

AFRICA'S LAKES

Atlas of Our Changing Environment



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Foreword

As we proceed into the 21st century, at least one-third of the world's population lives in countries with moderate to high water stress. The report on Water Policy Challenges, which was considered by the African Ministers' Council on Water (AMCOW) at the Pan African Implementation and Partnership Conference in December 2003, and the first United Nations World Water Development Report have both highlighted the water-related threats and vulnerabilities confronting humankind. These vulnerabilities are on the increase, particularly in Africa, and notably with regard to the continent's river and lake basins.

It is becoming increasingly clear that the availability of water resources will have a critical impact on the success of future efforts to alleviate poverty across Africa. The data provided in this Atlas of African Lakes makes abundantly clear just how threatened our precious water resources are becoming, through over-use, pollution, the destruction of ecosystems, and climate change. Satellite images of Africa confirm that dramatic environmental changes are affecting the continent's 677 natural and human made reservoirs, which contain an estimated 30 000 cubic kilometres of fresh water—the world's largest volume. It is, indeed, a wake-up call for Africans—and the international community—to take urgent action.

The rapid shrinking of Lake Songor in Ghana, partly as a result of intensive salt production, and the extraordinary changes in the Zambezi river system as a result of the building of the Cahora Basa Dam sit beside more familiar images of the 90 per cent shrinkage of Lake Chad. Other impacts, some natural and some human-made and which can only be truly appreciated from space, include the extensive deforestation around Lake Nakuru in Kenya. Satellite measurements detailing the falling water levels of Lake Victoria are also mapped. Africa's largest freshwater lake is now about a metre lower than it was in the early 1990s.

The Water Agenda of the new Partnership for Africa's Development (NEPAD) and the constitution of AMCOW exemplify positive recent developments in addressing these threats. At the 2003 Pan African Implementation and Partnership Conference on Water in Addis Ababa, African ministers pledged their commitment to the coordinated, multi-sectoral development of the continent's water resources in order to provide sustainable freshwater supplies for urban development, agricultural and industrial uses, low and flat lands management, and other activities covered by the new Integrated Water Resource Management (IWRM) policies.

It is estimated that over 300 million people in Africa face water scarcity conditions. By 2025, 18 African countries are expected to experience water stress. On the other hand, Africa has 60 international river basins whose freshwater potential could benefit all of their riparian communities. Transboundary cooperative mechanisms for the management of these shared resources are underdeveloped, however, further reducing their potential to meet growing freshwater requirements. The achievement of the MDGs will remain elusive in Africa without a major paradigm shift in water resources management.

A high-level African ministerial dialogue on The Management of Lake Basins for their Sustainable Use: Global Experience and African Issues, held during the 11th World Lakes Conference in Nairobi in November 2005, called for making the integrated

management of lake basins a long-term element of government and public priorities, planning and financing processes, integrated water resources management, habitat and biodiversity conservation, and economic development programmes. The resulting ministerial resolution recommended:

- The strengthening of local capacities for managing lake basins in a sustainable manner;
- The establishment of a Centre of Excellence in Africa for promoting a new generation of water and environmental planners and managers with skills in limnology and aquatic and environmental sciences;
- Consideration by the UN of the need to establish an International Year for Lakes; and
- The mobilisation of funds for supporting IWRM to meet the MDGs.

One of the priority areas for NEPAD is water and sanitation, and in response to the challenges faced in this sector the African Water Vision for 2025 was developed to stimulate more equitable and sustainable use and management of Africa's water resources for poverty alleviation, socio-economic development, regional cooperation, and environmental conservation. It is within this political and institutional setting that AMCOW has emerged as the principal mechanism for policy dialogue and coordination of strategies on water and sanitation among African countries, as well as with the international community.

AMCOW's efforts and increasing credibility have resulted in many successes already. It has established the African Water Facility (AWF), hosted by the African Development Bank, for the mobilisation of resources towards the MDG/WSSD targets for water and sanitation. Major development partners have committed resources to the AWF. AMCOW has cooperated with the UN agencies dealing with water, and has begun a strategic partnership with the EU Water Initiative. It is also charged with oversight of the implementation of NEPAD's water component. Through its Technical Advisory Committee and sub-regional arrangements, AMCOW cultivates a clear relationship with the Regional Economic Communities and River and Lake Basin Organisations for transboundary water management and development programmes.

As the current President of AMCOW, I strongly believe the Council is on the right track and warrants support from all stakeholders to translate the African Water Vision into reality and to put Africa on the road to achieving her commitments to the global community. The protection and management of freshwater resources is being addressed through AMCOW's triennial work programme, 2005-2007, which itself is designed as the platform on which Africa will move forward towards meeting the Millennium Development Goals on water and sanitation, as well as the WSSD targets for development of IWRM strategies. We firmly believe that it is only through the increasing coordination of our efforts—and through joining forces with civil society, the private sector and our international partners—that these challenges will be met.

