. In all cases, however, environmental factors are intertwined with a range of other social, political and economic issues.

UNEP's analysis indicates that there is a very strong link between land degradation, desertification and conflict in Darfur. Northern Darfur – where exponential population growth and related environmental stress have created the conditions for conflicts to be triggered and sustained by political, tribal or ethnic differences – can be considered a tragic example of the social breakdown that can result from ecological collapse. Long-term peace in the region will not be possible unless these underlying and closely linked environmental and livelihood issues are resolved.

Population displacement: significant environmental impacts

With over five million internally displaced persons (IDPs) and international refugees, Sudan has the largest population of displaced persons in the world today. In Darfur, internal displacement has occurred at an unprecedented rate since 2003, with some 2.4 million people affected. This massive population displacement has been accompanied by significant human suffering and environmental damage. Areas around the larger camps – particularly in Darfur – are severely degraded, and the lack of controls and solutions has led to human rights abuses, conflicts over resources and food insecurity. Although this is not a new phenomenon, the scale of displacement and the particular vulnerability of the dry northern Sudanese environment may make this the most significant case of its type worldwide.



Sudan has the largest population of displaced persons in the world today. Nearly two million are in Darfur, in large settlements such as Abu Shouk IDP camp in El Fasher, Northern Darfur

In addition, the large-scale return of southern Sudanese to their homeland following the cessation of the civil war is likely to result in a further wave of environmental degradation in some of the more fragile return areas.

Desertification and regional climate change: contributing to poverty and conflict

An estimated 50 to 200 km southward shift of the boundary between semi-desert and desert has occurred since rainfall and vegetation records were first held in the 1930s. This boundary is expected to continue to move southwards due to declining precipitation. The remaining semi-desert and low rainfall savannah on sand, which represent some 25 percent of Sudan's agricultural land, are at considerable risk of further desertification. This is forecast to lead to a significant drop (approximately 20 percent) in food production. In addition, there is mounting evidence that the decline in precipitation due to regional climate change has been a significant stress factor on pastoralist societies – particularly in Darfur and Kordofan – and has thereby contributed to conflict.

Natural disasters: increasing vulnerability and impacts

Sudan has suffered a number of long and devastating droughts in the past decades, which have undermined food security and are strongly linked to human displacement and related conflicts. The vulnerability to drought is exacerbated by the tendency to maximize livestock herd sizes rather than quality, and by the lack of secure water sources such as deep boreholes that can be relied on during short dry spells.

Despite serious water shortages, floods are also common in Sudan. The most devastating occur on the Blue Nile, as a result of deforestation and overgrazing in the river's upper catchment. One of the main impacts of watershed degradation and associated flooding is severe riverbank erosion in the narrow but fertile Nile riverine strip.

Agriculture: severe land degradation due to demographic pressure and poorly managed development

Agriculture, which is the largest economic sector in Sudan, is at the heart of some of the country's most serious and chronic environmental problems, including land degradation in its various forms, riverbank erosion, invasive species, pesticide mismanagement in the large irrigation schemes, and water pollution. Disorganized and poorly managed mechanized rain-fed agriculture, which covers an estimated area of 6.5 million hectares, has been particularly destructive, leading to large-scale forest clearance, loss of wildlife and severe land degradation.

In addition, an explosive growth in livestock numbers – from 28.6 million in 1961 to 134.6 million in 2004 – has resulted in widespread degradation of the rangelands. Inadequate rural land tenure, finally, is an underlying cause of many environmental problems and a major obstacle to sustainable land use, as farmers have little incentive to invest in and protect natural resources.

