UNEP

ENVIRONMENT STATISTICS & INDICATORS FOR KEEPING AFRICA's ENVIRONMENT UNDER REVIEW

Workshop on Environment Statistics
Yaounde, Cameroon

5 – 9 December 2011

Introduction and Background

UNEP Mandate

To keep under review the

state of the global environment….

UNGA Resolution 2997 (XXVII) of 1972

UNEP Mission

“The environment is the basis for achieving prosperity, stability and equity is sustained”

The environment arm of the UN….

As part of the UN Reforms....

UNEP Medium Term Strategy (MTS) 2010-2013

- **Climate Change:**
  - **Strengthen vulnerable states resilience to a changing climate**
  - **Facilitate the transition of a low greenhouse gas emission global economy**

- **Ecosystem management:**
  - **Manage ecosystems to enhance human well-being**

UNEP Medium Term Strategy (MTS) 2010-2013

- **Environmental Governance:**
  - **Structures and means of environmental governance are strengthened for effective decision-making and action**

- **Harmful Substances and Hazardous wastes:**
  - **Minimize the environmental and human impact of harmful substances**

UNEP Medium Term Strategy (MTS) 2010-2013

- **Disasters and conflict:**
  - **Minimize environmental threats to human well-being from conflicts, disasters and industrial accidents**
- **Resource efficiency:**
  - **Natural resources are used and consumed in an environmentally sustainable way**

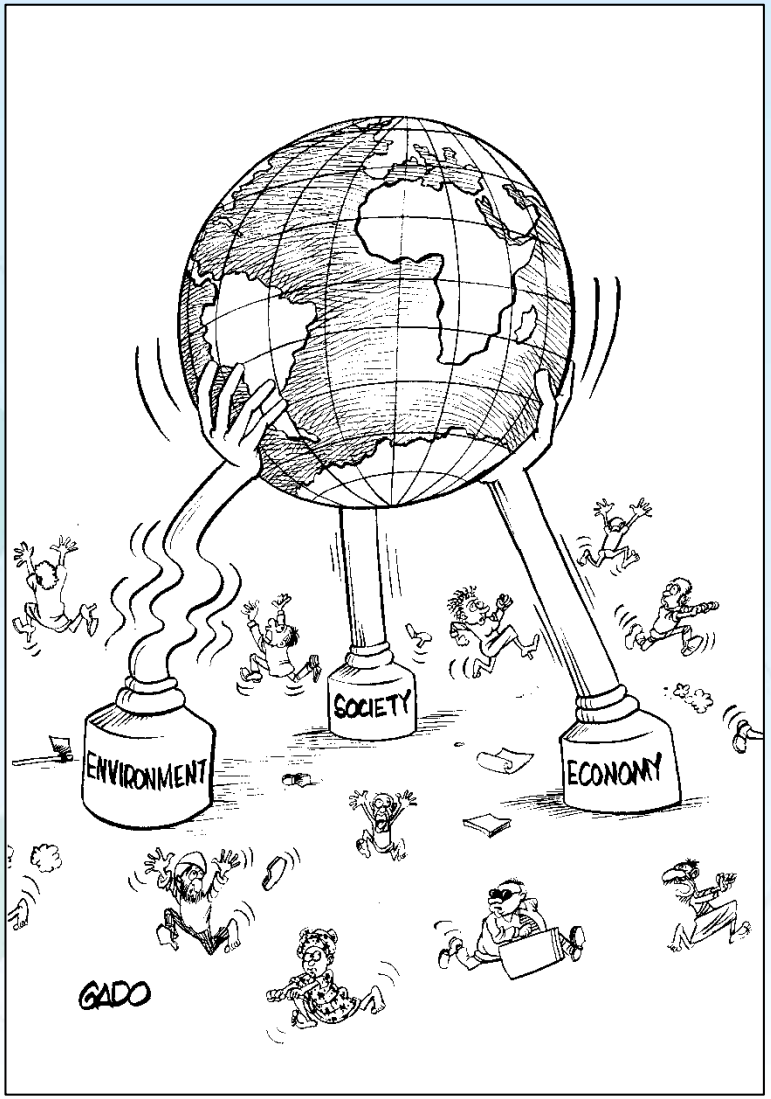
DEWA Mission

- adding essential value to environmental data and information as input to and follow-up from intergovernmental decision-making processes;

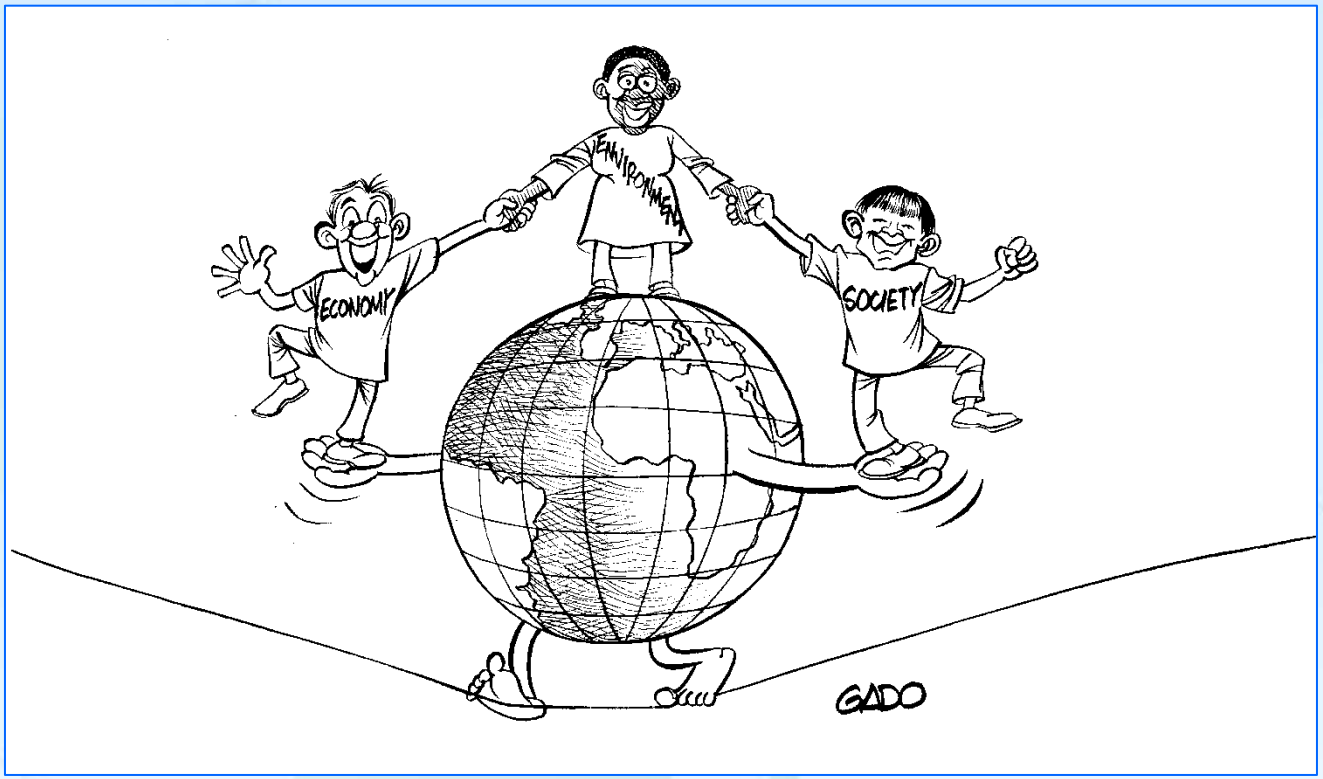
- the authoritative resource within the UN system for scientifically credible, environmental assessment tools and methodologies to support national sustainable development planning and implementation;

UNEP Env. Assessment Areas

UNEP assessments concerned with sustainable development, taking into account its three pillars, ***Social, economic and environment***



IEA multidimensional…



Integrates social, economic and environmental issues in the analysis

GEO reports using of IEA

- Analyze environmental change, causes and impacts, and policy responses over time
- Such responses include MEAs and their impacts on addressing challenges
- Communicates, raises awareness, provides policy options

Background – AEO Reports

- In response to the mandate above, UNEP has been providing support AMCEN to produce the Africa Environment Outlook (AEO) reports;
- First Africa Environment Outlook report (AEO-1) was prepared & launched at 9th AMCEN session, Kampala, 4th July 2002;
- Second AEO report (AEO-2) launched in Brazzaville on 25th May 2006 at the AMCEN session;
- AEO-3 process is currently underway in collaboration with WHO, UNECA and CCs – Theme "Health & Environment"

Data issues in Africa

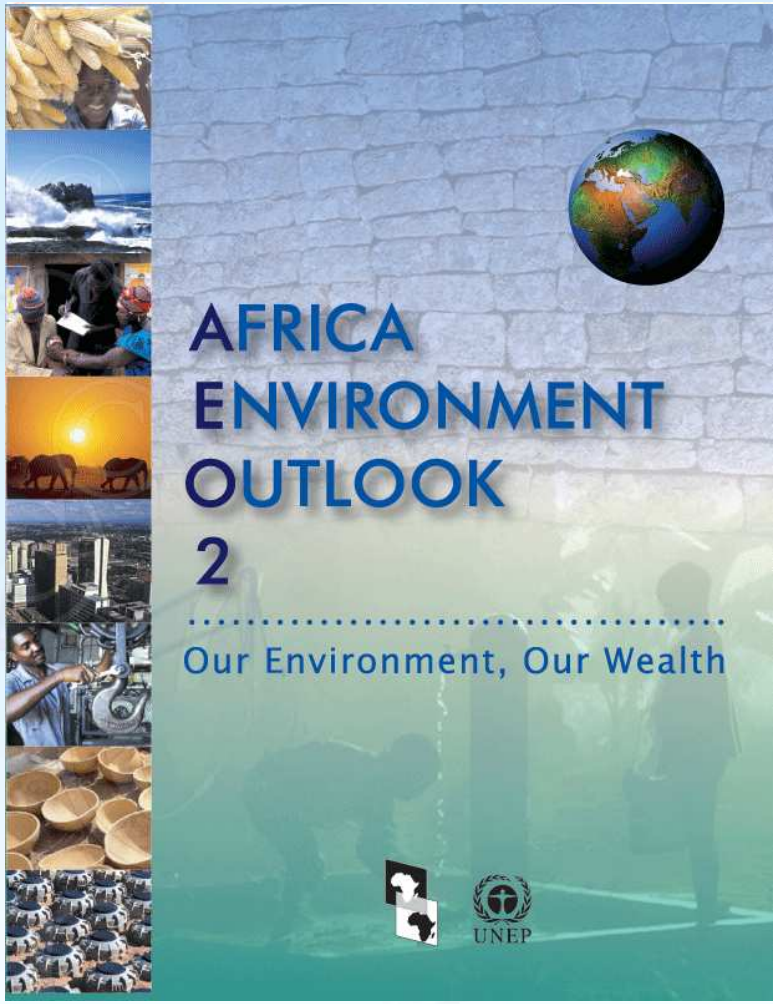
- Process of producing national and sub-regional inputs for the AEO reports revealed serious shortcomings in existing data and information;
- As a result, AMCEN, in July 2002 also approved the proposal for the establishment of a comprehensive environmental information network (AEIN) to promote access and harmonization of data in Africa and act as a basis for tracking environmental changes using quantitative indicators focusing on national needs;
- As a result of the gaps and weaknesses in data and information to support environmental assessment at national and regional levels, AEIN stakeholders and AEO-2 meetings emphasized the need to form a Data Working Group (AEO-DWG) to advice on data issues in the Africa;

AEO-2 Report and process

- Provides an integrated analysis of emerging issues under the NEPAD Environment Action Plan thematic areas, focusing on the driving forces, the impacts on human vulnerability. Also highlights opportunities

- Helps track regional level progress in terms of meeting the environmental targets set under the Millennium Development Goals (MDG).

