

# **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



 flood extent

0 100 200 Meters



# 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

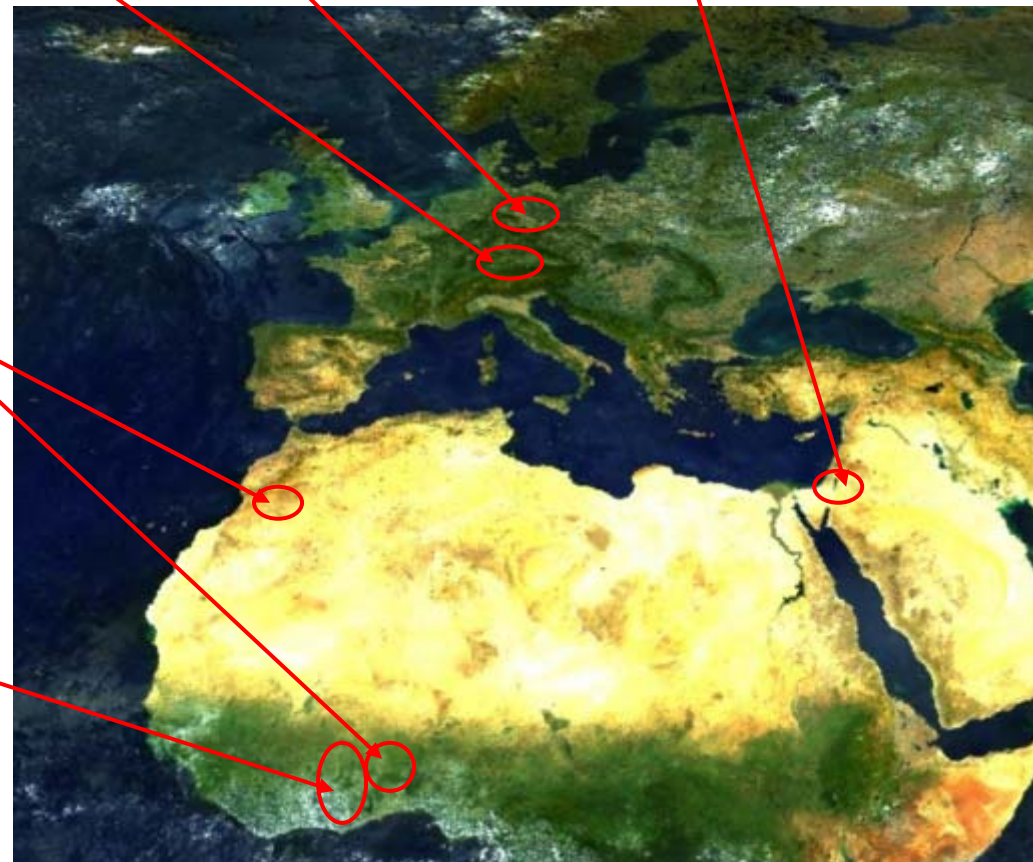
**GLOWA-Jordan**  
Global Change and the  
Integrative Water Resources  
Management in Arid Regions