A typical mechanized agriculture landscape in Dali, Sennar state. An estimated 6.5 million hectares of savannah vegetation have been cleared for mechanized rain-fed agriculture in Sudan

Southern Sudan still retains the majority of its forest cover, but deforestation is occurring at a steady rate. When shifting agriculture becomes unsustainable, forest cover disappears permanently, as seen here in Wau district, in Western Bahr el Ghazal

Forestry: a deforestation crisis in the drier regions, risks and opportunities in the south

Deforestation in Sudan is estimated to be occurring at a rate of over 0.84 percent per annum at the national level, 1.87 percent per annum in UNEP case study areas. It is driven principally by energy needs and agricultural clearance. Between 1990 and 2005, the country lost 11.6 percent of its forest cover, or approximately 8,835,000 hectares. At the regional level, two-thirds of the forests in north, central and eastern Sudan disappeared between 1972 and 2001. In Darfur, a third of the forests cover was lost between 1973 and 2006. Southern Sudan is estimated to have lost 40 percent of its forests since independence and deforestation is ongoing, particularly around major towns. Extrapolation of deforestation rates indicate that forest cover could reduce by over 10 percent per decade. In areas under extreme pressure, UNEP estimates that total loss could occur within the next 10 years.

These negative trends demonstrate that this valuable resource upon which the rural population and a large part of the urban population depend completely

for energy is seriously threatened. The growing use of fuelwood for brick-making in all parts of Sudan is an additional cause for concern. In Darfur, for instance, brick-making provides a livelihood for many IDP camp residents, but also contributes to severe localized deforestation. If it were properly managed, however, the forestry sector could represent a significant opportunity for economic development and sustainable north-south trade.

Dams and water projects: major impacts and conflict linkages

UNEP considers the principal and most important environmental issue in the water resource sector in Sudan to be the ongoing or planned construction of over twenty large dams. While its electrical output is expected to bring major benefits to the country, the Merowe dam epitomizes environmental and social concerns over the country's ambitious dam-building programme. Although it is the first dam project in Sudan to have included an environmental impact assessment, the process did not meet international standards, and would have benefited from more transparency and public consultation. Major environmental problems associated with the Merowe dam include silt loss for flood recession agriculture, dam sedimentation and severe riverbank erosion due to intensive flow release within short time periods.

In addition, the active storage capacity of all of Sudan's existing dam reservoirs (with the exception of Jebel Aulia) is seriously affected by sediment deposition. Dams have also caused major degradation of downstream habitats, particularly of the maya wetlands on the Blue Nile and of the riparian *dom* palm forests in the lower Atbara river.

The infamous Jonglei canal engineering mega-project, which started in the 1970s, was closely linked to the start of the north-south civil war. As it was not completed, its anticipated major impacts on the Sudd wetlands never came to pass. The unfinished canal bed, which does not connect to any major water bodies or watercourses, now acts only as a giant ditch and embankment hindering wildlife migrations. Nevertheless, lessons learnt from this project should be carefully studied and applied to existing efforts in peacebuilding between north and south, especially as economic motivations for the project still exist, including from international partners.

The main excavator for the Jonglei canal is composed of several self-propelled sections. Once the largest of its type in the world, it now lies in a derelict state in the canal bed

Urban issues and environmental health: rapid and chaotic urbanization and chronic waste and sanitation issues

Uncontrolled sprawl, chronic solid waste management problems and the lack of wastewater treatment are the leading environmental problems facing Sudan's urban centres. The explosive growth of the capital Khartoum continues relentlessly, with 64 percent of the country's urban population residing in the area. The larger towns of Southern Sudan are also experiencing very rapid growth fueled by the return of formerly displaced persons, estimated at 300,000 by end of 2006. In Darfur, the majority of the two million displaced are found on the fringes of urban centres, whose size in some cases has increased by over 200 percent in the last three years.

Sewage treatment is grossly inadequate in all of Sudan's cities, and solid waste management practices throughout the country are uniformly poor. In the majority of cases, garbage of all types accumulates close to its point of origin and is periodically burnt. These shortcomings in environmental sanitation are directly reflected in the elevated incidence of waterborne diseases, which make up 80 percent of reported diseases in the country.