NOTE: All the 8 goals are critical to SD in Africa



GEO family of products

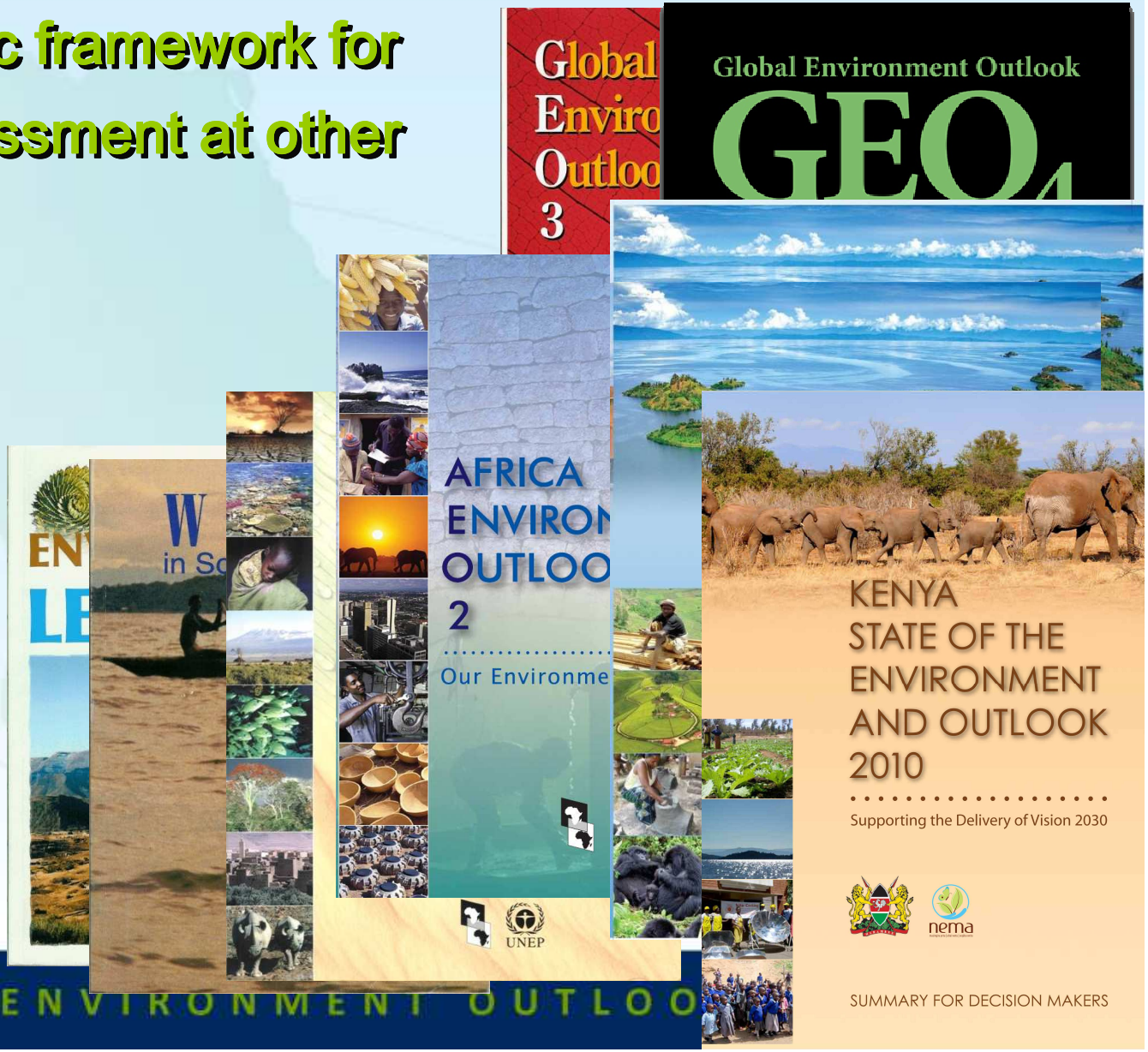
Provides a holistic framework for carrying out assessment at other levels of scale

Global
e.g. GEO

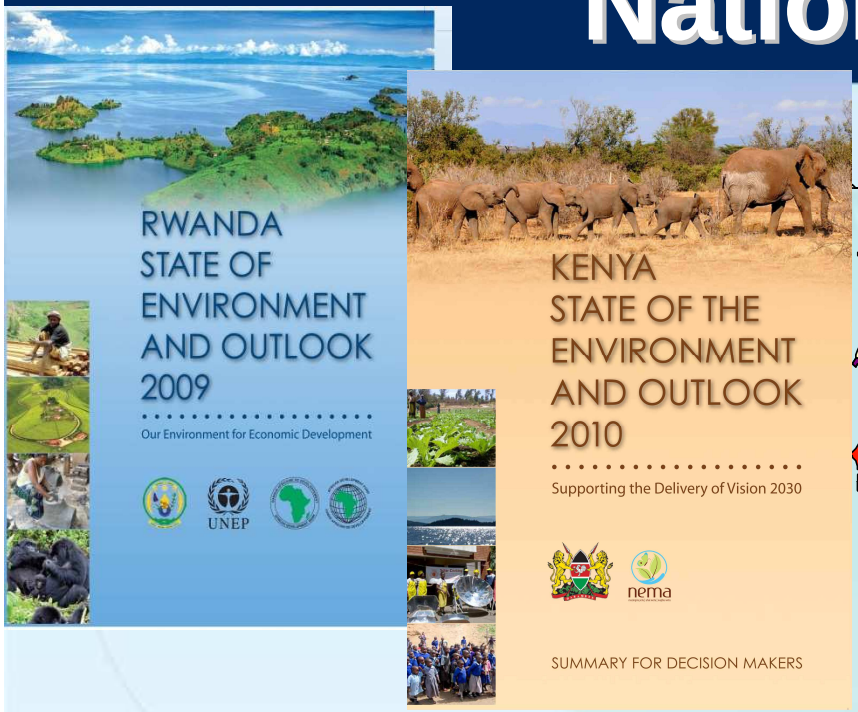
Regional
e.g. AEO

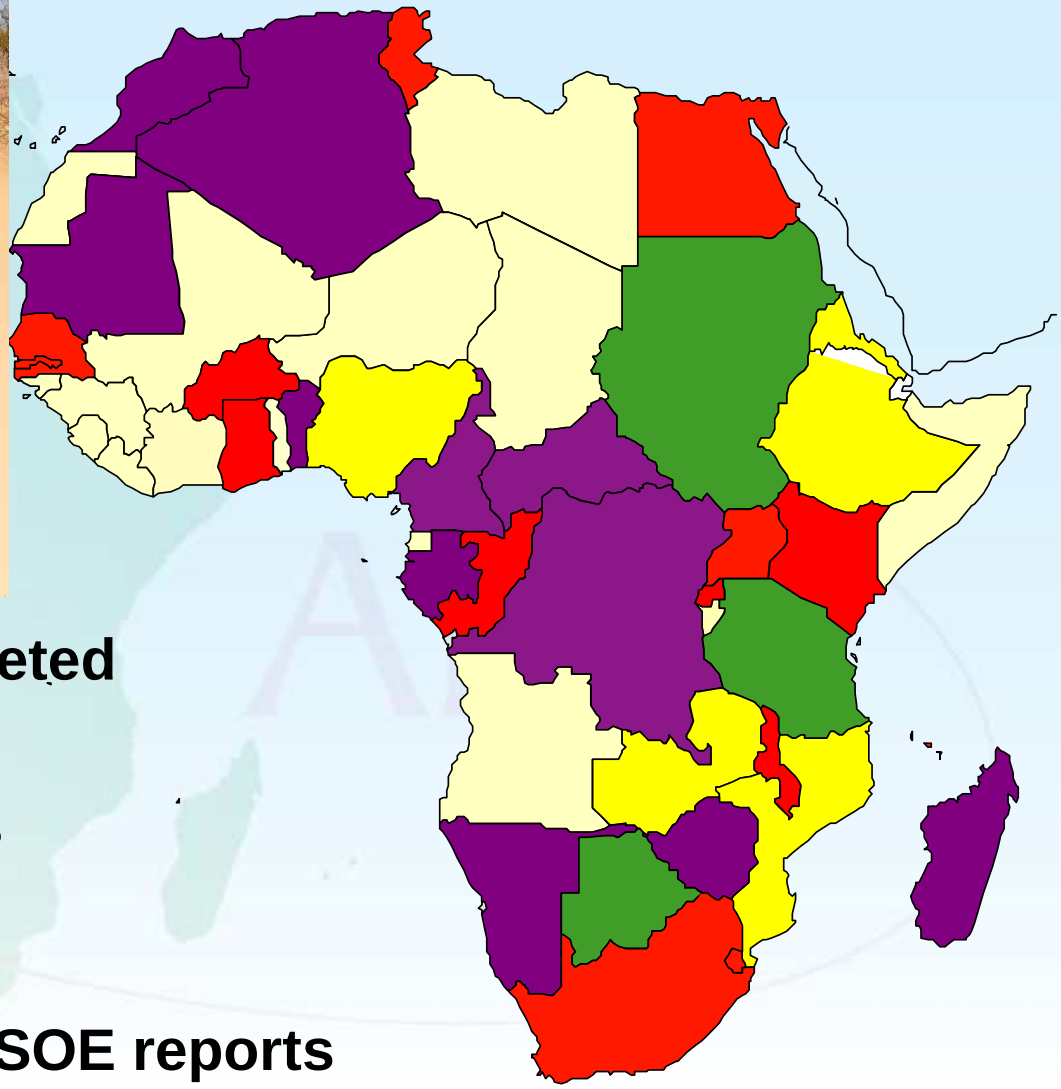
Sub-Regional
e.g. Water in Southern Africa

