

**WORLD ENERGY COUNCIL  
WEC/CFFS COMMITTEE & WEC UNITED ARAB EMIRATES  
ROUNDTABLE ON WATER / ENERGY: SUSTAINABLE  
TOGETHER?  
DUBAI, UNITED ARAB EMIRATES,  
FEBRUARY 2, 2009**

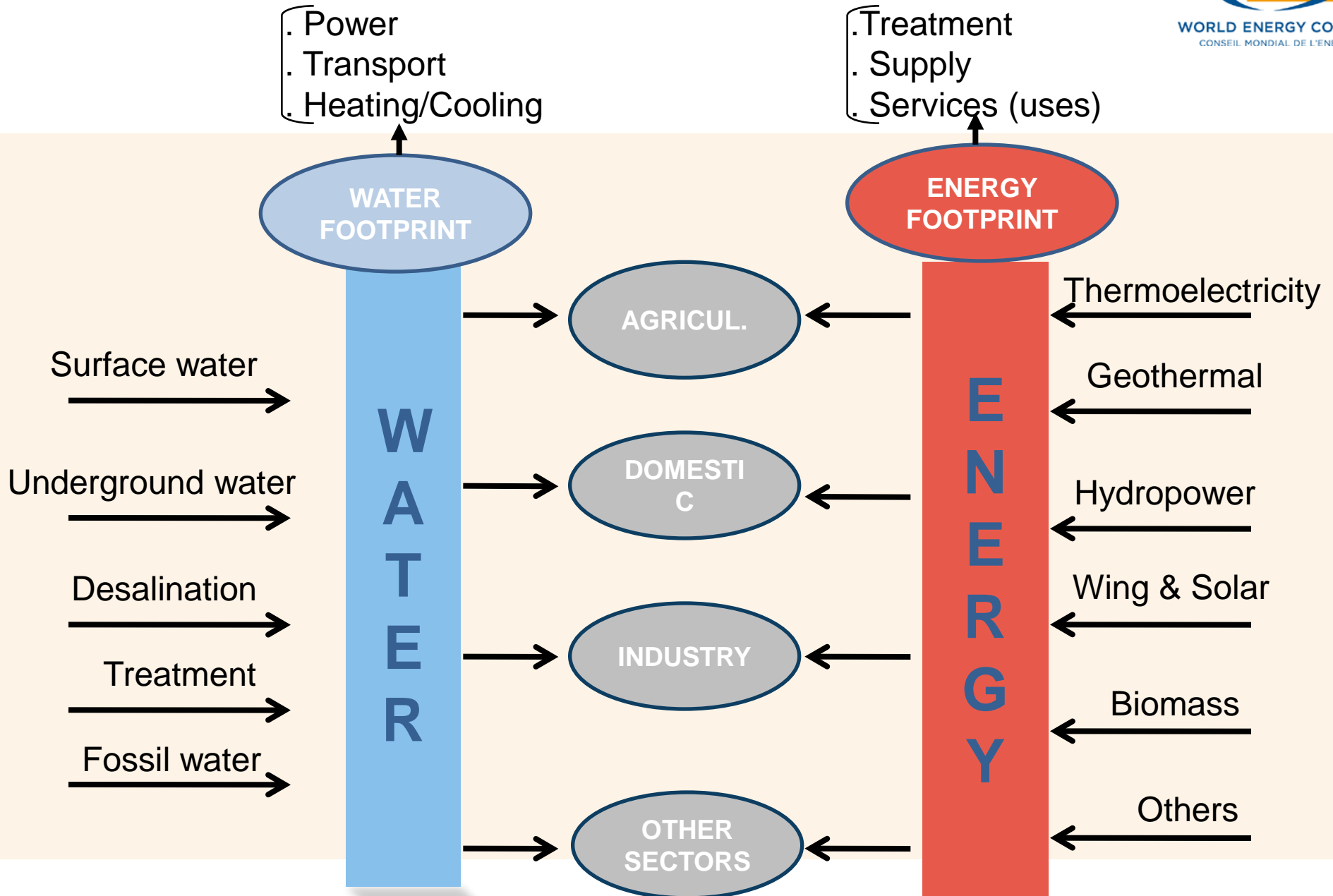
**Balancing Energy and Other  
Uses of Water: Policies,  
Strategies & Regulatory  
Frameworks**