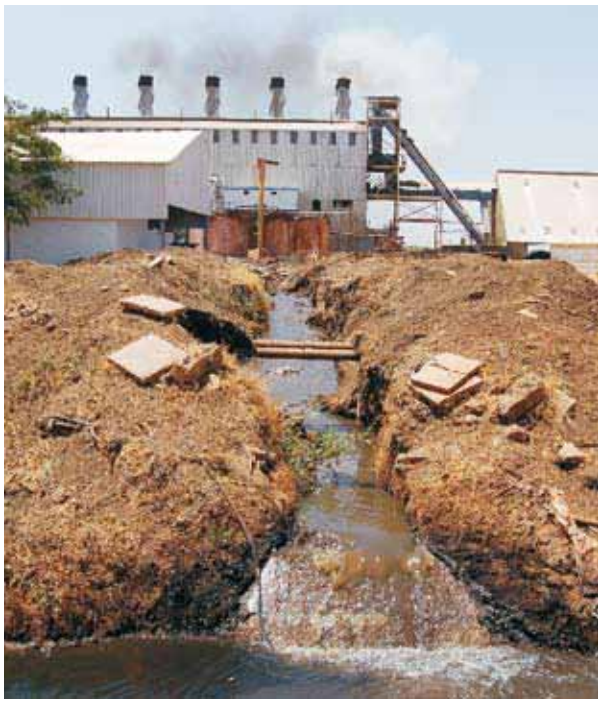
Industrial pollution: a growing problem and a key issue for the emerging oil industry

Environmental governance of industry was virtually non-existent until 2000, and the effects of this are clearly visible today. While the situation has improved over the last few years, UNEP has found that major challenges remain in the areas of project development and impact assessment, improving the operation of older and government-managed facilities, and influencing the policies and management approach at the higher levels of government.

Due to the relatively limited industrial development in Sudan to date, environmental damage has so far been moderate, but the situation could worsen rapidly as the country embarks on an oil-financed development boom. The release of effluent from factories and the disposal of produced water associated with crude oil extraction are issues of particular concern, as industrial wastewater treatment facilities are lacking even in Khartoum. Industrial effluent is typically released into the domestic sewage system, where there is one.

Other issues include air emissions, and hazardous and solid waste disposal. While UNEP observed generally substandard environmental performance

Most of the large-scale informal settlements in the Khartoum area have very limited access to water, and no sewage or waste management



Untreated effluent flows directly from the Assalaya sugar factory to the Blue Nile

A baboon in Dinder National Park, Sennar state. The level of actual protection is highly variable but generally weak throughout Sudan. Poaching is a problem in all major parks

at most industrial sites, there were exceptional cases of responsible environmental stewardship at selected oil, sugar and cement facilities visited.

Wildlife and protected areas: depleted bio-diversity with some internationally significant areas and wildlife populations remaining

The past few decades have witnessed a major assault on wildlife and their habitats. In northern and central Sudan, the greatest damage has been inflicted by habitat destruction and fragmentation from farming and deforestation. Larger wildlife have essentially disappeared and are now mostly confined to core protected areas and remote desert regions. In the south, uncontrolled and unsustainable hunting has decimated wildlife populations and caused the local eradication of many of the larger species, such as elephant, rhino, buffalo, giraffe, eland and zebra. Nonetheless, Sudan's remaining wildlife populations, including very large herds of white-eared kob and tiang antelope, are internationally significant.

Approximately fifty sites throughout Sudan – covering 10 and 15 percent of the areas of the north and south respectively – are listed as having some form of legal protection. In practice, however, the level of protection afforded to these areas has ranged from slight to negligible, and several exist only on paper today. Many of these important areas are located in regions affected by conflict and have hence suffered from a long-term absence of the rule of law. With three exceptions (Dinder, Sanganeb and Dongonab Bay National Parks), the data on wildlife and protected areas is currently insufficient to allow for the development of adequate management plans.

Marine environment: a largely intact ecosystem under threat

UNEP found the Sudanese marine and coastal environment to be in relatively good condition overall. Its coral reefs are the best preserved ecosystems in the country. However, the economic and shipping boom focused on Port Sudan and the oil export facilities may rapidly change the environmental situation for the worse. Steady degradation is ongoing in the developed strip from Port Sudan to Suakin, and the symptoms of overgrazing and land degradation are as omnipresent on the coast as elsewhere in dryland Sudan. Mangrove stands, for example, are currently under severe pressure along the entire coastline. Pollution from land-based sources and the risk of oil spills are further issues of concern.