National
e.g. Lesotho SOE



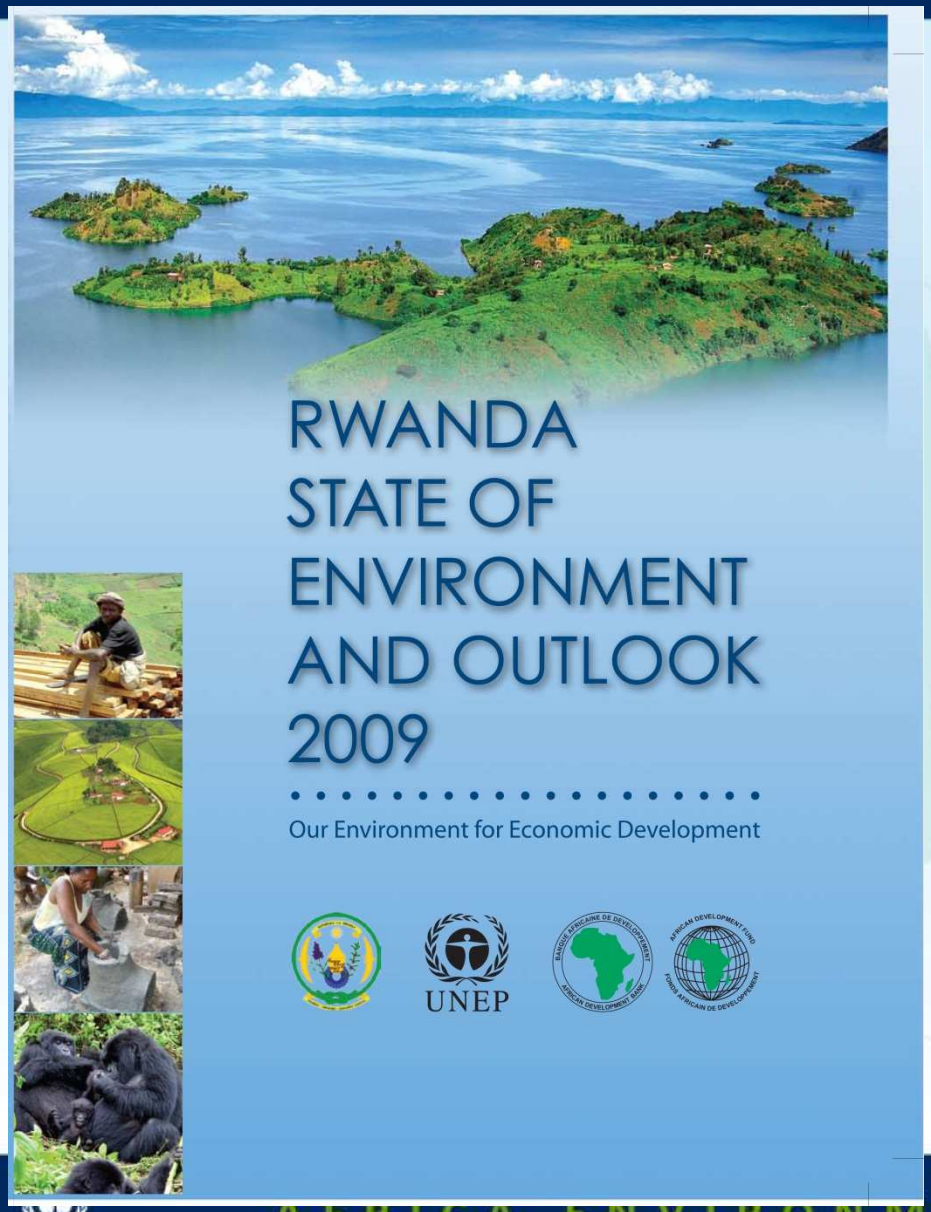
National Reports

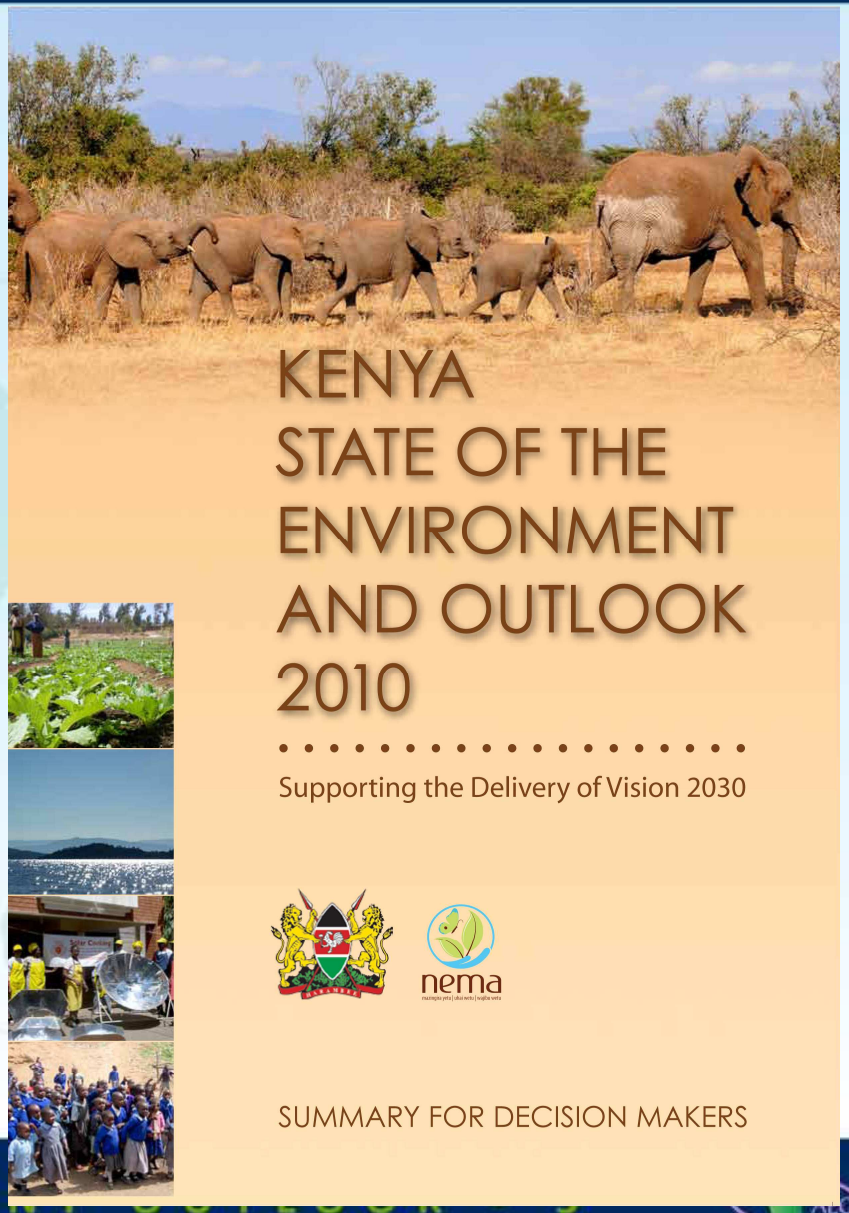




- **IEA/SOE reports Completed**
- **IEA reports: Under preparation/final stages**
- **IEA reports planned**
- **SOE like/ GEO-derived SOE reports**

Most recent env. outlook reports





Collaboration with UNSD, UNECA

- AEO-DWG realized the need to harmonize and work with other similar regional initiatives, led by UNSD, UNEP and UNECA, to develop environmental statistics for Africa;
- Members of the AEO-DWG therefore participated in workshops organized by UNEP, UNSD and UNECA to build capacity of African countries on environmental statistics and indicators;

Regional env. Stats workshops

- UNEP, UNSD and ECOWAS workshop for environmental statistics, Dakar, Senegal, 28 February to 4 March 2005;
- UNEP, UNSD & UNECA workshop for Eastern, Southern and Western Indian Ocean Islands, Addis Ababa, UNECA headquarters, 16 to 20 July 2007;
- UNEP, UNSD and ECOWAS workshop to adopt the proposed core list of environmental indicators and to test the indicators methodology sheets, May 2008, recently in March 2011;

Core list of Env. Indicators

- The process has seen the development of a harmonized list of environmental indicators for Africa;
  - Indicators respond to the NEPAD environment priority areas;
  - Are also relevant for monitoring and reporting on the Millennium Development Goals (MDGs) and;
  - Relevant for addressing the areas identified by the UN Commission on Sustainable Development (CSD);

Sample – Forest and Woodlands

Priority Area	Indicator
Forest change	Proportion of land area covered by forest [MDG]
	Area of forest under sustainable forest management [NEPAD/ CSD]
	Proportion of protected forest area to the total forest area [NEPAD/MDG]

Sample - Land

Priority Area	Indicator
Land tenure/ ownership	Proportion of population with secure land tenure [NEPAD]
	Percentage distribution of land area by ownership rights
Land quality (degradation)	Land affected by desertification [NEPAD/ CSD]
	Land degradation [NEPAD/ CSD]
	Proportion of land area affected by contamination [NEPAD]
Land use change	Land use change [CSD]

Indicators methodology sheets

- The workshops have also developed indicator methodology sheets which aim at harmonizing and mainly providing:
  - common name of indicator,
  - definition,
  - unit of measurement,
  - data needed to measure the indicator,
  - purpose of indicator,
  - its relevance to policy and sustainable development,
  - Etc.

- AEO-DWG used the indicators to update the AEO/NEPAD Opportunity-Themes-Issues-Data-Indicator matrix (includes WEHAB);

AEO/NEPAD indicators matrix

NEPAD: Themes – Issues – indicator – statistics

Human Well being/Development

Thematic Area/ *(NEPAD Programme area - PA)*	**NEPAD Priorities**	**Priority Issues**	**Lead Indicator(s)**	**Type of Indicator (D, P, S, I, R, O)**	**Units**	**Global or Regional sources/Data Providers (to be refined in consultation with data producers)**
Socio-economic issues	*Human beings are at the centre of concern for sustainable development. They are entitled to a healthy and productive life in harmony with nature*					
	Sustainable development, Economic well being, Social well being	Human development	· Population growth rate;	**S, P**	*%, -.*	UNDP, WB, AfDB (regional), WRI, UNAIDS, Human Development report, WHO
			· Economic growth rate (GDP)	**S, P**	*%*	
			· Education rate(illiteracy/literacy) by gender;	**O**	*%, -.*	
			· Human development index;	**S, P**	*%*	
			· Improved drinking water coverage - total population;	**O**	*-.*	
			· % of literate adults (per of total population);	**S, P**	*%, -.*	
			· % age of population in primary education(by gender);	**S, P**	*%, -.*	
			· % age of population in secondary education(by gender);	**S, P**	*%, -.*	

Type of Indicator:	D: Driving forces, P: Pressure, S: State, I: Impact, R: Response, O: Opportunity

NOTE: All the data should be dis-aggregated to show gender disparities.
Data should also present (Male, Female, Urban, Rural)

AEO/NEPAD indicators matrix (cont…)

NEPAD: Themes – Issues – indicator – statistics

Thematic Area/ *(NEPAD Programme area - PA)*	**NEPAD Priorities**	**Priority Issues**	**Lead Indicator(s)**	**Type of Indicator (D, P, S, I, R, O)**	**Units**	**Global or Regional sources/Data Providers (to be refined in consultation with data producers)**
Land Use	***[PA1] Combating Land degradation, drought and desertification*** Implement *objectives of the UNCCD* and at the same time improve livelihoods and contribute to food security on the continent through:					
	Sustainable land use	· Land tenure/ownership	· % of population (by groups, gender) with secure land tenure.	**S**	*%*	*UNEP/ FAO, ISRIC:GLASOD, FAO, FAOSTAT.FRA, SOFO, Global Forest Watch, World Development Indicators, WRI*
			· % of land area by ownership categories;	**O**	*%*	
		· Land Quality (degradation)	· Land affected by desertification;	**S**	***Km²*, *%***	
			· Land degradation; -wind/water erosion -salinization	**S**	***Km²*, *%***	
			· % of land/area effected by contamination;	**S, I**	***Km²*, *%***	
		· Land use change	· Land use change	**S**	*%*	
Agriculture		· Agriculture	· Agricultural Production Index.	**S**		*UNEP/ FAO, ISRIC:GLASOD, FAO, FAOSTAT.FRA, SOFO, Global Forest Watch, World Development Indicators, WRI*
		· Irrigation	· % of land/agricultural area under irrigation;	**S, O**	*%*	
		· Use of pesticides/ fertilizers	· Use of agricultural pesticides;	**S, I**	***metric tons per 10 km²***	
			· Number of reported cases of contamination of toxic substances;	**I**		
			· Fertilizer consumption;	**S, I**	***kg/kg***	
		· Rangeland carrying capacity	· Livestock pressure over carrying capacity	**S, I**	**-**	

AEO/NEPAD indicators matrix (cont…)

NEPAD: Themes – Issues – indicator – statistics

Thematic Area/ *(NEPAD Programme area - PA)*	**NEPAD Priorities**	**Priority Issues**	**Lead Indicator(s)**	**Type of Indicator (D, P, S, I, R, O)**	**Units**	**Global or Regional sources/Data Providers (to be refined in consultation with data producers)**
Forests and Woodlands	***[PA 6] Cross-border conservation or management of natural resources***					
	Protect and sustainably manage Africa's forest resources through:					
	Strengthening national programmes for forest management, inventory and monitoring	· Forest change (loss/degradation);	· Proportion of land area covered by forest;	**S, R**	***10^3 hectares***	FAO: FAOSTAT, FRA/SOFO, Global Forest Infor,ation System, IUCN, IUFRO, Global Forest Watch, WWF, CONFAK
			· % of forests damaged (abiotic, biotic and human induced);	**O, P**	***10^3 hectares, (%)***	
			· Area of forest under sustainable forest management;	**S, O**	***%, 10^3 hectares***	
			· Rate of afforestation/ deforestation;	**S, O**	***%, 10^3 hectares***	
		· Forest resources management;	· % of exports of forestry products;	**O**	***%, 10^3 hectares***	
	Maintaining protected forest areas	· Established protected areas (forests, etc).	· % of protected forest areas to the total forest area;	**S**	***%, 10^3 hectares***	

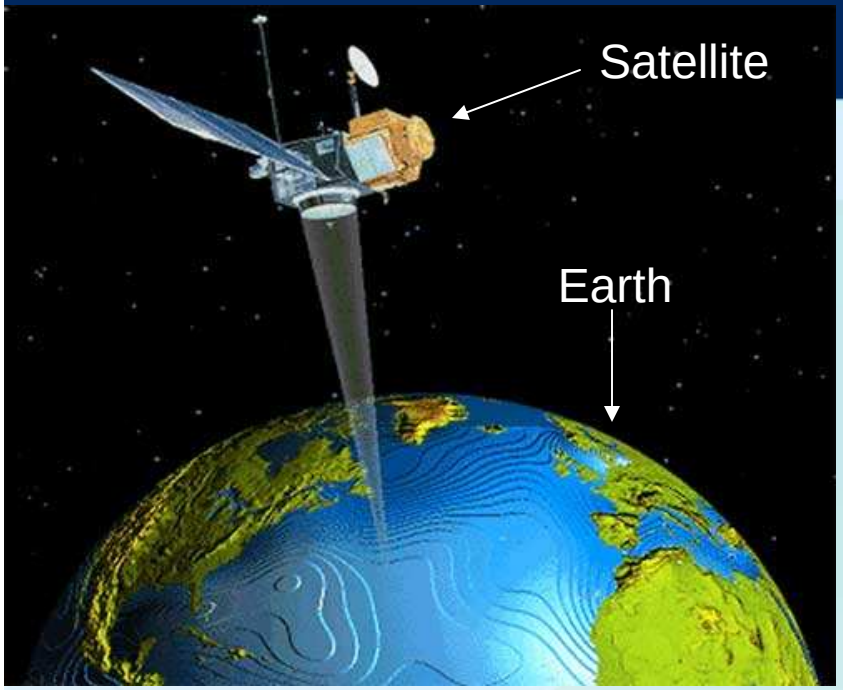
Application of Indicators

ATLASES :

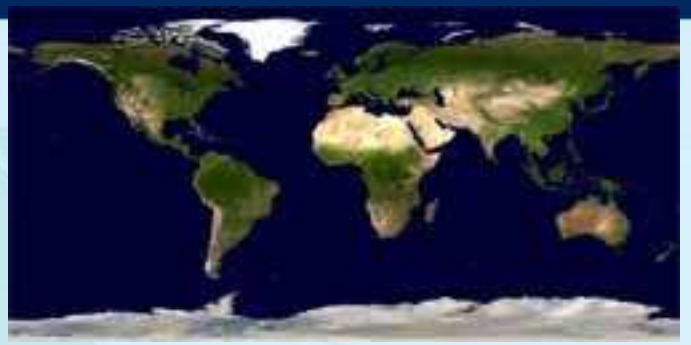
Range of Atlases of our Changing Environment

ATLASES : Range of Atlases of our Changing Environment

- **WHAT & WHERE:**
  - **What is happening where?**
- **WHY**
  - **Trend over time is the most compelling information**
  - **Hope images will contribute to change the way we perceive the environment**
  - **"A Picture is worth thousands words" and "Seeing is believing"**
- **HOW**
  - **Story of environmental changes told using current and historical satellite data, ground photographs and a short narratives**



Spatial Resolution



Global (>1km)

Local (1m)

1st Earth Observation satellite launched in 1972

Distance from Earth – approx. 720 km (447 miles)

