

IWRM SOUTH AFRICA II

Focussing Integrated Water Resources Management interventions on added-value to secure sustainability.

The 21st century is characterized by global environmental problems. Surface water and river water pollution is of special importance as clean water is the foundation of life. It therefore needs continuous monitoring in particular.

Middle Olifants South Africa

The IWRM-pilotproject in South Africa deals with the quality of the Middle Olifants near Pretoria. In its river basin many industries are located including large-scaled agricultural operations, mining, and tourism. The river water is precious, being food, habitat, and manufacturing resource.

Monitoring Technology

For the efficient, ecological and economical monitoring of water quality, analysis systems are required that are characterized by low costs of operation and environmental friendly methods. LAR Process Analysers AG develops highly innovative monitoring technology corresponding to these needs. Worldwide, LAR measurement systems are used in various applications.

Online analysis and data transfer system

Specially for the project, LAR has developed an online analysis and data transfer system. Its measurement results are provided directly via internet to the authorities and for further updates and evaluation of the IWRM model to the project partners.

Measurement points

However, in order to analyse the effects of household waste water and industrial waste water on the quality of the river as well as to check any influences of diffuse sources, the implementation of measurement points is of great importance. This, however, is often not possible.

As a part of the project, the following measuring points and surroundings were analysed and evaluated between 2013 and 2015:

Kubu Kwena / Riverside Lodge / De Villa Lodge / Forever Resorts Loskopdam / CSIR / Pretoria / Dam wall / Game Reserve / Riverside Lodge / Groblersdal 1 and 2 / Burgersford / Skukuza Rest Camp and Phalaborwa (Krüger National Park) / Marble Hall

For more information please visit: www.iwrm-southafrica.de

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ABOUT LAR



We are the leading manufacturer of water analysis instruments for industrial and communal waste water technology, process monitoring, as well as for pure water analysis. Further products in the areas of industrial process and environmental technology complete our product range.

AREAS OF APPLICATION

ENVIRONMENT / MUNICIPAL FACILITIES / INDUSTRY

INDUSTRIES

ENVIRONMENTAL MONITORING / WASTE WATER TREATMENT / WASTE PROCESSING / PHARMACEUTICAL / LABORATORY / PETROCHEMICAL / REFINERIES / CHEMICAL / COAL AND STEEL / POWER / AIRPORTS / AUTOMOBILE / PAPER MANUFACTURE / BREWERIES / FOOD MANUFACTURE / DRINK MANUFACTURE / MILK PROCESSING

TYPES OF WATER

GROUNDWATER / SURFACE WATER / DRINKING WATER / WATER INFLUENT / WATER EFFLUENT / DISCHARGE CONTROL / INDUSTRIAL WASTE WATER / DE-ICING WATER / PROCESS WATER / OIL-IN-WATER / HIGH SALT CONCENTRATION / COOLING WATER / PURE WATER / BOILER FEED WATER / CONDENSATE RETURN / PHARMA HPW / PHARMA WFI



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IWRM-Pilotproject Middle Olifants South Africa

Phase II

Development of an online analysis and data transfer system for the IWRM monitoring: The mobile lab.



THE MOBILE LABORATORY

LAR has set up an autonomously working containerized laboratory for the on-site monitoring of surface waters.



The scientific innovation of this mobile lab lies within its compact stand-alone solution. Moreover, it is equipped with innovative analysers to receive accurate and reliable monitoring data.

Ultra High Temperature Oxidation

The ultra high temperature oxidation (HTO) at 1,200°C determines the total organic carbon (TOC) in waste water. The analyser is able to analyse accurately the most difficult samples including particles - without clogging or blockages. Key components of the process operation are patented. This analyser additionally determines the chemical oxygen demand (COD) and total bound nitrogen (TN_b).

Ultra HTO analyser.

Nitrificant Toximeter

LAR's online toximeter determines toxic effects of pollutants on organisms using the very sensitive nitrifying bacteria. An European process patent is approved.

Ion-Selective Electrodes (ISE) with standard addition

LAR's ammonia analyser determines also sodium, potassium, cadmium, fluoride, chloride, and nitrite.

Sample Taking Systems

LAR's sample taking system is used for samples with high loads of particles as it is based on anti-isokinetic fluid dynamics. An European patent is approved.

Additionally, a relays-controlled sample taking system from WaterSam is used for taking control samples or stored samples. It can be addressed directly from the analysers for instance when measurement results are conspicuous.

Photometer

This method detects substances like SO₄, PO₄, NO₂, NO₃, TN_b, TP, Fe, Al in selected samples.

Centrifugal Sample Separator / Electrodes

This sample pre-treatment is used when monitoring important parameters such as pH, conductivity and redox potential.



The mobile laboratory on-site.

Once installed on-site the mobile laboratory can be controlled and monitored via remote control. No operator on-site is necessary. Moreover, it is possible to retrieve measurement data via internet. The results from all installed sensors and analysers are recorded and stored on a server that is accessible for project partners.

The lab is provided with magnificent and unique special features such as:

■ Environmentally friendly analyses

The technologies and analysis methods use no hazardous chemicals and cause no environmental pollution.

■ Reproducibility and reliability of data

Each measurement system is characterized by high sensitivity, reproducibility and reliability.

■ Direct data transfer and access online

The measurement results are directly transmitted to a special server from where they are accessible for project partners.

■ Mobility

The laboratory is applicable even at places that are difficult to access.

■ Autonomous operation

The laboratory is able to work without any operator during a period of one month.

■ Efficiency

It reduces expenses in terms of time and cost compared to normal laboratories.

■ Security

The laboratory is protected against theft by use of 4 video cameras and an alarm system.

ONLINE AND SINGLE MEASUREMENTS

The laboratory is installed at selected measurement points monitoring the water quality for a certain period of time.

The mobile lab performs analyses and online monitoring of water quality directly where it is needed.

One Water Cycle System

On-site the lab is set up so that all installed equipment is part of one water cycle system using a specially protected water pump and corresponding tubes.

Weather Station

In addition to the water parameters the lab records the most important parameters of the environmental conditions. It monitors various weather parameters such as temperature, rainfall, wind, humidity and more.

Objectives

The aim of the mobile lab is to support and improve the governmental monitoring system. Using the lab inspections and monitoring of diverse discharges from diffuse sources, from households, as well as industrial pollution sources are directly possible. It helps the South African authorities to prepare measures for the improvement of water quality in good time.



The lab's interior.

AT A GLANCE

Ultra HTO	TOC, TC, TIC, COD, TN _b
Nitrificant Toximeter	Toxicity
ISE + standard addition	NH ₄ , NO ₃ , Na, K, Cd, Cl, F
Photometer	SO ₄ , PO ₄ , NO ₂ , NO ₃ , TN _b , TP, Fe, Al
Electrodes	pH, conductivity, redox
Weather station	Temperature, wind, humidity, air pressure, rainfall