Environmental governance: historically weak, now at a crossroads

By granting the Government of Southern Sudan and the states extensive and explicit responsibility in the area of environment and natural resources management, the CPA and new Interim Constitutions have significantly changed the framework for environmental governance in Sudan and helped create the conditions for reform.

At the national level, the country faces many challenges to meet its international obligations, as set out in the treaties and conventions it has signed over the last thirty years. Although the technical skill and level of knowledge in the environmental sector are high and some legislation is already in place, regulatory authorities have critical structural problems, and are under-resourced.

In Southern Sudan, environmental governance is in its infancy, but the early signs are positive. High-level political and cross-sector support is visible, and UNEP considers the new structures to be relatively suited to the task.

Environment and international aid: reduced environmental impact of relief operations and improved UN response to environmental issues necessary

The environmental assessment of the international aid programme in Sudan raised a number of issues that need to be resolved to avoid inadvertently doing harm through the provision of aid, and to improve the effectiveness of aid expenditure in the environmental sector. UNEP's analysis indicates that while most aid projects in Sudan do not cause significant harm to the environment, a few clearly do and the overall diffused impact of the programme is very significant.

One major and highly complex issue is the environmental impact of the provision of food and other emergency aid to some 15 percent of the population, and the projected impact of the various options for shifting back from aid dependence to autonomous and sustainable livelihoods. Indeed, the country is presently caught in a vicious circle of food aid dependence, agricultural underdevelopment and environmental degradation. Under current circumstances, if aid were reduced to encourage a return to agriculture, the result in some areas would be food insecurity and an intensification of land degradation, leading to the high likelihood of failure and secondary displacement.

The integration of environmental considerations into the current UN programme in Sudan needs to be significantly improved. In addition, the environment-related expenditure that does occur – while acknowledged and welcome – suffers from a range of management problems that reduce its effectiveness. Priorities for the UN and its partners in this field are improved coordination and environmental mainstreaming to ensure that international assistance 'does no harm' to Sudan's environment, and 'builds back better'.

General recommendations

1. **Invest in environmental management to support lasting peace in Darfur, and to avoid local conflict over natural resources elsewhere in Sudan**. Because environmental degradation and resource scarcity are among the root causes of the current conflict in Darfur, practical measures to alleviate such problems should be considered vital tools for conflict prevention and peacebuilding. Climate change adaptation measures and ecologically sustainable rural development are needed in Darfur and elsewhere to cope with changing environmental conditions and to avoid clashes over declining natural resources.

Food distribution in Um Shalaya IDP camp, Western Darfur. Over six million Sudanese depend on food aid provided by the international community

2. **Build capacity at all levels of government and improve legislation to ensure that reconstruction and economic development do not intensify environmental pressures and threaten the livelihoods of present and future generations.** The new governance context provides a rare opportunity to truly embed the principles of sustainable development and best practices in environmental management into the governance architecture in Sudan.

3. **National and regional government should assume increasing responsibility for investment in the environment and sustainable development.** The injection of oil revenue has greatly improved the financial resources of both the Government of National Unity and the Government of Southern Sudan, enabling them to translate reform into action.

4. **All UN relief and development projects in Sudan should integrate environmental considerations in order to improve the effectiveness of the UN country programme**. Better coordination and environmental mainstreaming are necessary to ensure that international assistance 'does no harm' to Sudan's environment.