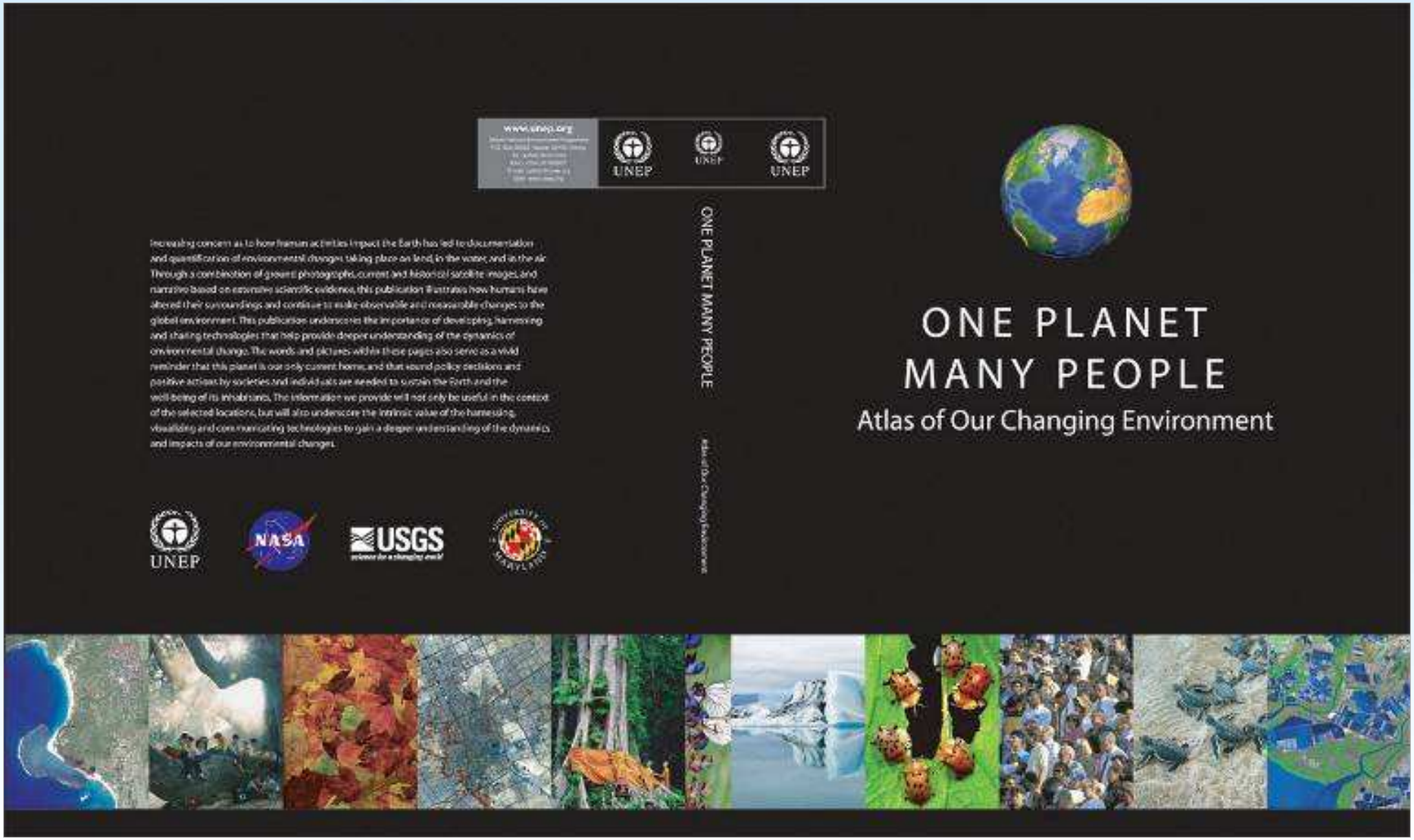
Objectives of Atlas

- Provide visual evidence of ecological assets, transboundary issues and environmental changes to make public and decision-makers aware of these issues;
- Identify important environmental issues, track progress towards them and tell stories of local changes in all 53 countries;
- Draw attention towards MDG Goal 7: Environmental Sustainability;
- Help connecting local to global through images, interesting facts & figures and graphics;
- Provide resource materials for educational purposes.

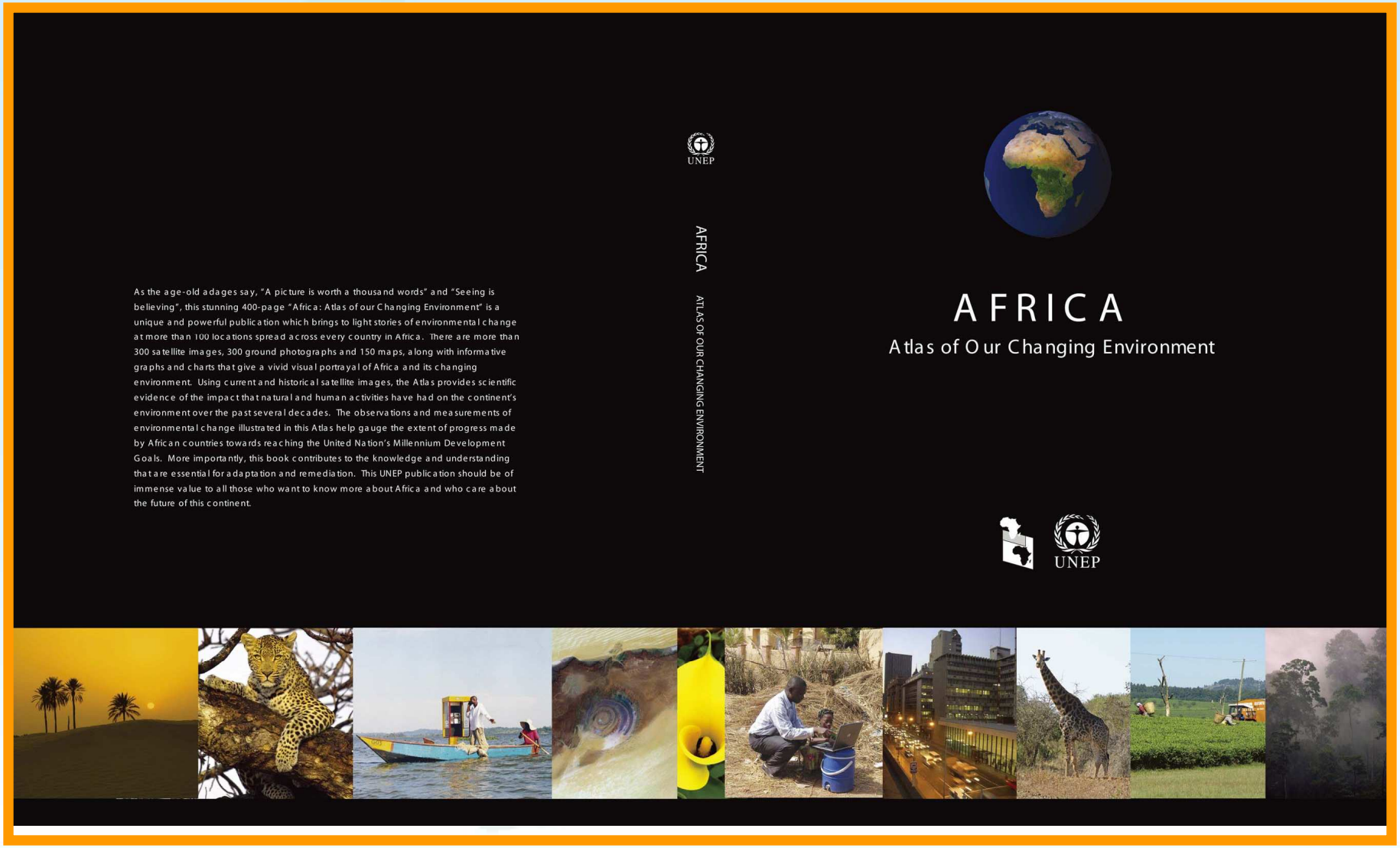
What policy relevant questions being addressed?

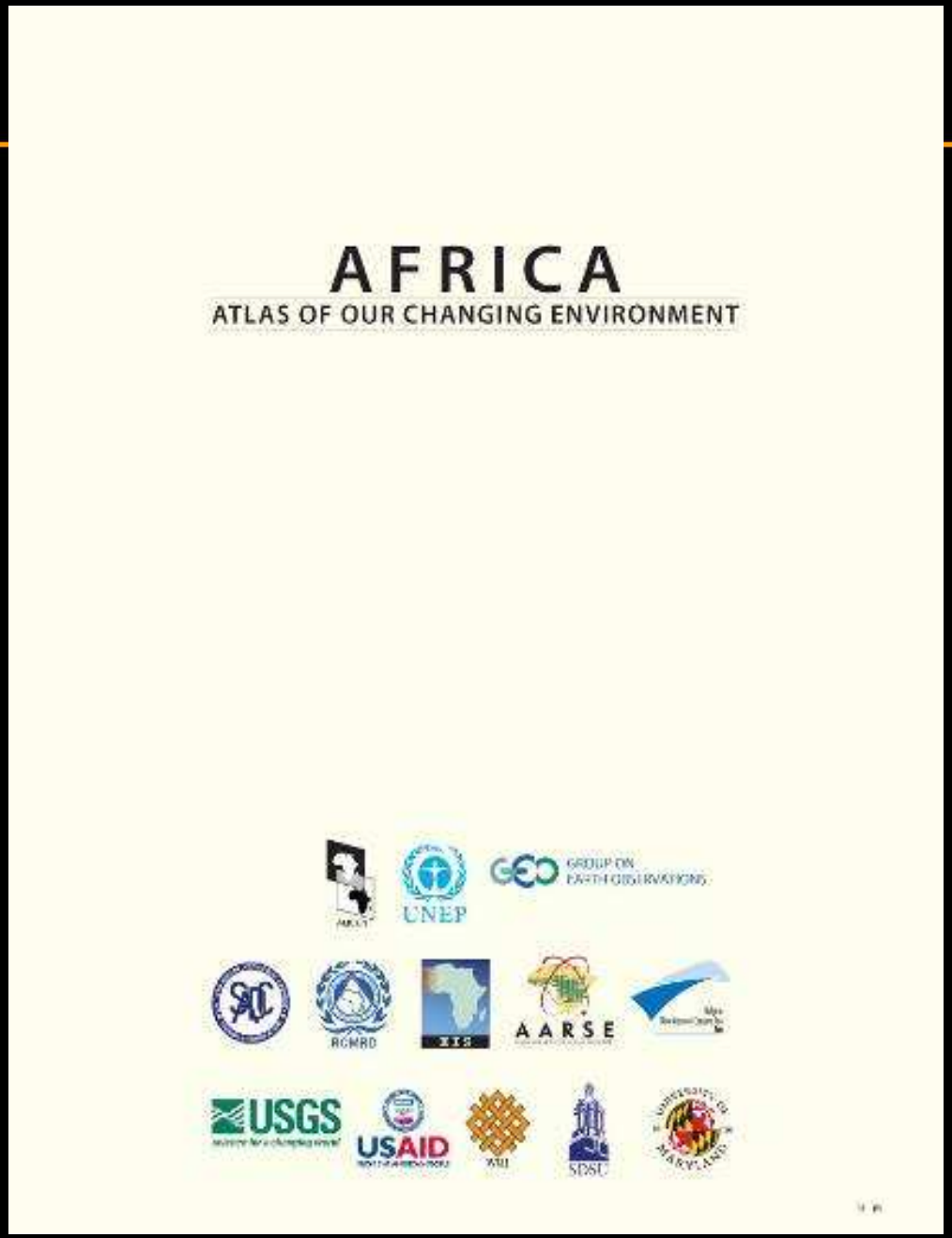
- What is status and trend of environment in Africa?
- What are transboundary issues which needs international cooperation?
- What are important environmental issues in each of African Countries? (Priority Setting)
- What progress countries have made towards MDG7?
- What are "scientific evidence" of significant local environmental changes in countries? (Risks and opportunities)
- What and Where are place based early warning of emerging issues?
- What are some interesting facts and figures about African countries?

