



## GROW – Joint research project iWaGSS

### Integrated Water Governance Support System

This project is sponsored by the Federal Ministry of Education and Research (BMBF) as part of the funding measure „Water as a Global Resource” (GRoW).

SPONSORED BY THE



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Federal Ministry  
of Education  
and Research



The objective of the research project iWaGSS is the development and practical pilot implementation of an innovative water governance system basing on new technologies and tools for mitigating water stress and for a sustainable management of the water resources in the South African pilot region as well as in other regions with overstressed water resources in Africa and worldwide.



Creating data transparency → realtime online monitoring  
Supporting sustainable O&M → incentive engineering  
**Effectivity on the local level**

The **Lower Olifants sub-catchment** has been selected as the primary iWaGSS demonstration area including the **Phalaborwa pilot zone**.



The Kruger Park is an international target of touristic, political and ecological importance and – therefore – a relatively stable region.

The first water PPP concession and the first water franchise had been piloted there, with former BMBF-MOSA and today's iWaGSS scientists involved.

This region has been selected in close cooperation with South African partners and stakeholders because the development of the region in terms of its ecological diversity and sustainability as well as economic progress and social stability is particularly vulnerable to water-related problems, including transboundary water issues.

Responsible:

**IEEM gGmbH**  
**Institute of Environmental Engineering and Management**  
**at the Witten Herdecke University**



In cooperation with:



- Focus on economic aspects of governance
- Includes socio-economic studies (e.g. on ecosystem goods and services, environmental economic accounting, cost-benefit analysis)
- Finance concepts for water infrastructure investments (“sustainable water finance“)
- GRoW cross-cutting topic “Incentive mechanisms in the context of governance”

**2019:** Finalising study on ecosystem goods and services  
& study on PPP opportunities for rehabilitation/O&M of WWTPs

Responsible:

**eE+E**  
**Environmental Engineering + Ecology**  
**Ruhr-Universität Bochum**

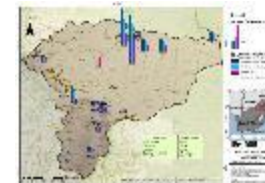
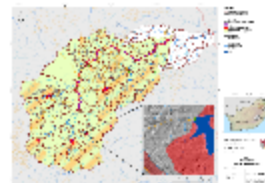
**eE+E**  
Prof. Dr. H. Stolpe

In cooperation with:



- GIS-based contamination risk assessment: ranking catchment areas with increased need for action
- Building a 1D hydrodynamic model for the real-time water management system
- Combination of the risk assessment tools and a 1-D DHI river model

**2019:** Further fieldwork to evaluate models and calibrate data  
& hand over first version of model to WP 5



© eE+E



# WP 3: Phalaborwa Barrage

Responsible:

**IWG**

**Institute for Water and River Basin Management  
Karlsruhe Institute of Technology**



In cooperation with:



- Numeric modelling of the sedimentation and remobilisation of sediments
- Development of sediment-management strategies & change of gate operations at Phalaborwa barrage in cooperation with Lepelle Northern Water (Start **2019**) including additional bathymetric study to monitor effects of new gate operations
- In-situ measurement campaigns to analyse sediment and “fluid mud” of the reservoir



# WP 4: Realtime Water Quality Monitoring

Responsible:

**LAR**  
**Process Analysers, Berlin**



In cooperation with:



- Installation and operation of a network of online water quality monitoring stations in the project region at the Olifants and Selati rivers
- Online measurement of toxicity, pH, conductivity, climate data and more
- Additional laboratory analysers for various parameters at SAEON offices

March **2019**: Start of operation and data collection



# WP 5: Data Management

Responsible

**Disy**  
Informationssysteme, Karlsruhe

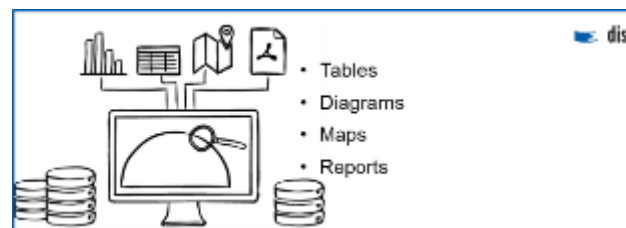


In cooperation with



- Development of a database to link and combine the input of the modelling, the risk assessment and the quality monitoring
- Realtime water management system and GIS
- Including “forecast” scenarios basing on real-time quality monitoring and hydrological modelling

