A recognised success for the 6th World Water Forum which gathered more than 35,000 participants in Marseille

400 open sessions of which fifty major ones.

**Participations** (key figures)
- 15 heads of State, of governments and European Commissioners
- 173 represented countries
- 103 Ministers, Vice-Ministers and Secretaries of State
- 170 national delegations and international organisations taking part in the Ministerial Declaration
- More than 750 elected officials among which 250 mayors and 250 parliamentarians
- More than 500 sponsorised persons
- 3,500 NGOs and civil society representatives

More than
1600 solutions proposed

Jean-luc Redaud
Académie de l’eau
Final ministerial declaration

Ensure Everyone’s Well-Being: Accelerate Access to Safe Drinking Water and Sanitation, Expand Sanitation and Deliver on Water and Health

Contribute to Economic Development: Green Economy, Water for Food Security and Water and Energy

Keep the Planet Blue: Water in the Rio Conventions, Water-Related Disasters and Water and Urban Development
GLOBAL CHANGE AND WATER RESOURCES
Getting there among uncertainties
What do we mean by “Climate Change”?

- Annual minimum flow of the River Nile (622-1284) at Roda, near Cairo
  - Natural Climate Variability
  - Hurst/Persistence/Memory

(Elshamy et al., Hydrology and Earth System Sciences, 2009)
Climate Change Impact

- **Uncertainty**
  - Simulated decadal mean flows of the River Nile at Dongola up to 2090s
  - Entire modelling chain is affected by Significant Uncertainty

*(Di Baldassarre et al., IAHS Hydrological Sciences Journal, 2011)*
Climate Change Only?

- Natural, undisturbed, pristine catchments are more and more uncommon

(Sanderson et al., BioScience, 2002)
Population change

- **Population growth**
  - Land use change, Economic development, etc..
  - Spatial and temporal dynamics (urbanization)
  - Often outweighs climate change

(Vorosmarty et al., Science, 2000; Alcamo et al., HSJ, 2007; Carter & Parker, HSJ, 2009)
Population change

African Floods and Population Dynamics

(Di Baldassarre et al., Geophysical Research Letters, 2010)
Many possible direct and indirect impacts

PM

1. PERMAFROST MELTS, GASES RELEASED
2. MOST OF THE WORLD UNINHABITABLE
3. TSUNAMIS
4. EARTH HOTTER THAN IN 55 MILLIONS YEARS
5. MILLIONS OF REFUGEES
6. BANGLADESH UNDER WATER
7. DEPRESSED?
8. UP 5°C
9. MASS EXTINCTION
10. UP 4°C
11. GLOBAL WARMING WORSE THAN
12. UP 6°C
13. MUST INVEST 1% GDP
14. WAR
15. FAMINE
16. PLAGUE
17. GLOBAL NUCLEAR WAR
18. ENVIRONMENTAL REFUGEES
19. FOOD SHORTAGES
20. AMazon Collapses
21. GREENLAND MELTS
22. POLAR BEARS EXTINCT
23. WATER SUPPLY AFFECTED
24. RARE SPECIES EXTINCT
25. CORAL REEFS DESTROYED
26. EXTREME WEATHER EVENTS
27. INCREASED EARTHQUAKES
28. SEA LEVELS RISING
29. HEAT WAVES
30. OCEANS WARMING
31. ARCTIC ICECAP MELTING

(ROB SWART, CIRCLE-2, 2010)
Which uncertainties should be considered?

Apart from those described by the IPCC exercise:

- **Uncertainties on climate itself**
  - **Through natural aggravation**
    - Antarctic and Groënland ice cap melting/flowing, methane emissions by permafrost melting and ocean
    - Natural and anthropic retroactions on climate (land use retroaction, wars, epidemics, desertification, land grabbing, etc.)
  - **Through anthropic aggravation**
    - Adaptation of human activity, Massive deforestation, GHG emissions

- **Possible strong effects, and unquantifiable uncertainty**
  - Thermohaline ocean circulation shut-down
  - Amazonian forest instability

- **Climate surprises**
  - Volcanic eruptions, tsunamis, increased tornadoes,

- **Unknown ?**
Coping with Uncertainty

- **Natural Climate Variability**

- **Uncertainty in Climate Projections**

- **Economically- and Demographically-driven changes often outweigh Climate Change**

- **Water Management –How to deal with Global Change?**
  - Recognize Uncertainty (sources, estimation, communication)
  - Avoid heavy reliance on climate projections ("all models are wrong")
  - Scientists consulted for plausibility checks
  - Build adaptive capacity ("no-regret")
  - Build-up resiliency (capacity to recover from stress)
  - Robustness of alternative options to a range of plausible futures
  - Through multi-stake-holder involvement (imagination, acceptance, effectiveness, success)

*(Dessai et al., 2009; Goulden et al., 2010; Di Baldassarre et al., 2011)*
4 key recommendations.

1 **By 2013**: compile a **scientific review and synthesis** on the impacts of climate change on groundwater resources including management recommendations and bring it to the attention of IPCC authors as a contribution to the on-going preparation of the 5th Assessment Report.

2 **By 2012**: initiate a **networking platform for researchers and water managers** as a water science-policy interface in order to facilitate communications in relation with the IPCC and other UN conventions, and to provide relevant inputs to help water resources managers develop effective management and climate change adaptation strategies.

3 **By 2012**: provide a **networking platform of basin organizations** for the collection and exchange of best practices and experiences on the implementation of climate change adaptation strategies in the field of water resources planning and management, relying on existing initiatives of UNECE and INBO and involving regional and international programmes.