One Planet Many People: Atlas of our Changing Environment



AFRICA: Atlas of our Changing Environment





AFRICA: Atlas of our Changing Environment

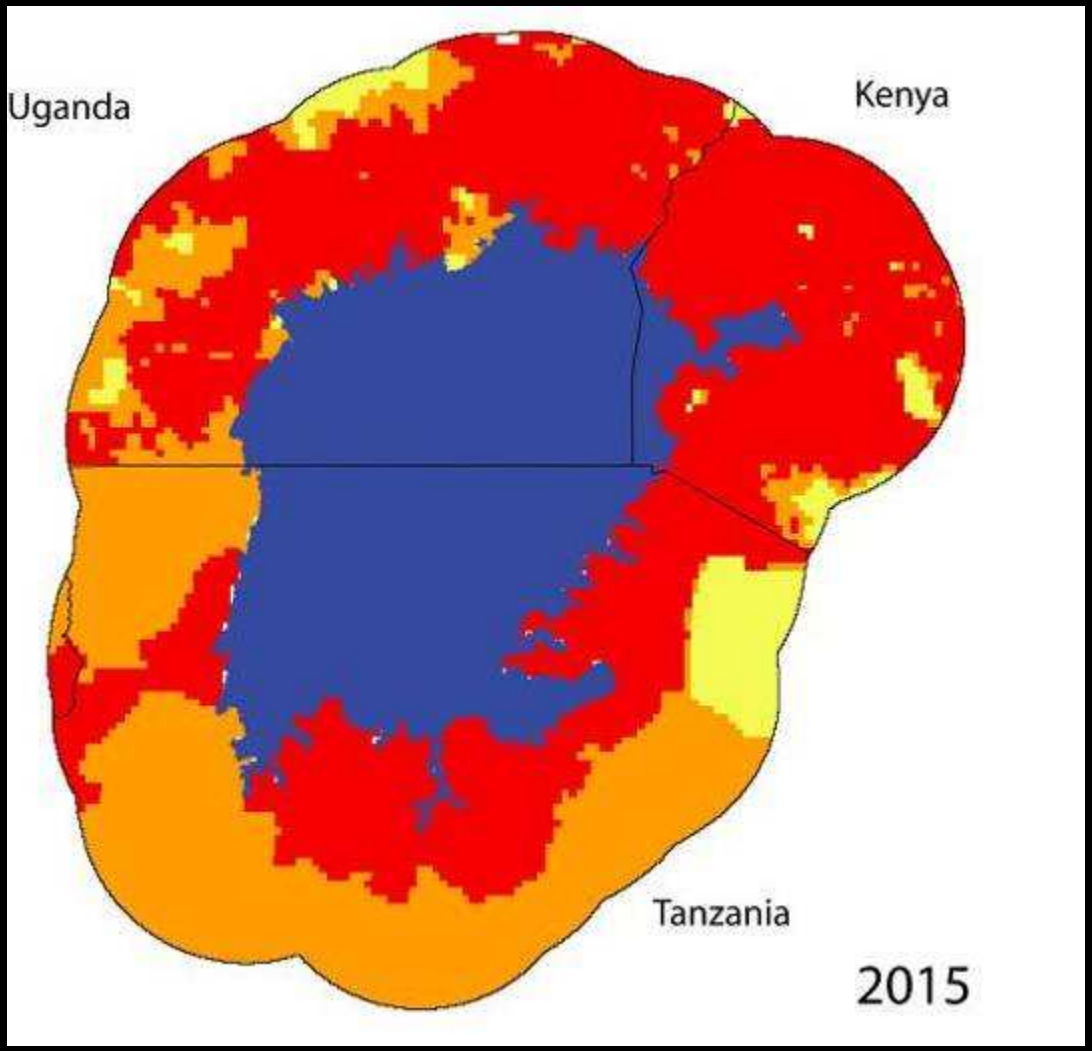
UNEP

Africa Atlas :Vital Statistics

- 390 pages
- 123,000 words
- 316 Satellite images
- 104 locations of environmental changes
- 319 Ground photos
- 151 Maps
- Printed in English and French same time
- All materials are non copy-righted, available for free use

Population growth around 100 km lake Victoria

Lake Victoria: Africa's Largest Freshwater Lake

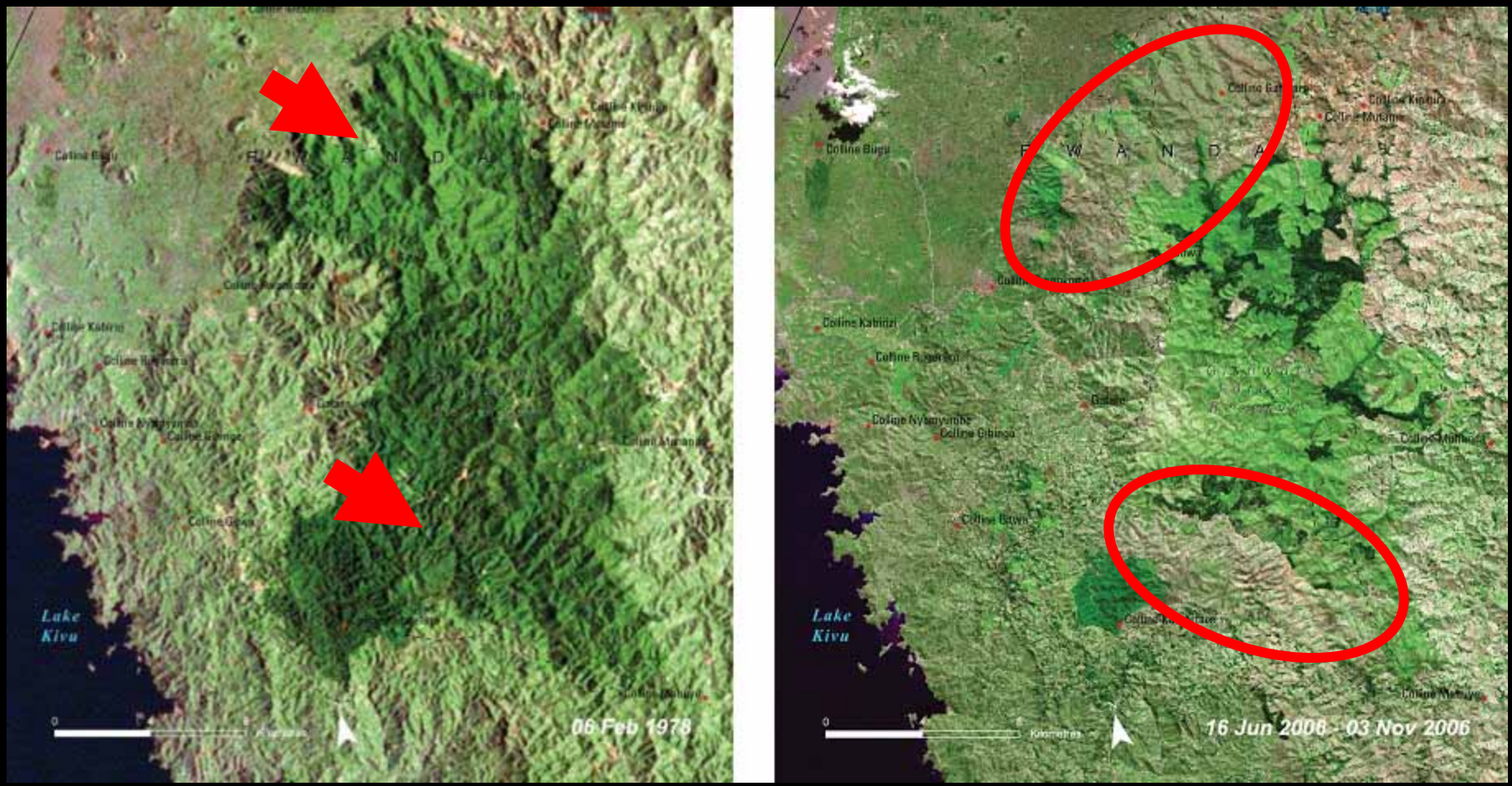


- Population growth around Lake Victoria, East Africa, is the highest in Africa

AFRICA: Atlas of our Changing Environment

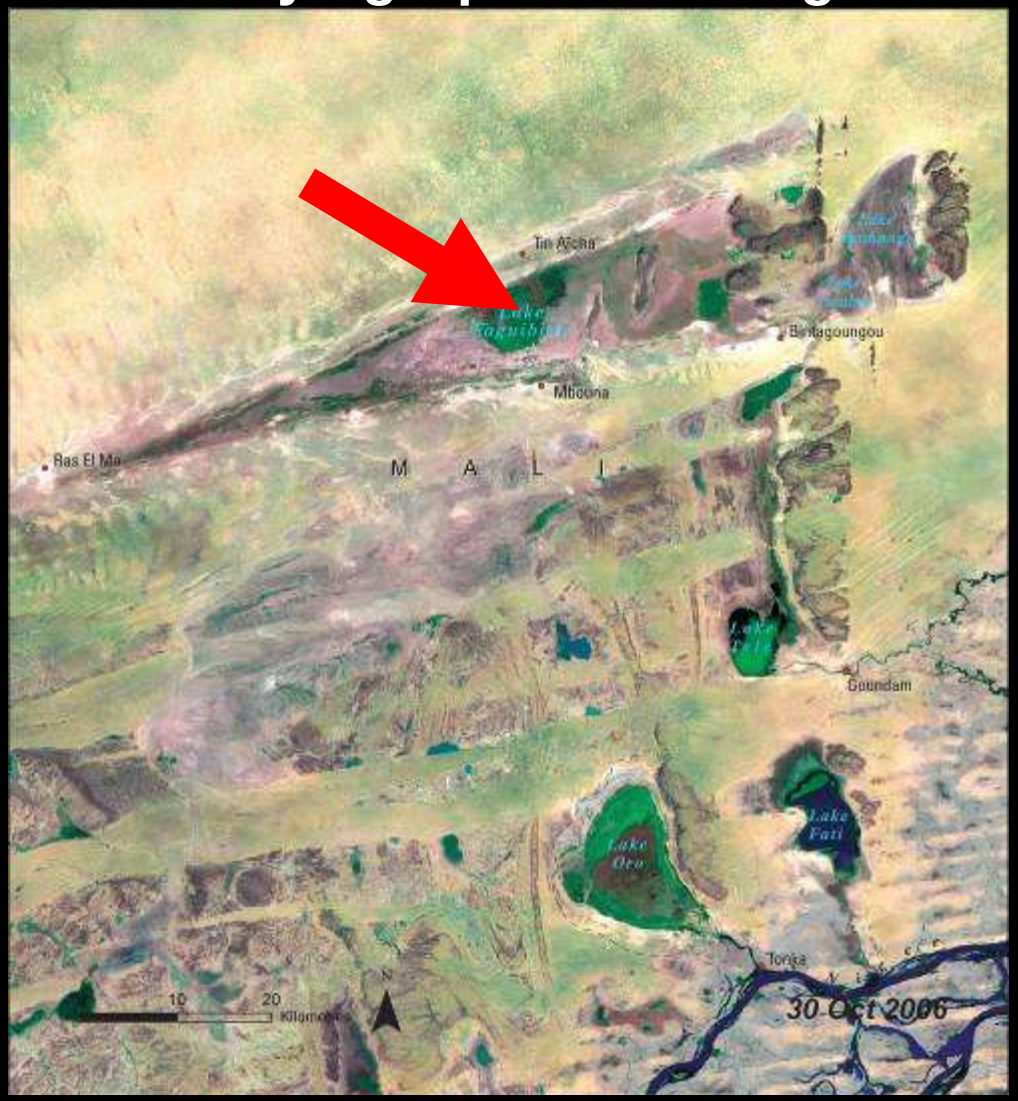
UNEP

Dramatic Deforestation: Gishwati Forest, Rwanda



Republic of Mali

The Drying Up of Lake Faguibine



AFRICA: Atlas of our Changing Environment

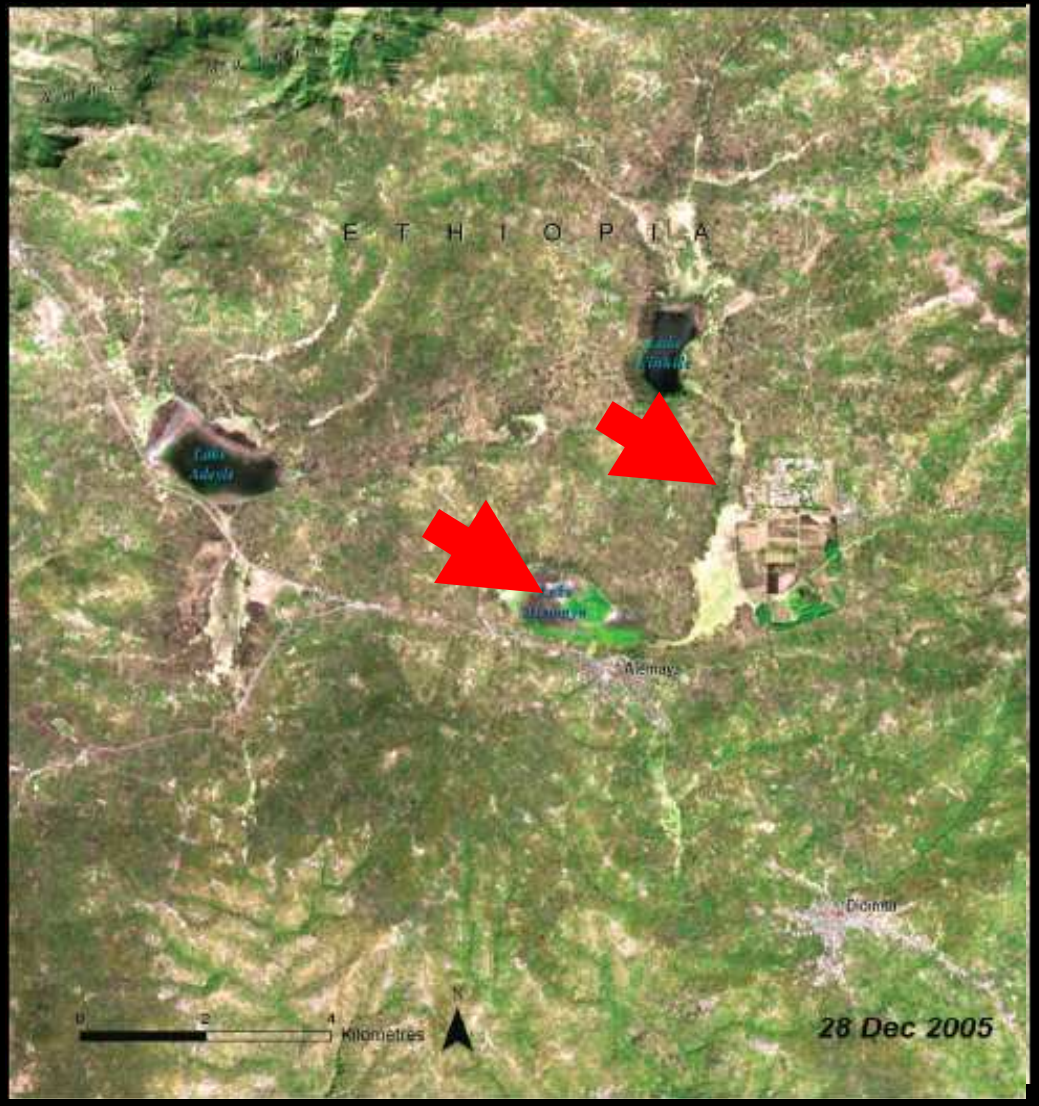
Water levels have fluctuated widely in Lake Faguibine since the beginning of the 20th century