**2019:** Start of data integration from other WP  
β-Version of data management system



disy



# WP 6: O&M concepts

Responsible

**IEEM gGmbH &**

**GWFA**

**Global Water Franchise Agency, Berlin**



In cooperation with



- Wastewater management: Identification & Quantification of the pollution from point sources in the project area
- Immission concept for the river system in the project region
- Optional water re-use concepts for the Phalaborwa industrial complex

**2019:** Further studies on PPP model for WWTP rehabilitation/O&M & establishing WWTP monitoring cooperation with local municipality and stakeholders



Responsible

**ZEF**  
**Center for Development Research**  
**University of Bonn**



In cooperation with



Special focus on interaction between transboundary water governance, impacts on people and ecosystems/nature protection

- Assessment of challenges and opportunities for transboundary water governance
- Assessment of the transaction costs and benefits of optimising the transboundary water governance
- Implementation research, focusing on various stakeholders and actors

**2019:** Stakeholder mapping and identification  
& focus group discussions in South Africa and Mosambique

# WP 8: Remote sensing

Responsible

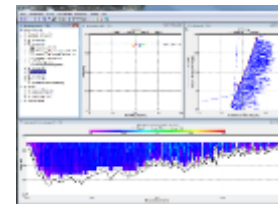
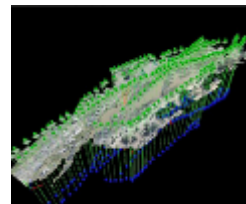
**Die Gewässer-Experten!**  
**Lohmar**

In cooperation with



- Use of drones for river monitoring in consultation with German and South African partners
- Generation of digital surface models (DSM) by drone
- Development of a drone that contains multiple sensors and samplers in order to enable a broad and efficient monitoring

**2019:** Further tests of sensors, samplers and data evaluation  
& Transfer of iWaGSS drone concept in cooperation with SANParks



© Gewässer-  
Experten!

Responsible:

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**Institute of Environmental Engineering and Management**  
**at the Witten Herdecke University**



In cooperation with:



- Identification of target regions, cooperation partners and international networks
- Presentation of the iWaGSS concept through publications, public relations and presentation at national / international meetings and conferences
- Development of a framework for the transfer and implementation of the iWaGSS concept for at least one other region (preferably in the Southern African Development Community or sub-Saharan Africa)

**2019:** discussion with SANParks and DWS to transfer risk assessment (WP2, eE+E) & realtime management system to other South African catchments

Responsible:

**IEEM gGmbH**  
**Institute of Environmental Engineering and Management**  
**at the Witten Herdecke University**



In cooperation with:



- Analysis of the knowledge of the authorities, public institutions local authorities etc. in the project region
- Accompanying measures for local capacity development in order to support the practical implementation of the developed concepts and recommendations (e.g. Development and preparation of adequate training measures) in close cooperation with the iWaGSS partners

**2019:** Training of WWTP operators (including monitoring & lab sampling) in cooperation with AWARD, local municipality and local stakeholders



# Examples of iWaGSS work I

Joint **Fieldwork** of German and South African partners (e.g. CSIR, SAEON, Wits Uni, SANParks, Lepelle Northern Water)



Drone surveys  
 (Gewässer Experten)



River profiles / Drone & ADCP  
 (Gew Exp / eE+E / CSIR)



Sediment samples  
 (KIT)



# Examples of iWaGSS work II

## Installation of monitoring stations



Protecting installation site against crocs, hippos and flooding



Installation of pumps at Oxford Weir



Large volume samplers to determine mass of transported sediments



Protecting pipes and cables against floods and animals



# Examples of iWaGSS work III

Animated 3D-model - Olifants River / Oxford  
South Africa / 2019



**DIE GEWÄSSER-EXPERTEN!**

FK 02WGR1424H, sponsored by:



# Networking / Contact

The iWaGSS project is collaborating with further partners from academia, industry, administration and civil society, for example:



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[www.iwagss.com](http://www.iwagss.com)

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# Thank you!

Prof. Dr.-Ing. Dr. rer.pol. Dr.h.c. **KU Rudolph**

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on behalf of the **iWaGSS** project  
INTEGRATED | WATER | GOVERNANCE

 **IEEM @**  
**university**  
Witten/Herdecke