Bonn and Cologne

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

Bonn and other universities

**GLOWA-Volta**  
Sustainable Water Use, Chan-  
ging Land Use, Rainfall  
Reliability and Water Demands  
In the Volta



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

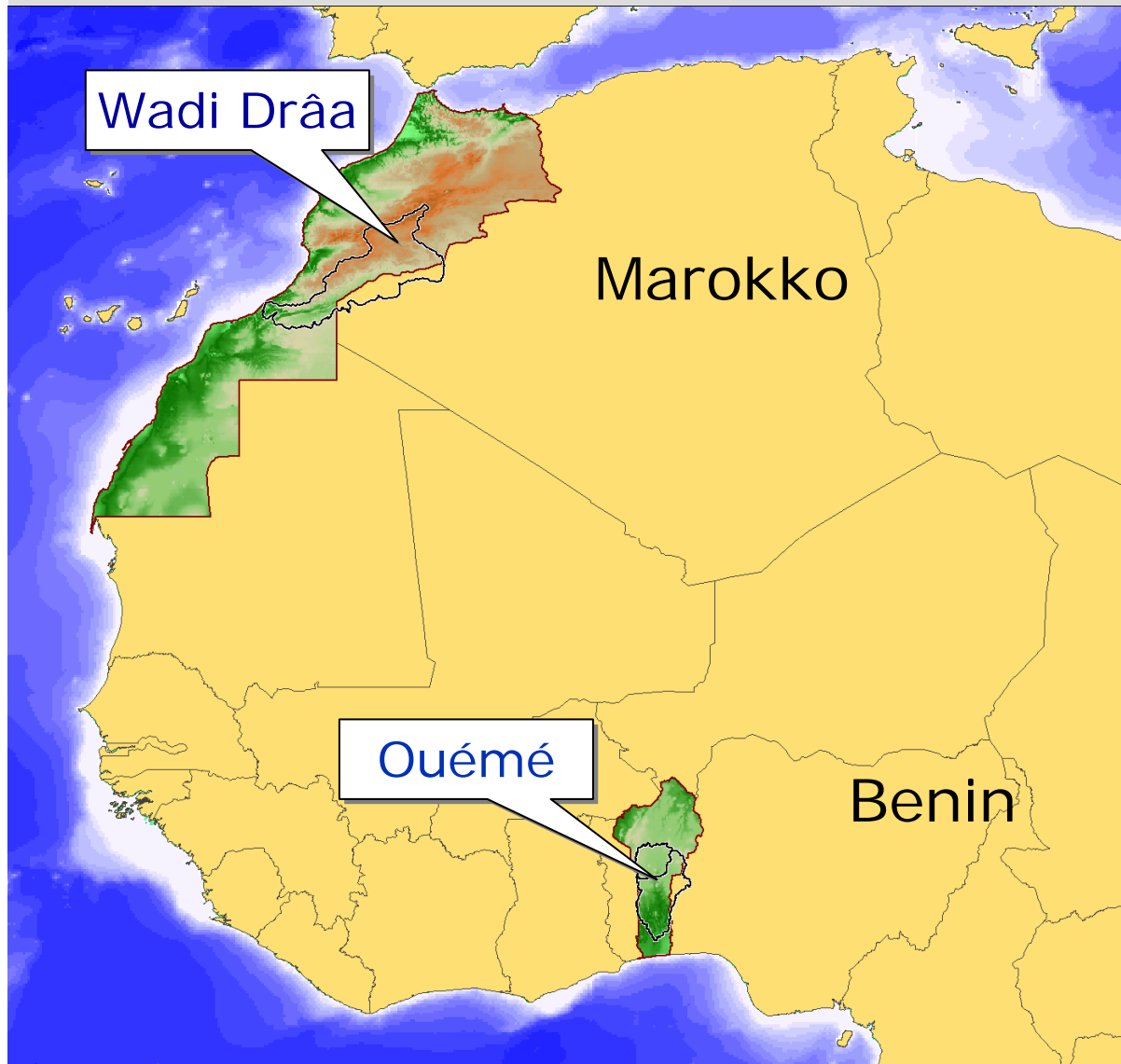
An Integrated Approach to the Efficient  
Management of Scarce Water Resources in  
West Africa

