Africa State of the Environment
An Overview

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My Lord, I may have committed some bad things in my life but I never contaminated the river.

An Old Egyptian confession, meeting God after death (book of dead)
Global average available biocapacity per person with no area set aside for wild species.
Africa is very vulnerable to climate change given its low capacity to respond and adapt.

Africa's contribution through greenhouse gas emissions is insignificant.

Greenhouse gas emissions per capita in Africa are low.

Europe emit 50-100 times, U.S. 100-200 times more.

Africa Regional Workshop in Accra, 21.-23.9.2006:

CC affects Sustainable Development;

CC jeopardizes MDG 1 (poverty & hunger eradication), 6 (AIDS), 7 (environmental sustainability).
Reuters) - A 400 billion euro ($774 billion) plan to power Europe with Sahara sunlight is gaining momentum, even as critics see high risks in a large corporate project using young technology in north African countries with weak rule of law.
Dead Vlei is a white clay pan located near the more famous salt pan of Sossusvlei, inside the Namib-Naukluft Park in Namibia. Also written DeadVlei or Deadvlei, its name means "dead marsh" (from English dead, and Afrikaans vlei, a lake or marsh in a valley between the dunes).
Water Scarcity in Sahel
Is it One of the Climate Change Manifestation, or Aerosol Emission in North Europe
Changing Rainfall Profile, Sahel
The Sahelian droughts developed in the latter part of the 20th century.

- Sahelian drying trend is associated with an anomaly pattern ("cool north–warm south") that developed during 1946–1975.
- This coincides with rapid post-war increase of SO2 emissions. One can make a reasonably strong case that industrial aerosols have contributed to the droughts in the Sahel.

Sahel rainfall % departure from long-term mean (from Sharon Nicholson)
The Sphinx’s limestone structure has been severely damaged by acid rain and weathering. The acid rain caused by the pollution is dissolving the limestone statue.
Per capita Food Production in Africa

Food Production Index

Net per capita (PIN base 1989-1991)

Africa

World

Source: Food and Agriculture Organization (FAO), Statistical databases (FAOStats), 1995.
Status and trends of drought in Africa:

Drought events per country from 1970 to 2004

- Climate change to exacerbate drought
- Two thirds of Africa is classified as either deserts or drylands.
- Current climate scenarios—driest regions of the world will become even drier

Source: Adapted from Noojin, Leah 2006. Factors that influence Famine in Sub-saharan African Countries

- Global Hunger Index of Internat. Food Policy Research Institute
- Of 12 countries with highest hunger levels, nine were affected by civil wars or violent conflicts.
- The 10 worst cases are all in Sub-Saharan Africa.
- Among most affected are countries in Nile Basin (Eritrea, Ethiopia), in Sahel (Niger).
- In all other countries: alarming.
- Situation may get worse:
  - demand increase and
  - supply decline due to impacts of Global environmental change.
Climate Change and Societal Uncertainties…
the Race Has Begun

Thank You for Attention
President Musevini (Uganda) in 2007: Climate change is an act of aggression of the developed countries against the African people.
Climate Change Vulnerability in Africa

- North Atlantic Oscillation a key factor in international climate vulnerability, with impact on fisheries industries
- Rainfall variability modulated by vegetation dynamics, surface properties in the Sahel; empirical evidence of species changes
- High proportion of population concentrated in coastal areas in West African cities such as Lagos and Banjul, thus especially vulnerable to sea-level rise
- Regional climate modeling experiments show deforestation in Central Africa will impact climate in distant south (teleconnections)
- Coastal marine fishery likely to be negatively affected by changes in Benguela current
- Long-lasting impacts of drought on national economies for SADC region
- Complete loss or displacement of Succulent Karoo biome projected under climate change, and many species losses in other biomes
- Intensity of extreme events increased significantly over South Africa; biome shifts will favor horticulture over plantation forestry; malaria risk areas projected to expand southward

The vulnerabilities:
- Desertification
- Sea level rise
- Reduced freshwater availability
- Cyclones
- Coastal erosion
- Deforestation
- Loss of forest quality
- Degradation of woodlands
- Coral bleaching
- Spread of malaria
- Impacts on food security