H.E. Mrs. Maria Mutagamba

President of the African Ministers' Council on Water

Minister of State for Water Resources, Uganda

Preface

As well as being the principal source of livelihood for many individual communities, Africa's lakes contribute significantly to the continent's socio-economic development. However, these lakes are undergoing rapid changes due to human activities and climate change. This has altered ecosystem processes and resulted in several growing threats, including loss of biodiversity, over-fishing, eutrophication, the proliferation of invasive weeds, siltation, toxic contamination, and over-abstraction of water. If they are not carefully managed, Africa's lakes face a growing risk of becoming unsustainable for future generations.

There is a critical need for valid scientific data and environmental information to enlighten decision-makers and various stakeholders on the changes taking place in and around most lakes in Africa. Satellite imagery vividly captures these changes over large areas and long periods of time. Large water bodies can easily be mapped, identifying changes in their surroundings. This is particularly useful for illustrating human-induced changes across country borders, especially for transboundary lakes.

This Atlas was prepared as part of United Nations Environment Programme's (UNEP) contribution to the 11th World Lakes Conference, which was hosted in Africa for the first time in November 2005. Its overall objective is to show various changes within Africa's lakes in an integrated manner, by the use of remote sensing technologies, geographic information systems, and case studies on particular lakes. This publication uses satellite images to document, assess and vividly illustrate the changes in and around African lake basins over recent years.

It is important to note that water systems are sensitive barometers of the health of our planet. While water covers most of the Earth's surface, less than two per cent of water bodies consist of fresh water – and most of that is bound in the polar icecaps. Indeed, fresh water in a liquid state is very scarce. Severely aggravating the problem is that most of the world's available fresh water is concentrated in relatively few large lakes, many of which are shared by two or more countries.

We hope the information contained in this Atlas will prove useful not only for managing and monitoring selected lakes, but will also underscore the intrinsic value of harnessing, visualising, assessing and promoting new technologies to gain a deeper understanding of the changes affecting Africa's lakes, and their impacts on the environment and societies living around them. As a follow up to the 11th World Lakes Conference, UNEP will be updating this Atlas in order to enlarge its scope and content. In Africa, as elsewhere, UNEP continues to work closely with governments and other partners on a number of initiatives aimed at the environmentally sound management of the continent's vital freshwater lakes.



Klaus Töpfer

Executive Director, UNEP

NP Clark/UNEP/MorgueFile



Main Findings

Status and trends

- Due to differences in methods for classifying water bodies as lakes, the precise number of lakes in Africa is difficult to determine. However, according to the WORLDLAKE database, there are 677 lakes in Africa.
- Lakes are a source of livelihoods for many African communities. However, Africa's lakes are subject to a variety of human-induced pressures as well as climate change. If they are not managed properly, the continent's lakes risk over-exploitation and loss of sustainability for future generations.

Pressures on Lake Victoria

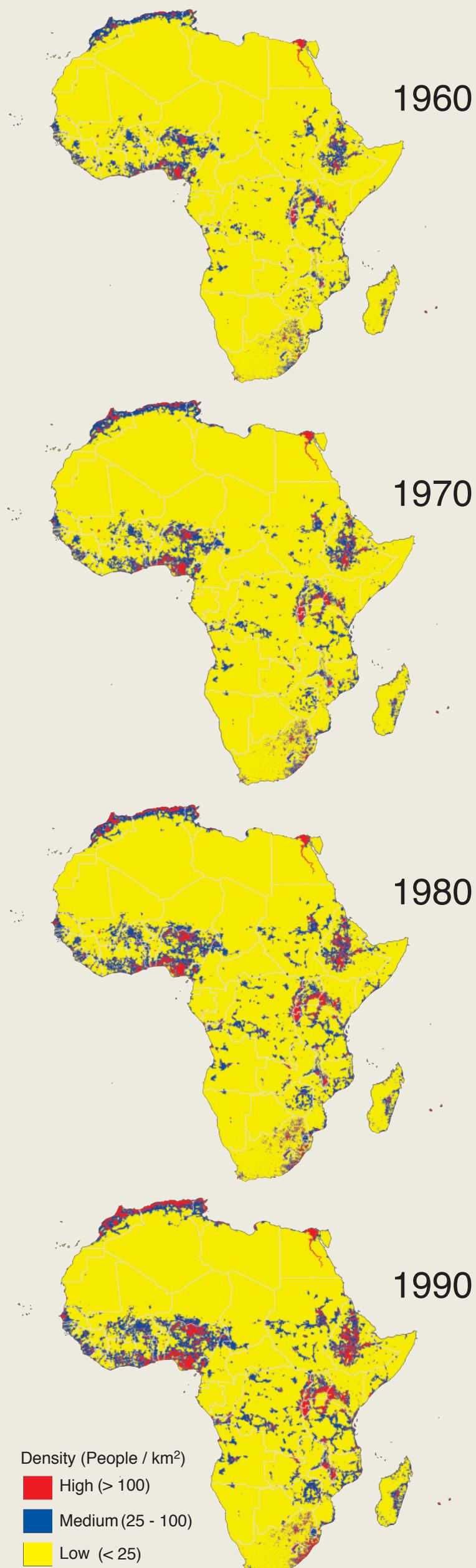
- Population growth around the continent's largest lake, Lake Victoria, is significantly higher than the rest of Africa. In recent decades, the rate of population growth within a 100 km (62 mile) buffer zone around the lake has outpaced the continental average, reflecting growing dependency and pressure on the lake's resources.
- Lake Victoria's level variation, derived from satellite altimeter measurements, shows a negative height variation trend—even after the significant inflows of water from the 1997-98 flooding. This pattern should be of long-term concern to all the countries of East Africa, as well as those along the Nile Basin.
- Lake Victoria was widely invaded by water hyacinth during the 1990s. Initially, the hyacinth was controlled by hand, with the plants being manually removed from the lake. More recent control measures include the careful introduction of natural insect predators and some improvements can be seen, even from space.