**Africa Perspectives**

**Dr. Latsoucabé FALL  
Africa Region Manager,  
World Energy Council**



# WATER – ENERGY CONNECTION



# Water and Energy Nexus

**WATER**

**ENERGY**

**Water is used for:**

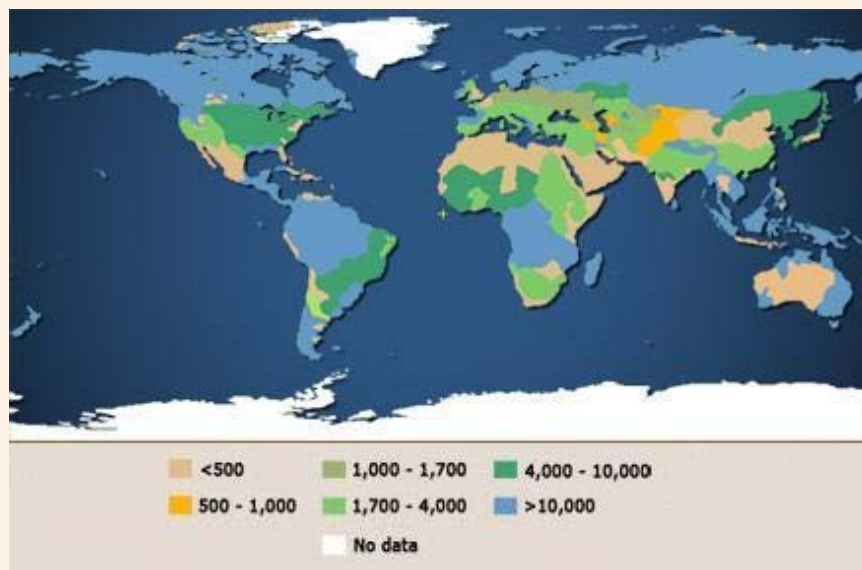
- . Producing electricity
- . Power plants cooling
- . Mining fuels
- . Home-related

**Energy is used for:**

- . Wastewater treatment
- . Pumping water
- . Water supply
- . Home-related

# Water Resources in Africa and Worldwide : relative abundance/scarcity

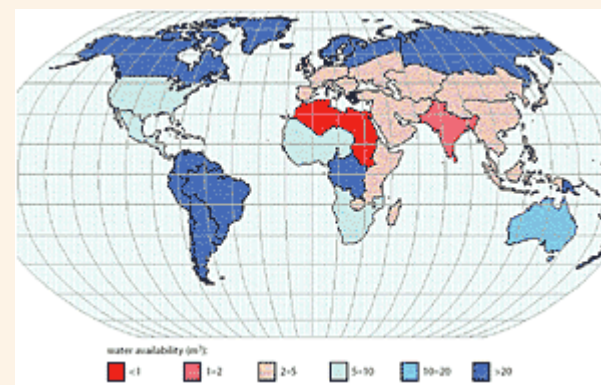
(m<sup>3</sup>/person/year)



## Water availability in Africa

- In Africa, there are large disparities in water availability, the resources being unequally distributed (see Figure).
- Some countries in Central and West Africa have more than enough water on a per capita basis.
- Average water availability per person is 5720 m<sup>3</sup>/cap/yr – compared to a global average of 7600 m<sup>3</sup>/cap/yr.
- Some countries, with less availability, like Algeria, Libya, Egypt, Morocco, Tunisia, and South Africa, are using desalination of seawater (reverse osmosis & thermal) in meeting their withdrawal requirements (UNDP, 2000).
- Moreover, some countries have turned to alternative sources of water (recycling of wastewater, passive direct solar water desalination & others) to meet the demand for water.

### Annual renewable water availability per capita (1995) - (1000 m<sup>3</sup>/person/yr)



Source: Shiklomanov 1999

## Africa : water use by sector

- The agriculture sector is the main user of water, with an average of 88% of African water allocation.
- Compared to the agriculture sector, the domestic and industrial sector uses relatively little water (respectively, 7% and 5% of all water allocation). (see Table)
- For most countries, domestic and industrial uses together are not exceeding 15%.