In the late 1980s, an extended period of reduced precipitation led to a complete drying up of the lake in the 1990s

As global warming intensifies, there may be more change in store for the people who depend on water resources such as Lake Faguibine for their livelihoods

UNEP

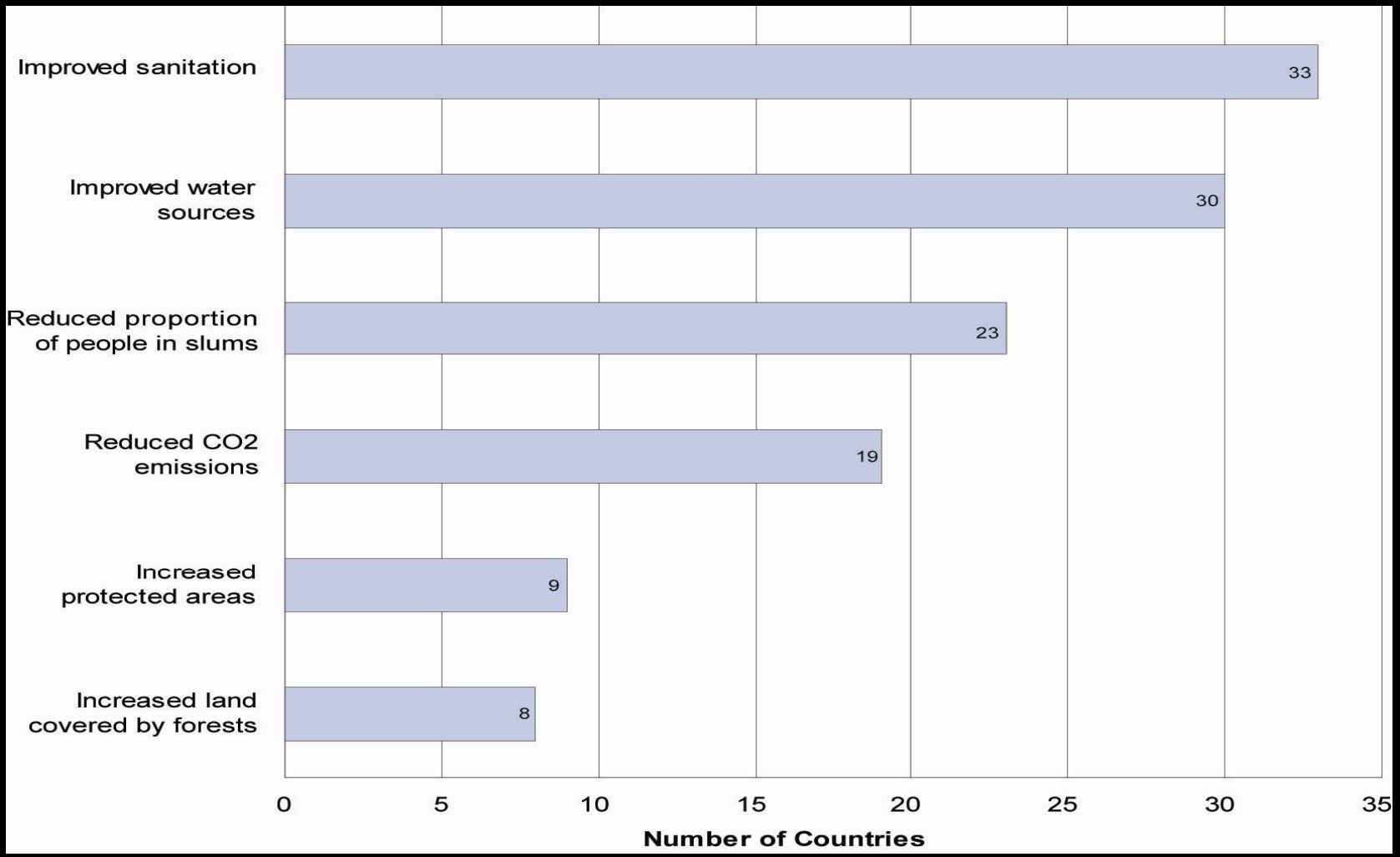
Reducing Lake Alemaya, Ethiopia



Mid-1980s, maximum depth was around 8metres with 4.72km2 coverage

Siltation caused by deforestation of Alemaya watershed reduced capacity of the shallow lake

Tracking progress towards MDG7



National: Kenya Atlas

In the footsteps of *One Planet Many People*, and *Africa: Atlas of Our Changing Environment*, this is the newest in a suite of UNEP Atlases that have inspired decision-makers to action through the power of photographs.

This Atlas does two unique things:

- it assesses Kenya's progress towards its own goals of improving the environment to achieve development goals; and
- it delivers a stunning bird's-eye view of environmental change through the use of paired satellite images taken years apart.

In the first case, it demonstrates that the social and economic pillars of Kenya's development plan, *Vision 2030*, need to be built on a solid foundation of environmental sustainability. Similarly, it teases out the links between the environment and the Millennium Development Goals (MDGs), showing how the 7th goal, environmental sustainability, underpins them all. In its second unique contribution, the Atlas contains an array of visual tools, including current and historical remote sensing images, maps, and photographs, that help scientifically document site-specific environmental change across the country.

This Atlas will serve as an important educational tool to improve local, national, and international knowledge about environmental change in Kenya and to stimulate action at all levels to protect the rich resources that are the base of its culture, economy, and human well-being.

KENYA ATLAS OF OUR CHANGING ENVIRONMENT

KENYA

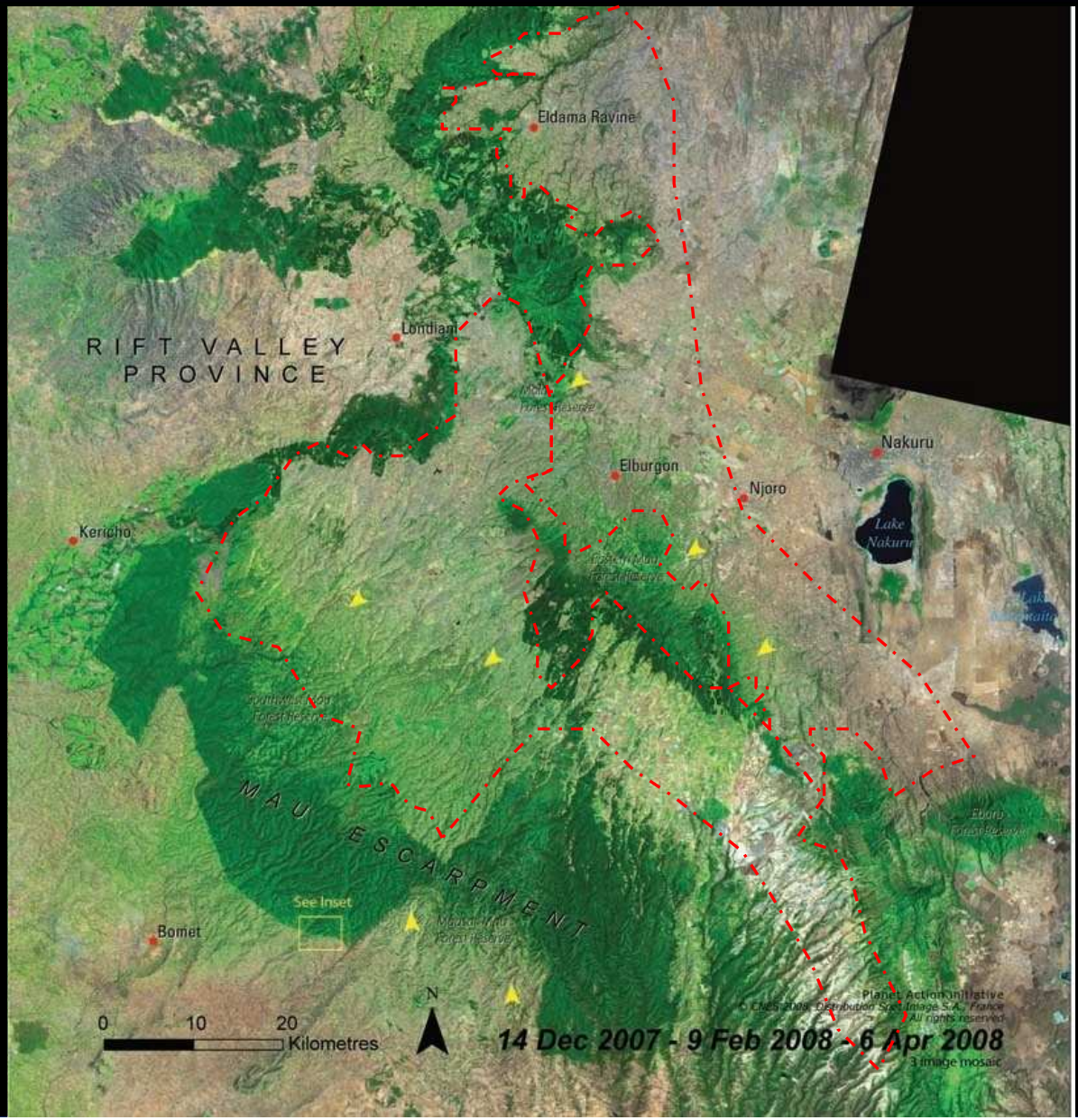
Atlas of Our Changing Environment

UNEP

The Mau Forest Complex: Degrading Forests

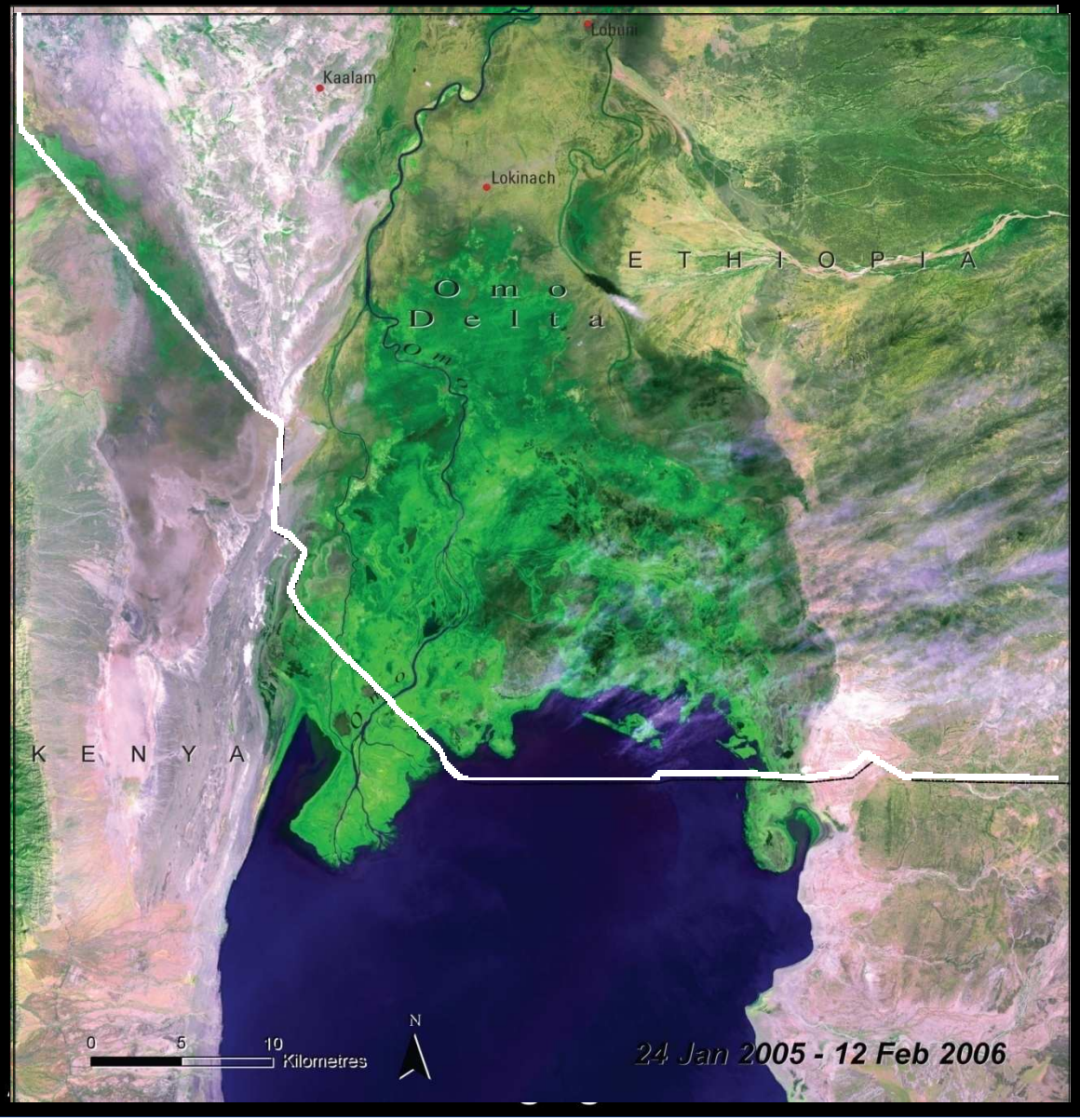
1973

2008



UNEP

The Omo Delta: Expanding Land



1973

2006

UNEP

AFRICA WATER ATLAS

This Atlas is a visual account of Africa's endowment and use of water resources, revealed through 224 maps and 104 satellite images as well as some 500 graphics and hundreds of compelling photos. These visual elements vividly illustrate a succinct narrative describing and analysing Africa's water issues and exemplifying them through the judicious use of case studies. The Atlas tells the paradoxical story of a continent with adequate renewable water resources, but unequal access because water is either abundant or scarce depending on the season or the place. It explores the opportunities to develop Africa's untapped water resources and human capacities to deliver safe drinking water and sanitation services to achieve the water-related Millennium Development Goals, as well as hydropower and irrigation that help support livelihoods and boost economic development. It should serve as a baseline of information and analysis to help inform decision makers and water managers in their work to improve water availability and access across Africa.

