



## WATERQ2: UNDERSTANDING WATER QUALITY AND QUANTITY IN THE LIMPOPO BASIN

Improved water resources management is critical for biodiversity conservation, water services, and economic growth. Measurement and modeling of water quality and quantity is a prerequisite for management.

The 400,000 square-kilometer Limpopo River Basin is home to over 18 million people living in Botswana, Mozambique, South Africa, and Zimbabwe. Additionally, biodiversity hotspots such as Kruger National Park and the UNESCO Vhembe Biodiversity Reserve are in the Basin. Water-intensive industries include agriculture and mining.

### CHALLENGE

The Basin has seen severe droughts in the last decade. Furthermore, the region's rainfall is highly variable; some areas record 400 mm annually, while others have over 750 mm annually. Data show variability in both the start and duration of the rainy season.

### APPROACH

A systems approach, such as integrated water resources management (IWRM), is needed to address such complex, large, and interrelated components of water resources. More data and modeling capacity are needed by decision-makers to implement evidence-based management strategies to support IWRM.

This project supports water resources monitoring and the development of water quality and quantity measurement tools that use environmental sensors and satellite data. These **measurements** enable scientists and decision-makers to better understand water resource dynamics across the Basin and use computer **models** that can help estimate hard-to-measure parameters. The enhanced monitoring and data sharing provide the platform for decision support by policy-makers and evaluations of biodiversity and water resources projects.

## OBJECTIVES

### MODULE 1: WATER MONITORING AND ALGORITHM DEVELOPMENT

High-resolution satellite images are now taken almost every day. Scientists use these images to determine how much water flows in a river and the quality of that water. These measurements are compared to measurements made in the river directly. The results will help provide a basin-wide view for the report in Module 3.

### MODULE 2: TRAINING, WORKSHOPS, AND CONFERENCES

Key stakeholders from local, district, provincial, national, and transboundary organizations are invited to participate in workshops to identify data gaps needed for improved management. The project works to resolve these data gaps through innovative technologies. The key stakeholders and technical staff in the field are offered training in integrated water resources management, analysis of environmental needs of rivers, and other technical skills. Conferences encourage sharing water and biodiversity science and resource management strategies. These activities should enhance the self-reliance of the Limpopo Basin.

### MODULE 3: REPORT ON THE STATE OF THE LIMPOPO BASIN

The results of the water resources and biodiversity studies conducted are being compiled into a report for the Basin stakeholders. This living document is intended to facilitate communication and data sharing.

### MODULE 4: LIMPOPO RESILIENCE LAB

Continued high-quality data collection, training, and collaborations depend on infrastructure. To support data collection efforts as well as training and collaboration the **Limpopo Resilience Lab** at the University of Venda is being established. The lab will continue to encourage innovation and regional collaboration.

## PROJECT DETAILS

The **WaterQ2: Understanding Water Quality and Quantity in the Limpopo Basin** project is a collaboration led by Duquesne University with the University of Venda and Rensselaer Polytechnic Institute supported by the United States Agency for International Development, Southern Africa Regional Mission, Fixed Amount Award 72067419FA00001. This work reflects the work of the authors and does not necessarily reflect the views of USAID or the United States Government. For more information on WaterQ2, please contact the principal investigator, David Kahler, at [kahlerd@duq.edu](mailto:kahlerd@duq.edu) or visit [www.duq.edu/limpopo](http://www.duq.edu/limpopo).