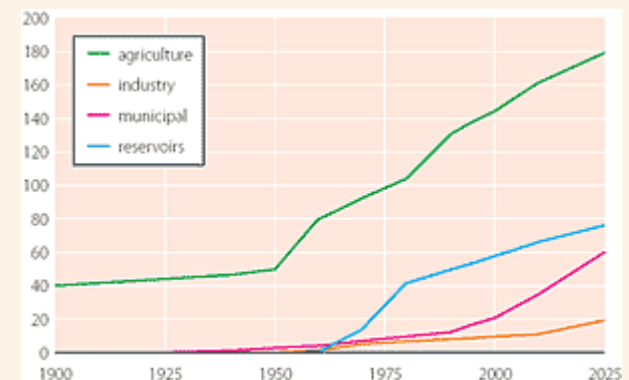
**Table: Water uses : share by sector (%)**

Countries	Agriculture	Industry	Domestic
Algeria	74	4	22
Egypt	88	5	7
Morocco	91	3	6
Tunisia	80	7	13
Ethiopia	86	3	11
Senegal	92	3	5
Central Africa Rep.	74	5	21
Angola	76	10	14
South Africa	67	17	16
<b>Africa</b>	<b>88</b>	<b>5</b>	<b>7</b>

*Sources: Humanity Development & World Resources Institute*

## Evolution of water demand by sector in Africa (1990 – 2025)

- Water demand is expected to rise substantially over the next few decades, as numbers of people and general prosperity increase, irrigation lands increase (needs for food), industrial output expands and electricity generation rises.
- Water demand for agriculture will continue to dominate water resources allocation over the next decades. (Figure)
- All these will inevitably pose the problem of water availability (relative abundance or scarcity), and subsequently, will lead to competition between countries or users of different sectors.

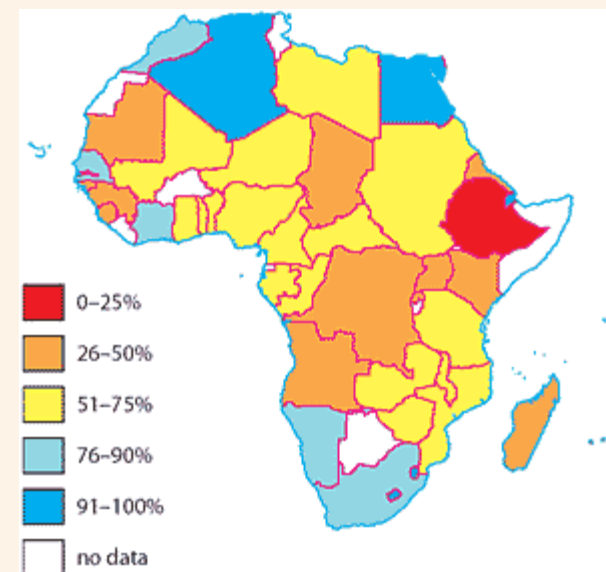


Source: Shiklomanov 1999

## Africa : water access/ coverage

- About 64% of the African population have access to improved water supply - the lowest proportional coverage of the World's Regions.
- The situation is worse in rural areas, where coverage is only 50% - compared with 86% in urban areas.
- Africa is home to 27% of World's population without access to improved water supply.

### Water coverage in Africa (2000)



Source: WHO/UNICEF 2000

## Africa : water issues and Challenges

- Securing water availability is one of the most critical challenges for economic development and stability.
- Water is still subsidized in many African countries for agricultural or domestic, or even industrial uses - and often, water tariffs are set below the supply costs.
- Water resources management, conjunctive management and absence of regulation are also issues that need to be addressed, in order to meet the goal of sustainable access to water of acceptable quality, and to facilitate agricultural and industrial development.