AFRICA WATER ATLAS

UNEP

AFRICA

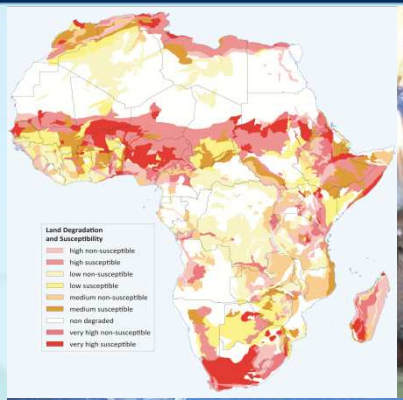
WATER ATLAS

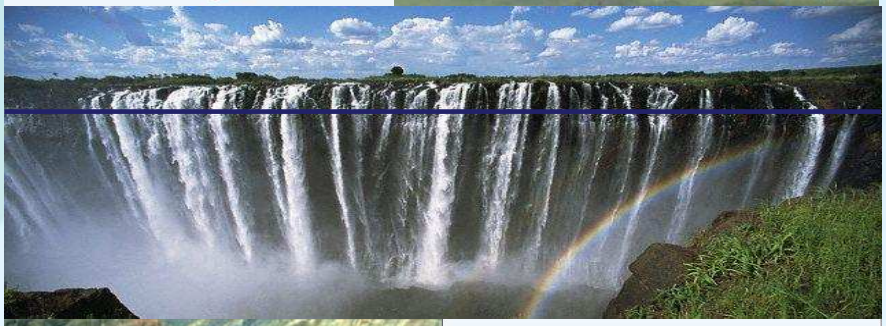
UNEP

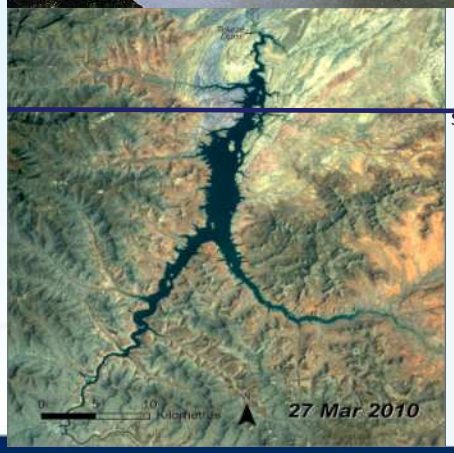
A VISUAL ACCOUNT OF AFRICA'S ENDOWMENT AND USE OF WATER RESOURCES……

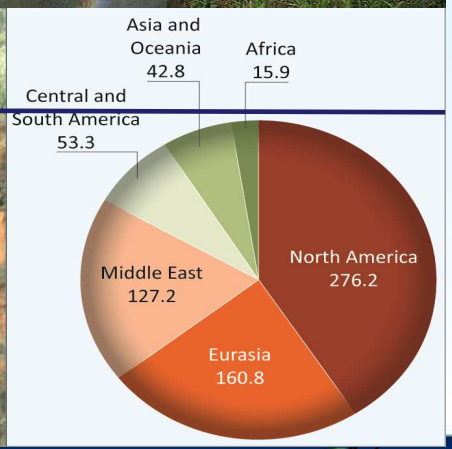
Revealed through :

- 224 maps
- 104 satellite images
- 500 graphics and
- Hundreds of compelling photos

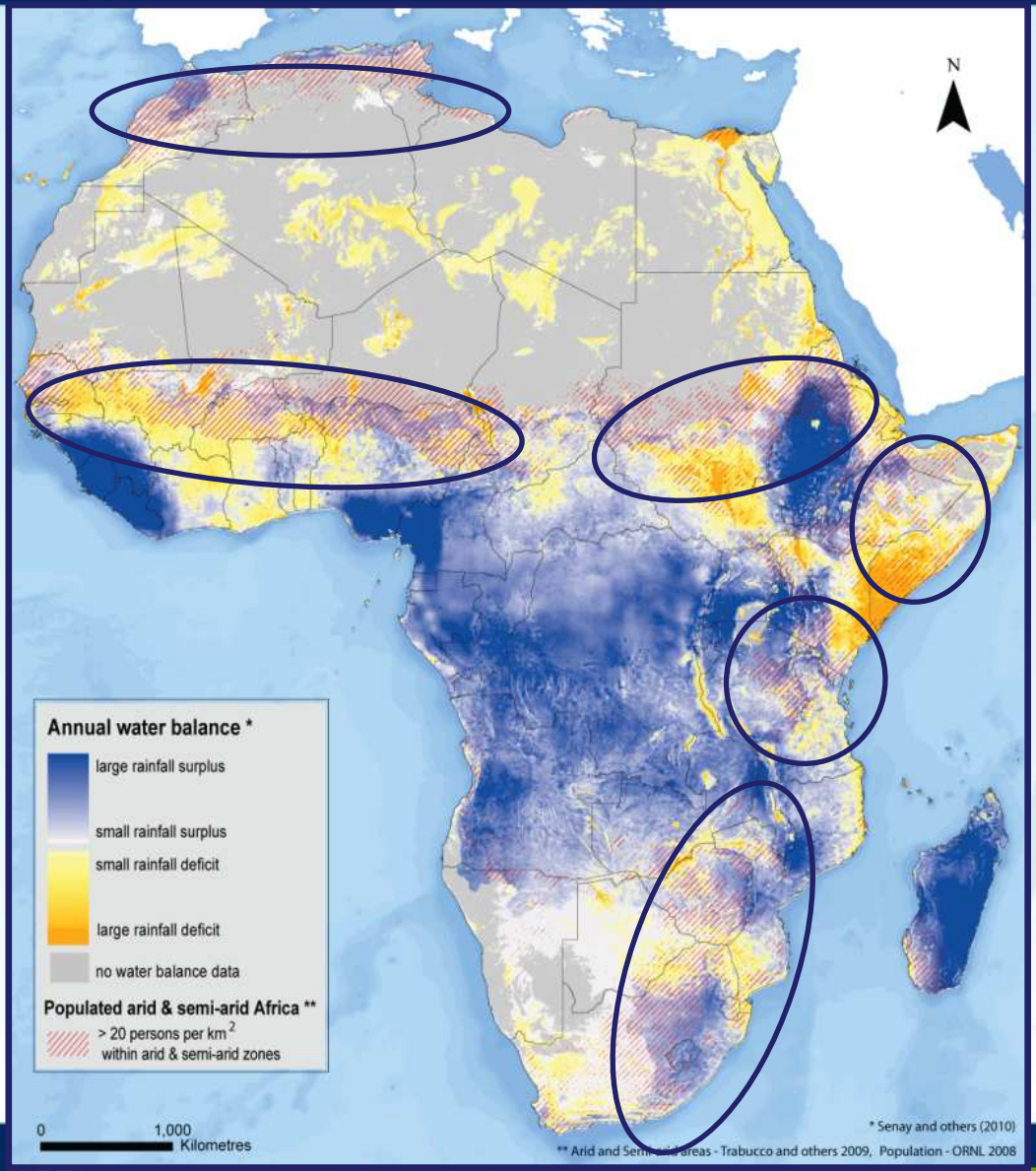








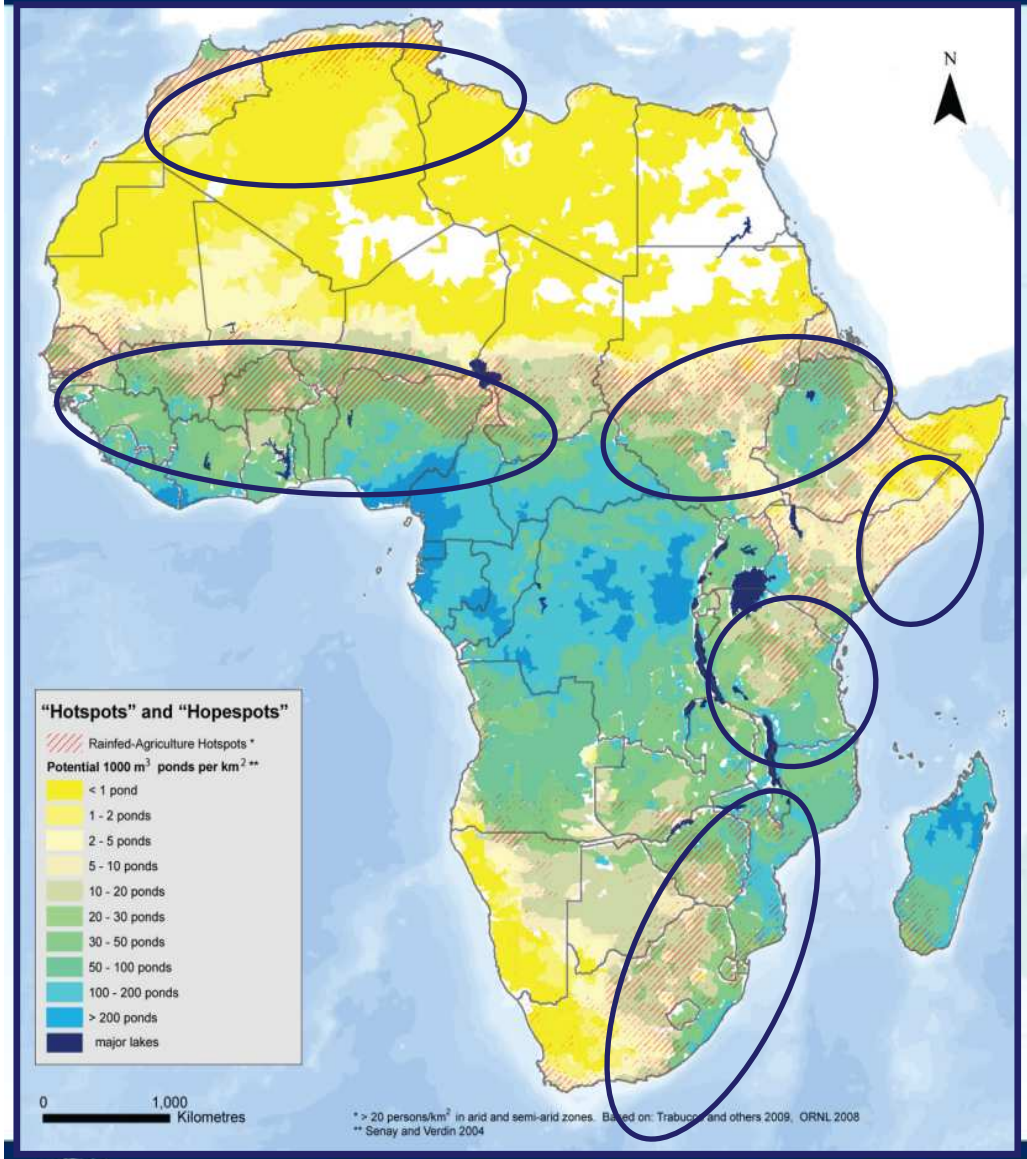
ANNUAL WATER BALANCE



Annual water balance is an estimate of the available runoff after evapotranspiration — water that is potentially available for harvesting

The red hatching overlaying the water balance map shows where population density >20 persons per km^2 coincides with areas defined as arid or semi-arid