## 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)

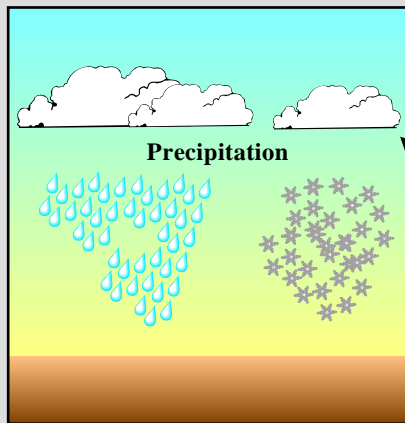
# GLOWA-IMPETUS study areas





# Interdisciplinary approach

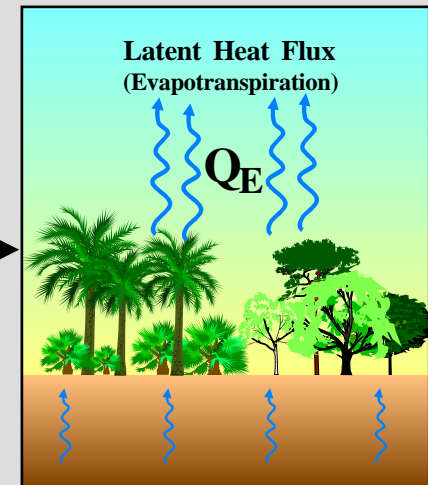
Precipitation  
variability



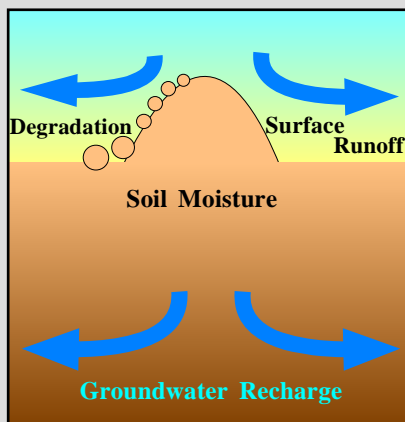
Socio-demography and  
ethnology



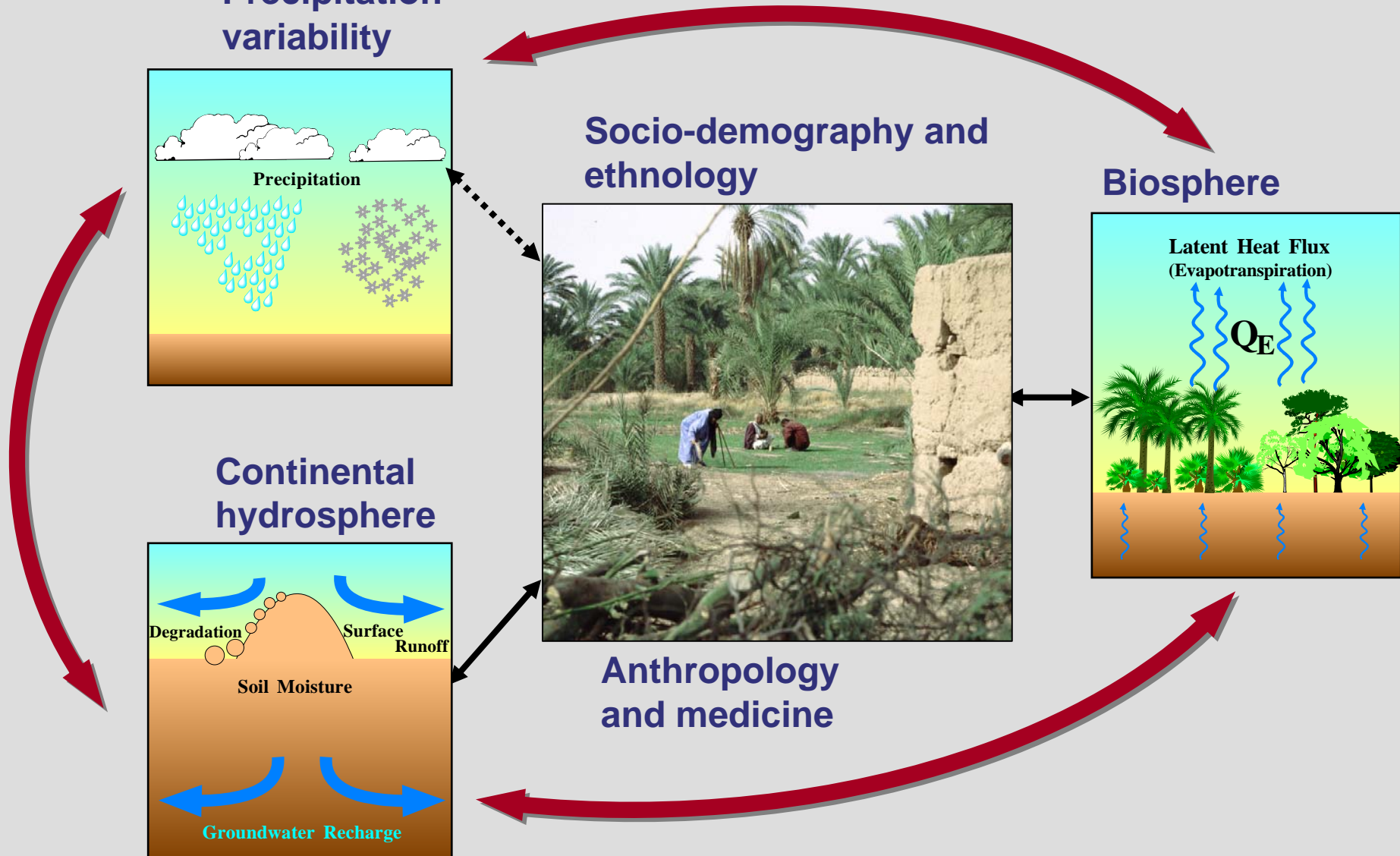
Biosphere



Continental  
hydrosphere

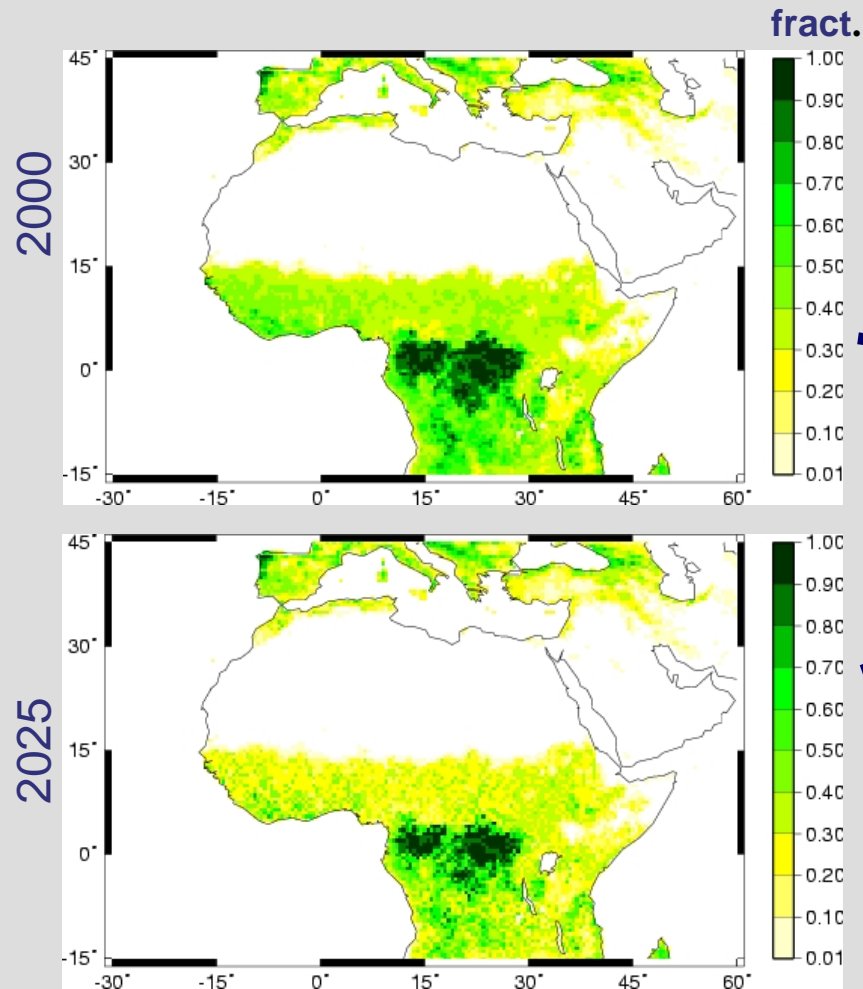


Anthropology  
and medicine

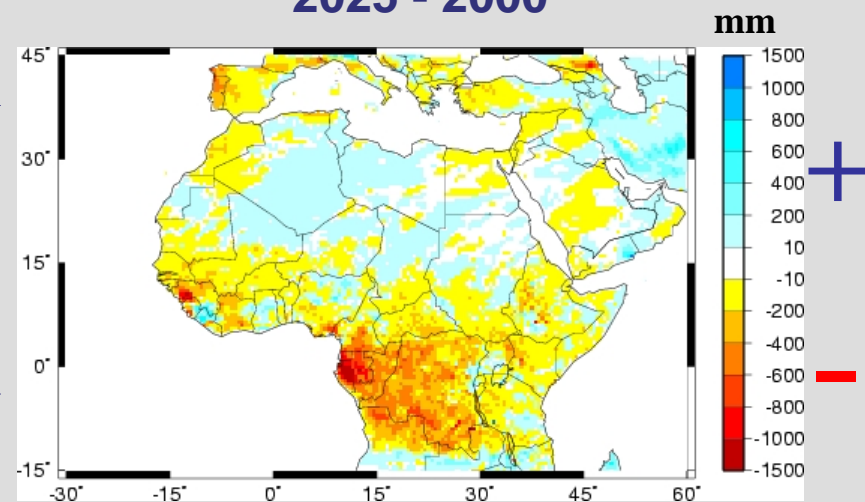


# GLOWA-IMPETUS in West Africa

## FOREST COVER



## CHANGES IN ANNUAL RAINFALL 2025 - 2000



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