Concluding remarks

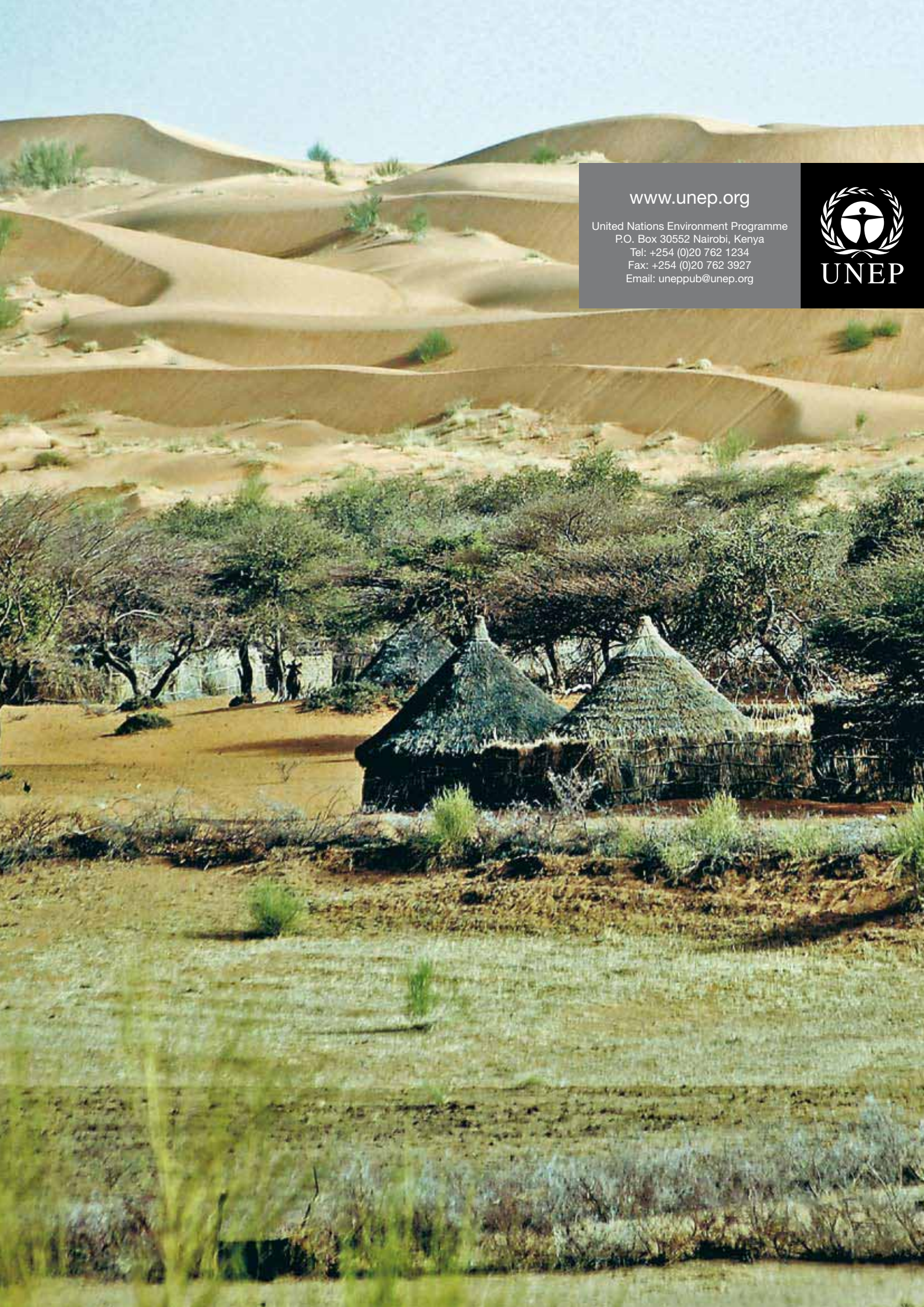
Sudan is now at a crossroads. While the country clearly faces many severe environmental challenges, the combination of the 2005 Comprehensive Peace Agreement and the oil-driven economic boom represents a major opportunity for positive change.

The sustainable management of the country's natural resources is part of the solution for achieving social stability, sustainable livelihoods and development in the country. For this goal to be reached, however, it will be necessary to deeply embed a comprehensive understanding of environmental issues in the culture, policies, plans and programmes of the Government of Sudan and its international partners, such as the United Nations.

This will require a long-term process and a multi-year commitment from both the Government of Sudan and its international partners. As the environmental expert of the United Nations, UNEP is ready to assist the Government and people of Sudan, as well as their international partners, in taking forward the recommendations developed from this assessment.

Accessing further information

This document is a concise summary of the findings of the UNEP post-conflict environmental assessment of Sudan. The main report, which includes detailed sector-specific recommendations, may be accessed online via the UNEP Sudan website: http://sudanreport.unep.ch. Additional information on the environment of Sudan available on this website includes technical reports, historical literature, over a thousand photographs, and a short film.



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