## Water issues & challenges (Cont.)

### ➤ Addressing the following challenges is of utmost importance:

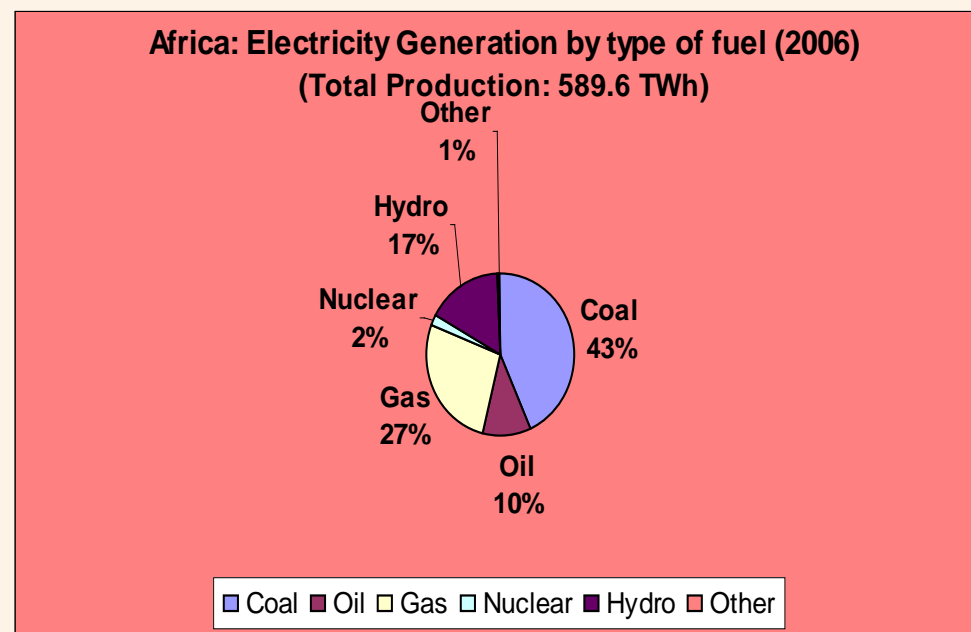
- Scaling up and speed up safe drinking water coverage, including in areas with greatest needs /and for the poor.
- Developing water resources and reinforcing integration/cooperation between rivers & lakes riparian countries.
- Mobilizing finance for the infrastructure and improved services (setting sustainable water tariffs is a pre-requisite).
- Improving water resources allocation and arbitration between sectors & users.
- Promoting improvement of efficiencies (for both water & energy end-uses).
- Developing/deploying technologies and ensuring technology transfer.
- Setting up appropriate strategies, frameworks and policies.

## Energy uses of water

- Energy uses of water are increasing, due to substantial increase of energy demand. And energy sector competes with other sectors uses of water, including agriculture, domestic and industrial - mostly in areas with limited water resources.
- The electricity industry is a quite big user of water, but mostly in African countries with large and important hydro schemes, and at a less extent, in countries with substantial coal processing and production. Although, in general, in most African countries, electricity use of water is not prominent as it is the case in industrialized countries.
- Balancing energy and other water uses and reconciling diverse interests at the local, national, and regional level, would be a critical challenge.