**GLOWA**Volta



# Example 2

## The GLOWA Volta Project

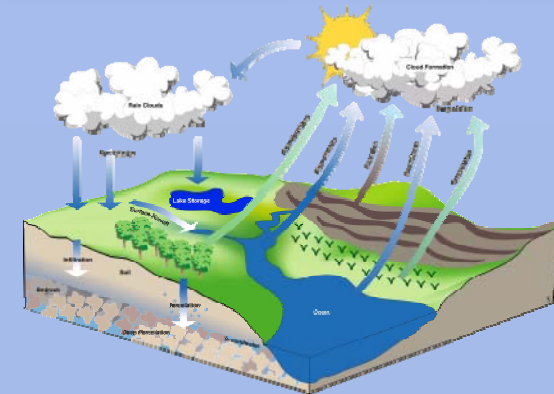
*Paul L. G. Vlek*





## 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

**WASCAL**

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

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

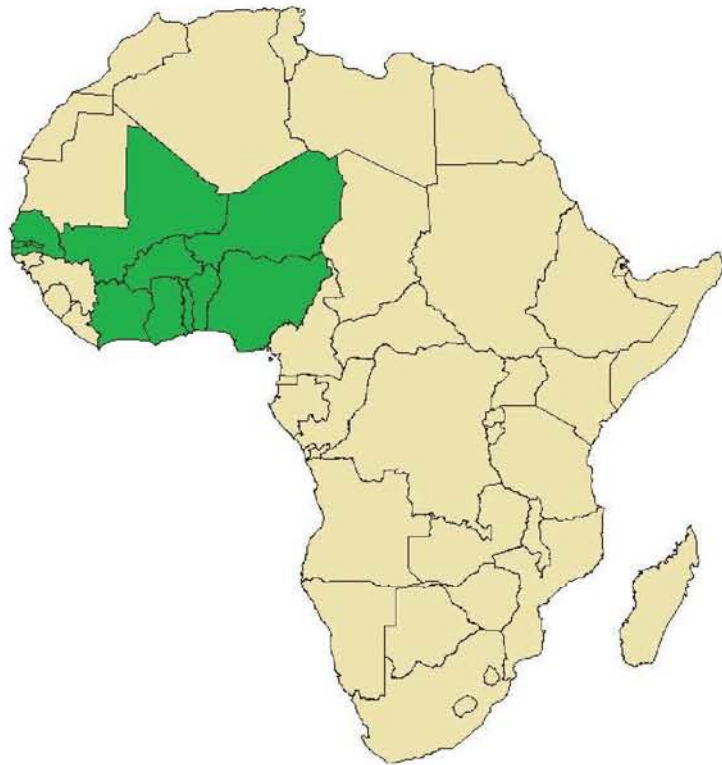
main phase

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

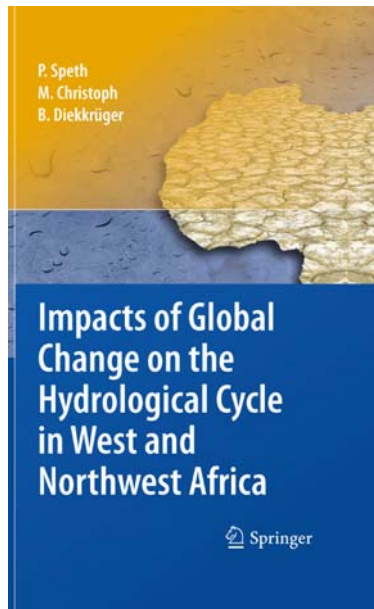
- **Bonn** has a number of excellent organizations which make it attractive for water related research
  - ZEF, UNU-EHS, UNCCD, UNFCCC, UNW-DPC, GWSP
  - NGOs like DIE, BICC, DKKV, ICLEI Secretariat, Deutsche Welthungerhilfe, InWent and GTZ, etc.
  - Federal Ministries
- **Bonn** has a close cooperation with
  - the University of Cologne
  - the Technical University of Aachen
  - the research Center Jülich

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

# Thank you for your attention

## Acknowledgements

This work was and will be supported by the Federal German Ministry of Education and Research (BMBF) and by the Ministry of Innovation, Science, Research and Technology (MIWFT) of the federal state of Northrhine-Westfalia



<http://www.impetus.uni-koeln.de/>



<http://www.glowa-volta.de/>