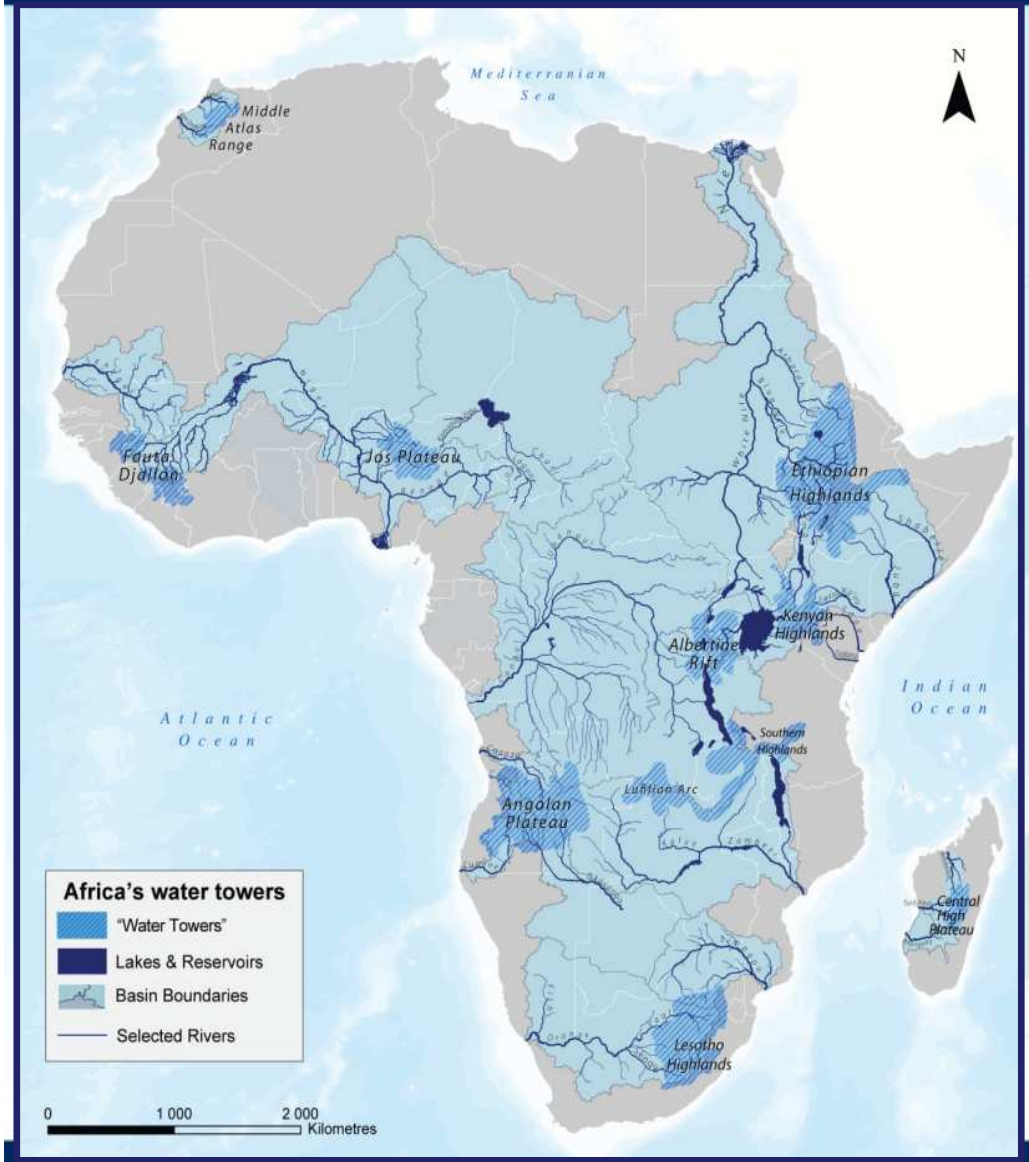
“HOTSPOTS” and “HOPESPOTS”



Areas of population density >20 persons per km^2 that coincide with arid and semi-arid zones are potential hotspots of vulnerability for water-constrained rain-fed agriculture (red hatch marks)

Many of these areas have adequate runoff for filling small farm ponds, which can reduce vulnerability and improve food security

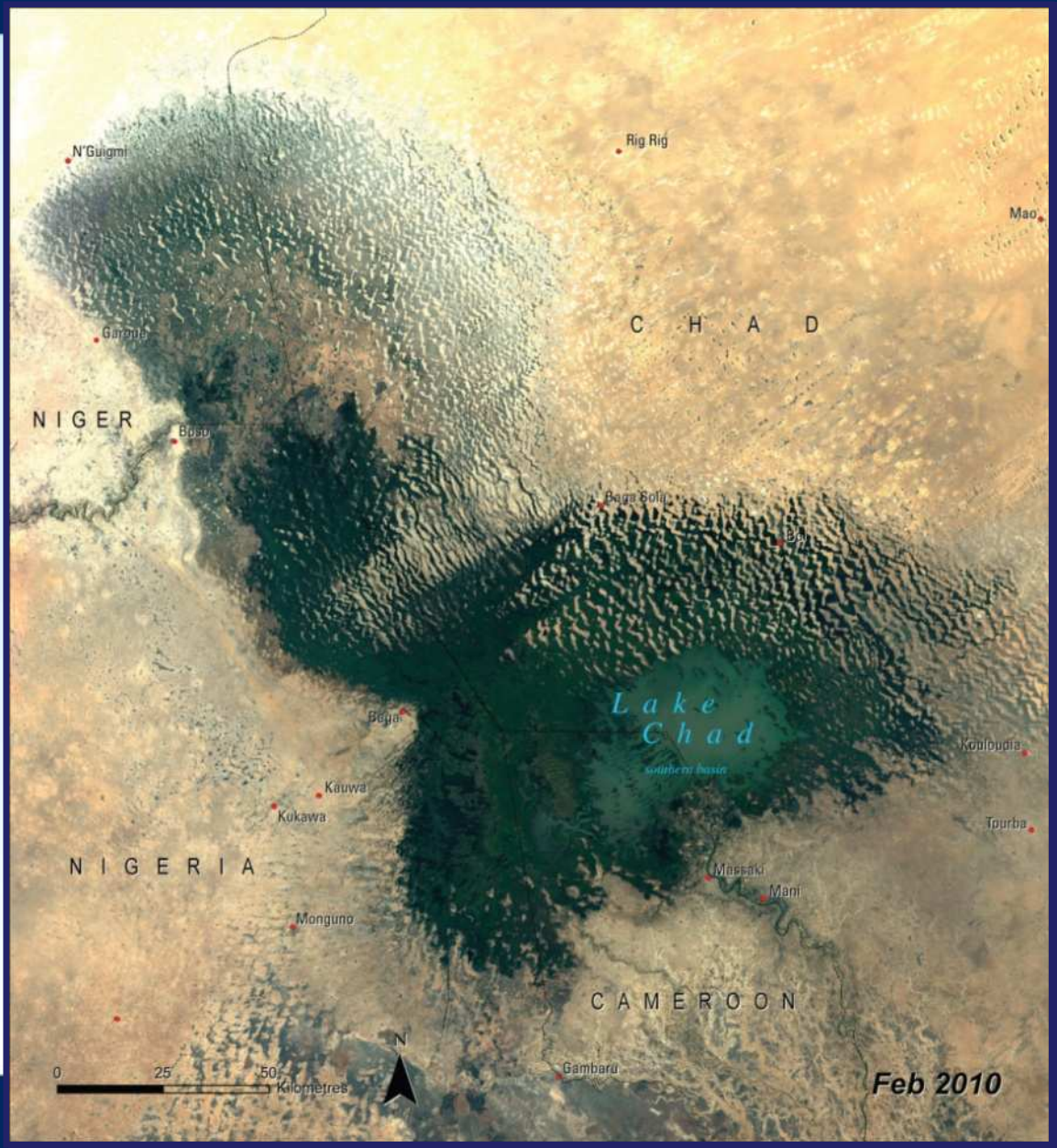
WATER TOWERS OF AFRICA



These are areas identified by:-

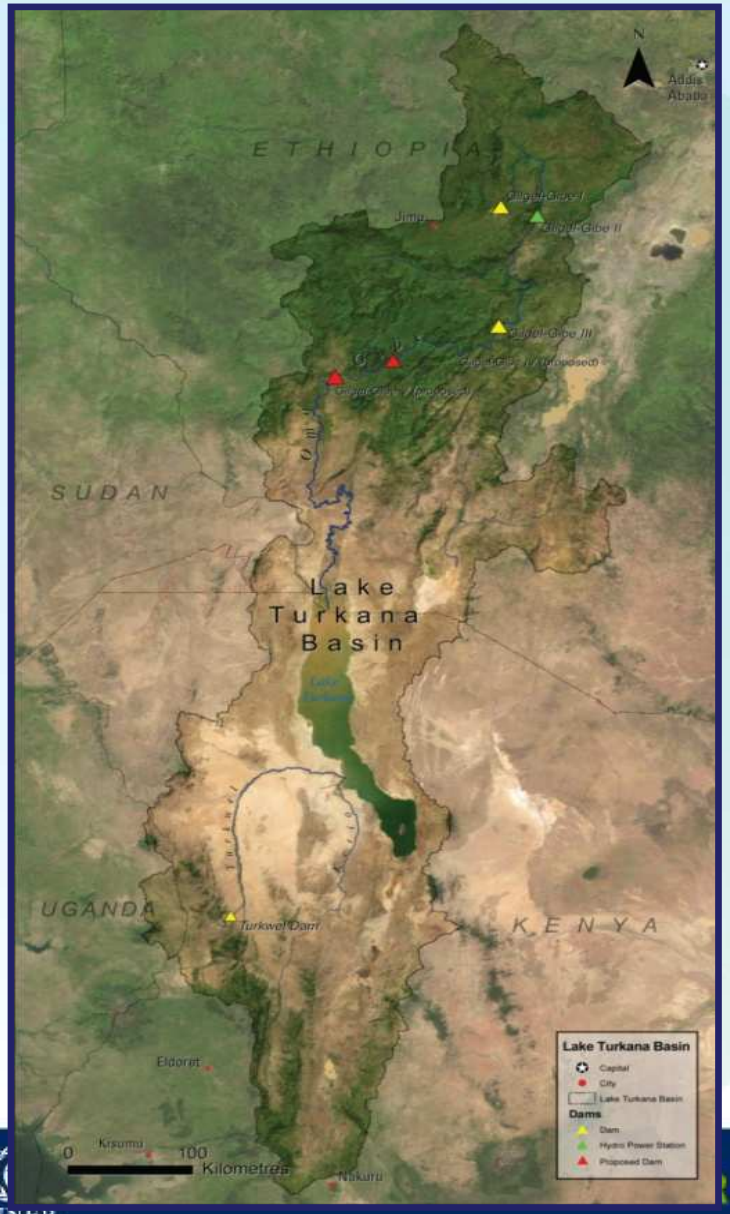
- Relative elevation (generally 200–800 m above the surrounding area)
- Precipitation above 750 mm
- Runoff above 250 mm
- And the contribution they make to water resources for populations beyond their delineated boundaries

LAKE CHAD'S VARIABILITY



While Lake Chad's surface area fluctuates considerably with the seasonal rains, these dry-season images of Lake Chad show the long-term trend since the 1960s Changes in rainfall during this period have been a major factor as has diversion for irrigation

LAKE TURKANA BASIN



Although the Lake Turkana Basin occupies parts of four countries, 98 per cent of its area lies within just two of them. More than half (52 per cent) is in Ethiopia, where almost three-quarters of the basin's rain falls

Lake Turkana is the largest desert lake in the world

GIBE III DAM SITE

The Gibe III dam was roughly one-third of the way to completion when this March 2009 image was acquired

It is expected to be finished around the end of 2013

Key Elements of the 3th Africa Environment Outlook (AEO–3) and the 5th Global Environment Outlook (GEO-5)

Proposed structure – AEO-3

Three parts

- ✓ **Part 1: Backward linkage to AEO-1 and 2**
- ✓ **Part 2: Identifying priority inter-linkages issues and emerging challenges**
- ✓ **Part 3: Assessing challenges and opportunities**

Towards AEO-3

- PART 1: SOE
  - Persistent problems – AEO-1, AEO-2
  - Emerging Issues
- PART II: Health and Env. (DPSEVIR)
  - Inter-linkages – Health and environment.
  - Data and indicators
  - Scenarios
- PART III: MDGs (1 - 7)
  - Policy analysis – towards achieving regional agreed goals and targets
  - Assessing challenges and opportunities

TOWARDS GEO-5 report

OBJECTIVES:

- **To provide a comprehensive, integrated and scientifically credible global environmental assessment to support decision-making processes at appropriate levels.**
- **To engage all Governments, relevant United Nations bodies and stakeholders in GEO-5 in order to support and strengthen further the scientific credibility, policy relevance and legitimacy.**
- **To strengthen the on-going process of capacity building for developing countries and countries with economies in transition to conduct environmental monitoring and assessments at all levels, in collaboration with relevant on-going activities of UNEP and other initiatives, including through south-south and triangular cooperation.**

TOWARDS GEO-5 report (cont…)

- To inform, as appropriate, the strategic directions of the United Nations Environment Programme and other relevant UN bodies.
- To strengthen the policy relevance of GEO-5 by including an analysis of case studies of policy options, that incorporates environmental, economic, social and scientific data and information and their indicative costs and benefits to identify promising policy options to speed up achievement of the internationally agreed goals such as those agreed at the Millennium Summit in 2000 and in Multilateral Environmental Agreements.
- To inform and learn from relevant global and regional processes and meetings where progress towards these agreed goals will be discussed.
- To identify data gaps in the thematic issues considered by GEO-5.

Proposed structure – GEO-5

Three parts

- ✓ **Part 1: Assessment of the State and Trends of the Global Environment**
- ✓ **Part 2: Options for Regional Policy Action**
- ✓ **Part 3: Opportunities for a Global Response based on regional priorities**

Africa GEO-5 priority themes

- CLIMATE CHANGE AND VARIABILITY
- SOIL, LAND USE, LAND DEGRADATION AND DESERTIFICATION
- FRESHWATER
- BIODIVERSITY
- [incl. FORESTS]
- OCEANS AND SEAS (COASTAL AND MARINE)

Email:

africa.coordinator.unep.org

DEWA Africa Website:

http://www.unep.org/dewa/africa

Thank You