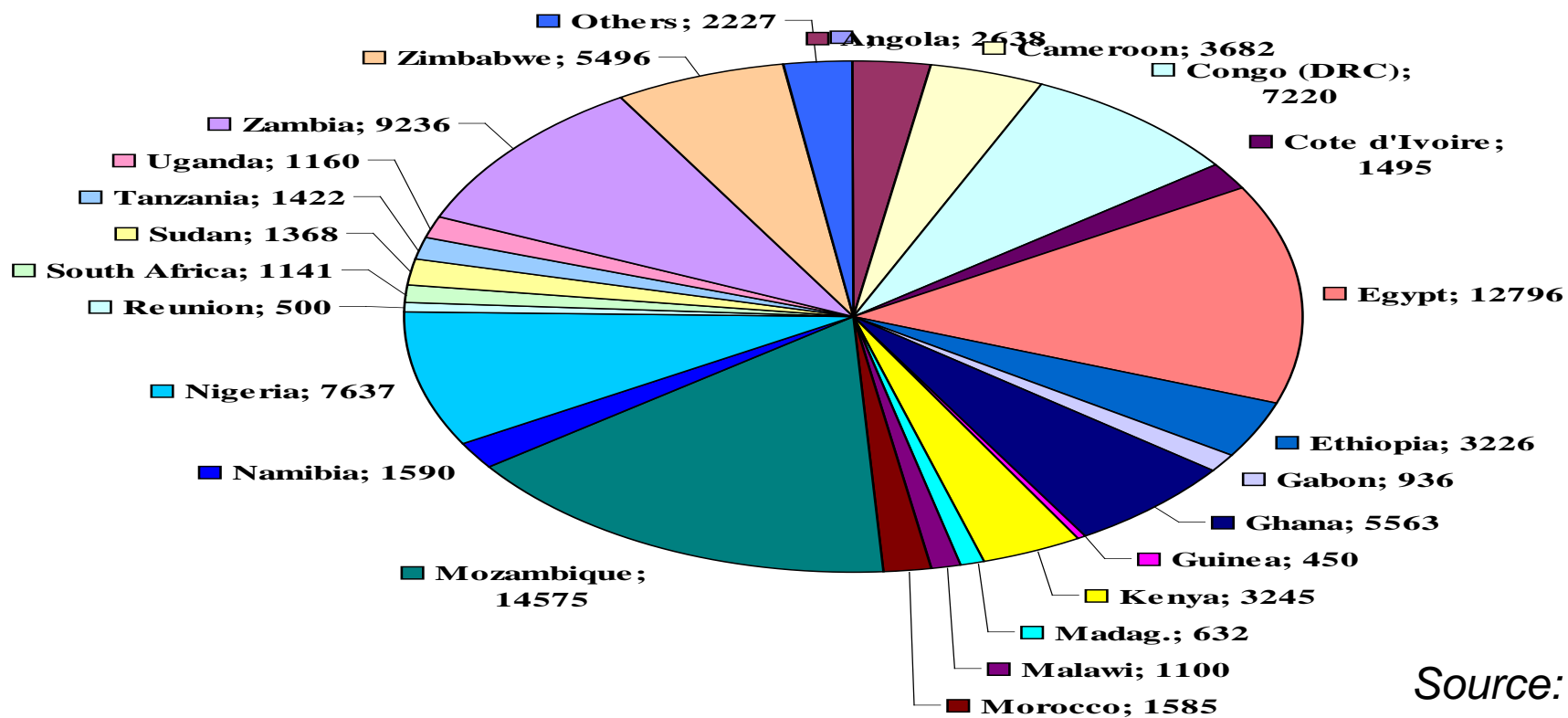
## Electricity generation, by source

- Both energy and water needs are critical for the African nations, so the multiple benefits of hydro schemes are of special importance.
- Large dams can provide benefits through power supply, drinking water supply, flood control, fisheries and recreation opportunities.
- Hydropower plants account for 25 GW of total African generating installed capacity (about 17% of the total African installed capacity). (see Figure)



Source: « Africa Recovery, United Nations » – Africa Renewal

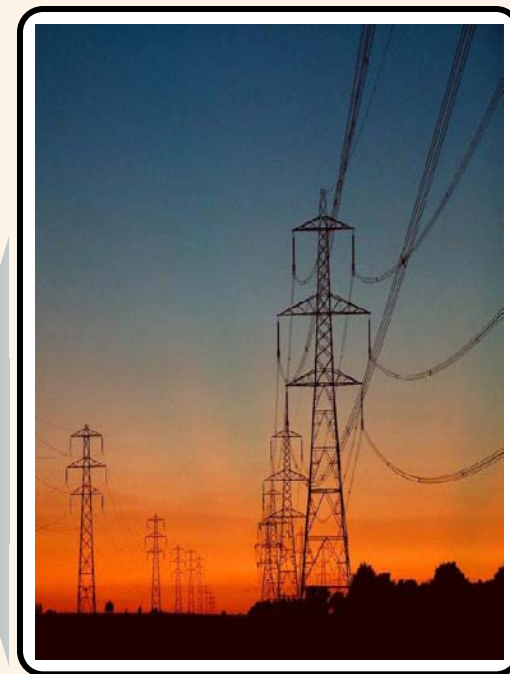
## Africa Hydropower Generation, by country (90920 GWh in 2006)



Source: IEA,  
2008

## Ensuring Sustainability

- Water and Energy are central to Sustainable Development.
- Ensuring their sustainability together would be key to making substantial progress toward the achievement of all the MDGs.

