Water initiatives at the University of Bonn

Current situation and outlook

Bernd Diekkrüger
Department of Geography
Bonn is a city at the river Rhine and suffers from floods and droughts.
Research projects

• At the **University of Bonn**, a number of **water related** projects are situated

• Topics are
  – Extreme events: flood risk and droughts
  – Patterns in the Soil-Vegetation-Atmosphere System
  – Mass transport and mass distribution in the system Earth
  – Rainfall predictions
  – Climate Change and Global Change impacts
  – Integrated Water Resource Management
  – Vulnerability and resilience
  – Social Ecological Systems
  – …
Due to limited time

concentration on examples from Africa
GLOWA - Program

GLOWA-Danube
Integrative Techniques, Scenarios and Strategies for the Water Cycle in the Danube Watershed

GLOWA-Elbe
Global Change Impact on Environment and Society in the Elbe Region

GLOWA-Jordan
Global Change and the Integrative Water Resources Management in Arid Regions

GLOWA-IMPETUS
An Integrated Approach to The Efficient Management of Scarce Water Resources in West Africa

GLOWA-Volta
Sustainable Water Use, Changing Land Use, Rainfall Reliability and Water Demands In the Volta

Bonn and Cologne

Bonn and other universities

Financed by the Federal Ministry of Education and Research in Germany

Funding period 2000-2011
Example 1

GLOWA-IMPETUS project

**Integratives Management- Projekt für einen Effizienten und Tragfähigen Umgang mit Süßwasser in West Afrika**

An Integrated Approach to the Efficient Management of Scarce Water Resources in West Africa
objectives of the GLOWA-IMPETUS project

• offering concrete ways of using scientific results within application-oriented solution strategies

• sustainable management of water resources on the local and regional scales
  • changing natural environment
  • social and economic conditions

• providing a reliable basis for political measures and international agreements

in close cooperation with local partners (stakeholders)
GLOWA-IMPETUS study areas

- Wadi Drâa
- Ouémé
Interdisciplinary approach

Precipitation variability

Socio-demography and ethnology

Biosphere

Latent Heat Flux (Evapotranspiration)

Contiguous hydrosphere

Soil Moisture

Groundwater Recharge

Degradation

Surface Runoff

Anthropology and medicine
GLOWA-IMPETUS in West Africa

FOREST COVER

2000

2025

CHANGES IN ANNUAL RAINFALL
2025 - 2000

Ongoing deforestation will cause a substantial reduction in precipitation over tropical Africa.

Paeth, Meteorological Institute, University of Bonn
Example 2

The GLOWA Volta Project

Paul L. G. Vlek
Objectives

• **Integrated analysis** of the physical and social determinants of the hydrological cycle

• Scientifically sound **Decision Support System** for the assessment, sustainable use and development of the water resources of the Volta Basin

• **Development of “Human Capital“** via advanced education and training, co-operative research and stakeholder participation

The GLOWA Volta Project is a **scientific**, and not a **development** project *per se*; although the scientific outputs are **development-relevant**.
Is there life after GLOWA?
Example 3

West African Science Service Center on Climate Change and Adapted Land Use

main phase
August 1, 2011 – July 31, 2015

Coordinator Prof. Dr. Paul L.G. Vlek
(ZEF University of Bonn)
The objectives are to

• significantly improve the climate change research infrastructure and capacity in West Africa,

• explore science-based scenarios and options for enhancing the resilience of human and environment systems in the face of climate change,

• assist policy and decision makers in design and implementation of land use patterns at watershed level that ensure the provision of the essential ecosystem services while supporting the livelihoods of local communities, and

• help educate the next generation of scientists and policy makers that have intimate knowledge of the different climate related issues and can help the region in developing suitable coping strategies.
WASCAL partner countries
- Benin
- Burkina Faso
- Côte d’Ivoire
- Gambia
- Ghana
- Mali
- Niger
- Nigeria
- Sénégal
- Togo
The three pillars of WASCAL

1. Competence Center
2. Core Research Program
3. Graduate Research Program
Competence Center in Ouagadougou

• provides infrastructure for research and development,
• brings together know-how in climate, hydrology, land use, biodiversity, economics and social sciences,
• analyzes the impacts of climate change and develops coping strategies,
• collects data and establishes databases for the relevant disciplines.
Establishment/improvement of observation networks

- Meteo (station network)
- Hydro (station network)
- Land (satellite receiving station)
- Households (socio-economic surveys)
- Biodiversity (observatories, surveys)
Core Research Program

- African and German scientists develop a joint research program on land management under changing climatic conditions.
- The research program will focus on the adaptive capacity of human and ecological systems.
Graduate research programs

Establishment of above average GRPs at regional universities with counterpart institutions in Germany to establish above average GRPs:

1. African Climate Systems (Nigeria – Augsburg/KIT)
2. Climate Change and Water Resources (Benin - Bonn)
3. Climate Change and Economics (Senegal - Bonn)
4. Climate Change and Land Resources
5. Climate Change and Agriculture
6. Climate Change and Biodiversity
7. Climate Change and Human Security

Plan: 150-200 PhD students in the next years
Conclusion

• Bonn has a number of excellent organizations which make it attractive for water related research
  – ZEF, UNU-EHS, UNCCD, UNFCC, UNW-DPC, GWSP
  – NGOs like DIE, BICC, DKKV, ICLEI Secretariat, Deutsche Welthungerhilfe, InWent and GTZ, etc.
  – Federal Ministries

• Bonn has a close cooperation with
  – the University of Cologne
  – the Technical University of Aachen
  – the research Center Jülich

Water is one of the important topics in ABC/J
Acknowledgements

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