Sources: Anna Balanza, 2002

United Nations Environment Programme / GRID-Arendal
5.14. Impact of Climate Change on Precipitation

- **Sahel**: precipitation decline: -25%
- **Zambezi runoff** under CC is projected to drop by 40%.
- **By 2000**, 300 million Africans risk living in a water-scarce environment.
- **By 2025**, the number of countries experiencing water stress will rise to 18 affecting **600 million people**
- Population growth & climate change cause economically significant constraints in parts of Africa.
- Water scarcity, increasing population, degradation of shared freshwater ecosystems, & competing demands for water have potential to create bilateral & multilateral conflicts.
Africa is More Prone to Drought and Agriculture Losses than any Other Continent
Water Resources
25% of Africa’s population to experience water stress by 2020 (75-250 mil people)

Areas of concern include: North Africa, Western Cape, Arid Lands of Kenya etc.
Per capita water 1950 - 2050, Egypt

Year

1950

1955

1995

2025

2050

Cubic meter

2650

2560

936

606

503

3000

2500

2000

1500

1000

500

0
Other impacts in Africa
Loss of Ecosystem Services

Loss of Corals and Bleaching – resulted in loss of tourism in Egypt and Kenya

Biodiversity Hotspots: Reduction of mammal species in National Parks up to 25-40%
Impact of temperature rise on robusta coffee in Uganda

Today's temperature

A temperature increase of 2°C

Impact of Temperature Rise on Tea in Kenya

Impact of temperature rise on tea in Kenya

Today's temperature

Tea-growing area
- Very good
- Fair to good
- Not suitable

A temperature increase of 2°C

The Disappearance of Lake Chad in Africa

1963

1973

1987

1997

2001

Source: This collection of maps has been drawn after a series of satellite images provided by NASA Goddard Space Flight Center, available at:
Lake Faguibine, in Mali has dried up due to diminished rainfall

The situation will worsen if we fail to act now
Thousands of people had to flee their homes and their land when floods struck Uganda in 2006. This young woman could only carry her infant child and had to leave everything else behind. Photo: Jakob Dall/Danish Red Cross (p-UGA0104)
5.15. Climate Change Impacts for Nile Delta

Global Climate Change:

Sea level rise: IPCC, TAR, WG 2 (2001)
- 1860-2000: 0.1 – 0.2 m;
- 1990-2100: 0.09-0.88 m

Climate Change Impacts: Egypt:
- Nil Delta: 50cm, 2 mio. pers., 214.000 jobs
- Temperature Cairo 2000-2060: + 4°C
- Self-sufficiency rate (SSR) for cereals: 1990-2060: decline from 60 to 10%
- Projected yield decline for wheat due to climate change: 2000 - 2050: -18%.
With about 5 million inhabitants, Alexandria is Egypt's second biggest city. A rise in sea levels of 50cm could lead to the loss of about 194,000 jobs and the displacement of about 1.5 million people.
Major and Capital Cities of Africa at risk due to sea level rise

Alexandria
Mombasa
Dar es Salaam
Maputo
Durban
Port Elizabeth
Cape Town
Luanda
Douala
Lagos
Accra
Cotonou
Lome
Abidjan
Monrovia
Conakry
Banjul
Dakar
Casablanca
Algiers
Tunis
Two decades ago, the rains in southern Sudan began to fail. ... Scientists at first considered this to be an unfortunate quirk of nature. But subsequent investigation found that it coincided with a rise in temperatures of the Indian Ocean, disrupting seasonal monsoons. This suggests that the drying of sub-Saharan Africa derives, to some degree, from man-made global warming,” wrote UN Secretary-General Ban Ki Moon in the Washington Post (Washington Post, 2007). Reference: Washington Post. 2007. http://www.washingtonpost.com/wp-dyn/content/article/2007/06/15/AR2007061501857.html
Climate Change and Conflicts in Africa

- Many countries in sub-Saharan Africa face chronic malnutrition, frequent famine episodes.
- There are still many places in Africa where civil strife is a major constraint to livelihood and food security.
- Achieving food & water security are development priorities for Africa for years to come.
- IFRI World Hunger Index on linkage to conflicts.

Thank You