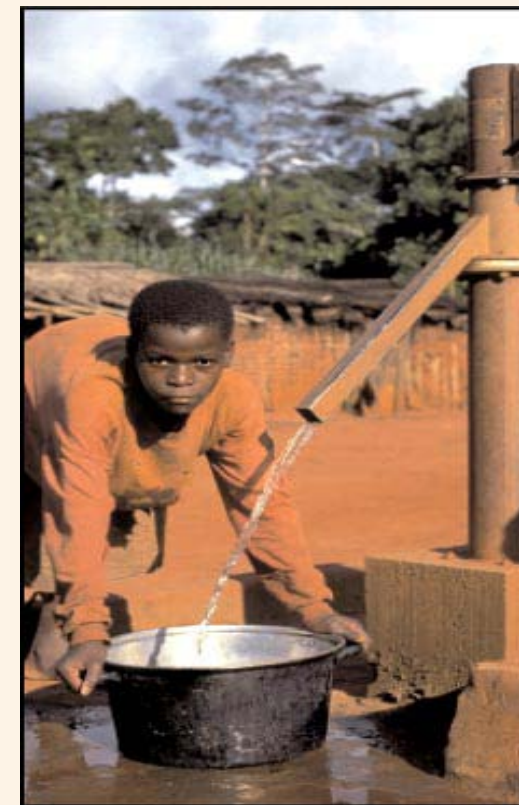


## Strategy

- **The principal aim of the water strategy for Africa is to ensure sustainability of water supply & use, by addressing the technical, hydrological, economical, environmental, social and legal aspects of supply, use and quality challenges. It will thus contribute to poverty reduction and to achieving the related MDGs by 2015, and to do more.**
- **The Strategy will be sustained by an integrated approach, called “*Integrated Water Resources Management*” (IWRM) which is an interdisciplinary and inter-sectoral approach, responding to these aforementioned objectives, and favouring a demand side management approach rather supply management.**
- **IWRM is the mainstream for a cross-sectoral approach aimed at coordinating and integrating water and other related development policies (including those of energy & agriculture sectors), and using tools and practices to control & reduce demand.**
- **Its implementation will only be effective if it is supported by a legal & institutional framework, sound policies and good practices that influence the sustainable supply, use and management of the resources.**

## Examples of Strategies

- Senegal developed a strategy focusing on ensuring the long-term sustainability of the water sector, based on:
  - ✓ *establishing a competent parastatal water Company (SONES), aimed at enforcing policy and strategy;*
  - ✓ *deepening the institutional reform and establishing a regulatory framework, in order to make critical investments to meet the demand for safe water.*
- Some African countries have adopted strategy on IWRM or have enacted water laws and established institutions to enforce the laws (Egypt, Morocco, Tunisia, Algeria, the Nile Basin Initiative countries, the Nubian Sandstone Aquifer members).



## Policies & Regulations

- An effective water management system (IWRM) depends on an enabling environment, with: appropriate legal & regulatory frameworks, sound water policies and well-functioning institutions.
- The related water policy involves methods & practices that influence water management (pricing & tariffs, recycling & reusing wastewater, using alternatives to water, using technologies & methods that improve water use efficiency, etc.).
- The policy also must be mainstreamed into cross-sectoral policy options, including: energy, industry, agriculture, domestic, health and the environment (*in order to achieve a sustainable balance in the use of water for the different needs*).

## Policies & Regulations (cont.)

### ➤ ***Sound water policies will take into account the following objectives:***

- ✓ Ensuring the sustainable supply and use of water to all the sectors and users.
- ✓ Managing water resources, in a way of preventing potential transboundary conflicts, while satisfying the different needs of the related countries.
- ✓ Integrating regional, sub-regional and national water and energy resources planning, and ensuring better coordination and cooperation among related agencies, as well as with industry/energy and other stakeholders. This will ensure the optimisation of the resources, and also, that users from the different sectors can get their fair share.

## Conclusions / Recommendations

- ❑ The World demands for more water & energy services seem inexorable; and the pace of these demands is of particular concerns for DCs, including Africa.**
- ❑ In relation, the projected water scarcity and stress might be overwhelming in most African countries.**
- ❑ Moreover, sustainable solutions of the water sector require more than a sector-only approach, and this is also true for the energy sector. Harmonized and coordinated approaches are thus required, in terms of planning, policies, strategies and management to reduce costs and impacts and to optimize supply and uses. This will ensure that related services are delivered in a sustainable way and the related resources are managed efficiently.**

## Conclusions / Recommendations (cont.)

Key actions should focus on:

- **Creating an enabling environment for IWRM, by developing legal and institutional frameworks for effective implementation.**
- **Developing frameworks and coherent policies which favour economic instruments in water allocation and pricing, and drive investment decisions on water, agriculture, and energy sectors.**
- ✓ **Developing / deploying appropriate technologies and promoting improved efficiencies to reduce the water & energy footprints.**
- ✓ **Developing and implementing national and regional water and energy information systems (these are essential tools for planning purposes and establishing sound policies).**
- **Streamlining water resources allocation, on the basis of planning and policy studies based on technico-economic considerations, rather than pure political considerations.**
- ***All actors have a significant role to play, but strong government engagement combined with reinforced cooperation & integration, as recommended by WEC, are most needed for the sustainable achievement of the 3As in the water and energy sectors together (WEC Lion Scenario), and further, to achieve sustainability in the two sectors.***

**Thank you for  
your attention.**