Unsustainable use of Lake Chad and Lake Tonga

- Lake Chad's area has shrunk by 95 per cent over the past 35 years, driven by a complex interaction between climatic and human causes. Lake Chad's surface area decreased from 22 902 km² (8 843 square miles) in 1963 to a mere 304 km² (117 square miles) in 2001. Studies reveal that the drastic decline in the lake level and area since the 1970s can be attributed in nearly equal parts to the continued decrease in precipitation over the basin and to the widespread increase of irrigated agriculture.
- Uncontrolled damming, the withdrawal of water for irrigation, and climate variability are the major causes of the drying up of Lake Tonga in Algeria.

Transboundary lakes and river basins

- There are 15 natural lakes that cross the political boundaries of two or more countries in Africa, namely Lakes Victoria, Chad, Turkana, Tanganyika, Tana, Rudolf, Natron, Malawi, Mweru, Kivu, Kariba, Edward, Chilwa, Albert and Abe. The extent of water in the human made Lake Nasser falls across the boundaries of Egypt and Sudan.
- There are 60 transboundary river basins in Africa, covering over 63 per cent of the continent's land area. Of these, two countries share 30 basins and more than two countries share the remainder. The Congo Basin is shared by 13 countries, followed by the Niger and Nile basins with 11 countries, and the Zambezi and Chad basins, with nine and eight countries respectively.
- The Congo, Nile, Niger, Chad and Zambezi river basins occupy about 42 per cent of Africa's land area and sustain over 44 per cent of the continent's population.



- Population density is the highest in the Nile Basin, followed by the Niger Basin. The Chad Basin had the lowest population growth between the 1960s and the 1990s.

“Killer lakes”

- Some lakes in central Africa have become known as “killer lakes,” because of the catastrophic natural events that have occurred in their vicinities. Lakes Monoun, Nyos and Kivu are located in active volcanic areas; in 1984 and 1986, CO₂ bursts in Lakes Monoun and Nyos led to the sudden deaths of 37 and 1 746 people respectively.
- A breach of the natural dam in Lake Nyos appears imminent, with a high likelihood of this occurring within the next five years.

Threats to Africa’s lakes

- Rapid population growth continues to pose a major threat to Africa’s lakes and its most significant freshwater reservoirs.
- The continent’s freshwater supplies are being threatened by both natural phenomena and human factors.

The major natural threats facing Africa’s lakes include:

- The transboundary nature of most freshwater resources
- Extreme and temporal variability of climate and rainfall
- Growing water scarcity, the shrinking of some water bodies, and desertification

The main human-induced threats include:

- The multiplicity of transboundary river basins, with different countries pursuing their own management and extraction agendas, often in conflict with conservation priorities
- Depletion of water resources through pollution, deforestation, overgrazing and soil erosion
- Failure to invest adequately in resource assessment, protection and development
- The expansion of large-scale irrigation and dams
- Unsustainable financing of investments in water supply and sanitation

Other threats include:

- Drought and flooding
- ‘Killer lakes’
- Invasive species
- The potential collapse of dams

Hope for the future?

The Africa Water Vision for 2025 (World Commission on Water for the 21st Century) calls for:

- Strengthening the governance of Africa’s freshwater resources
- Improving national and regional water wisdom
- Meeting the most urgent water needs
- Strengthening the financial base for a sustainable water future

By supporting this vision, it is hoped that the conditions in and around Africa’s lakes can be steadily improved over time.