4 **By 2015**: develop **methodological guidelines** based on gathered information and lessons learned from both networks, to promote the creation of new tools of governance for decision-makers to better integrate climate change impacts into water resources planning and management.
Croissance verte ?

Économie verte ?

Économie de transition ?
Box 1: Definitions related to green growth, green economy and water and green growth:

The Water and Green Growth project defines green growth as: a strategy that fosters economic growth and development, protects natural ecosystems and the resources and environmental services they provide, and enhances socially-inclusive development.

Building upon this, water and green growth is defined as: a strategy to invest in water infrastructure and water security, fostering economic growth and development, protecting the environment and the services it provides, and enhancing socially-inclusive development.
## Green growth: Strategies and goals of the Republic of Korea

| Mitigation of climate change and energy independence | 1. Effective mitigation of greenhouse gas emissions  
2. Reduction in the use of fossil fuels and the enhancement of energy independence  
3. Strengthening the capacity to adapt to climate change |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------|
| 2. Creation of new growth engine                    | 4. Development of green technologies  
5. Greening of existing industries and promotion of green industries  
6. Advancement of industrial structure  
7. Engineering a structural basis for the green economy |
| 3. Improvement in quality of life and enhanced international standing | 8. Greening the land, water and building the green transportation infrastructure  
9. Bringing green revolution into our daily lives  
10. Becoming a role-model for the international community as a green growth leader |
A  Ecosystem Recovery & Water Quality Improvement
  A1 Green Growth-Based Integrated Water Management
      Indonesia (Citarum River Basin)
  A2 Development of Lake District
      Republic of Korea (Lake Shinji)
  A3 Rehabilitation of Urban Estuary as a Green Growth Project
      Turkey (Golden Horn, Istanbul)
  A4 Water Quality Management & Wastewater Services
      USA (Tualatin River Watershed, Oregon)

B  Watershed Management
  B1 Integrated Natural Resources Management in Watersheds (INRMW) Programme
      Georgia
  B2 Regional Development & Canal Project
      Japan (Aichi Canal)
  B3 Rural Electrification Project (AHREP)
      Nepal (Anhiththo River)
  B4 River System Rehabilitation
      The Philippines (Bang Pas-Zapote River)
  B5 Basin-Scale Approach to Balancing Power Generation
      & Ecosystem Restoration
      USA (Penobscot River, Maine)

C  Policy, Planning & Governance
  C1 Green Growth & Integrated Water Resources Management
      Brazil
  C2 Water Planning Towards a Green Economy
      Spain (Ebro River Basin)

D  Financing & Public-Private Partnerships
  D1 Public Policy of Payment for Environmental Services: A Financial Instrument to
      Improve Water Quality
      Brazil
  D2 Rewards for Watershed Services
      Indonesia (Sumberjaya Watershed)
  D3 Payment for Environmental Services Pilot Project
      Kenya (Lake Naivasha Basin)
  D4 Public-Private Fund Mechanism for Watershed Protection: Water Funds
      Latin America & the Caribbean (Columbia & Ecuador)
  D5 Eco-Compensation for Watershed Services
      People’s Republic of China

E  Innovation & Technology
  E1 Integrated Urban Water Management: Modelling Human Behaviour
      Australia
  E2 Recycled Water Scheme: A Best Practice for Industrial & Potable Supply
      Augmentation
      Australia (Western Corridor)
  E3 Role of Technology in Water Quality Improvements
      India (Gujarat State)
  E4 Photovoltaic System Floating on Reservoir
      Republic of Korea (Hopcheon Dam)
  E5 Nutrient Recovery and Conversion to Fertilizer
      USA (Tigard, Oregon)

F  Infrastructure
  F1 Sanitation Plan
      Chile (Santiago Water Basin)
  F2 Logistical Hotel: A River Transport Project
      France (Quai d’Austerlitz, Paris)
  F3 Urban Water Sector Improvement Project
      India (Karnataka State)
  F4 Four Major Rivers Restoration Project
      Republic of Korea (Han, Nakdong, Geum & Yeongsan Rivers)
  F5 Participatory Irrigation Management
      Turkey
Increasing resilience to climate change

Climate change increase risks due to drought and floods

Large investments in water have reduced insecurity due to water in developed countries and recently in china, brasil, india

Large investments may be not flexible (dams)

Food, energy and water security are connected but may have adverse effects

Democratic solution adapted to local context have to be privileged
Numerous sessions on climate change for identifying Factors for success

Cross-cutting factors
Environmental factors
Social factors
Economic Factors
1. Collaboration among a wide variety of interests, public and private interests & partnerships;
2. Economic opportunities for industry, small-scale enterprises, commerce and agriculture;
3. Demand management and improved efficiency as means to water and energy savings;
4. Better utilization of existing waterways, revitalization of urban waterfronts, mixed-use waterfront development;
5. Large-scale infrastructure balanced with small-scale innovations;
6. Increased water availability from recycling and pollution control & wastewater treatment;
7. Costs and benefits shared by upstream stewards and downstream beneficiaries;
8. Financing from multiple sources, including public and private investors.
Key new messages

water-food-energy nexus

Coping with climate change and global changes

Water and green growth

TIME FOR SOLUTIONS
pour les ONGs Rio+20
Une transition fondée sur 4 régulations

1. Régulation économique et financière
2. Socle international de protection sociale et arêt dumping social
3. Régulation écologique, changement climatique, dumping social
4. Régulation juridique fondée sur adoption charte des responsabilités universelles
MERCI / THANK YOU

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solutionsforwater.org

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