



WIBIS: Coping with Competing Claims on Water in the Incomati Basin through Interactive Science

Rationale

The Incomati river basin is shared between South Africa, Swaziland and Mozambique. The basin faces huge challenges in terms of water scarcity and over-allocation of water resources. Population growth, economic development, socio-economic reforms (including the issue of land to emerging farmers) and the global climate change will cause additional pressure on the already scarce land and water resources.

To cope with the competing claims impartial information and good communication between the stakeholders in land and water management is imperative. This refers to the various sectors, regions and the three countries.

Objective of the project

The WIBIS project is aimed at supporting inter-sectoral and inter-state (transboundary) policy development and sustainable (wise) use of the Incomati basin water. The project supports ongoing regional initiatives and projects, such as the PRIMA project (Progressive Realisation of the IncoMaputo Agreement).

Approach: Interactive science

WIBIS provides an interactive discussion support tool in land and water development and management. The tool can generate spatially distributed information on water consumption and water productivity for different land uses, based on a consistent method and impartial information. The WIBIS tool enables stakeholders to –interactively– evaluate alternative land use scenarios, assess the economic water productivity of the various land uses within regions or countries, and assess the water availability to downstream regions or countries.

The tool does not optimize land and water management. The stakeholders should establish their own priorities, i.e. whether to increase land productivity (ton/ha), crop water productivity (kg/m³), economic water productivity (R/m³) or the socio-economic water productivity (e.g. poverty alleviation, job creation, nature). WIBIS is principally a tool for identification and quick scanning of land use scenarios, which helps stakeholders to investigate and discuss land and water policy scenarios.

Crop water productivity (CWP) and economic water productivity (EWP) for sugarcane in the Incomati Basin

	ET mm	Biomass ton/ha	Yield sugar ton/ha	CWP kg/m ³	EWP R/m ³
2002-2003	827	53.06	11.51	1.39	1.02
2003-2004	812	57.41	12.45	1.53	1.06
2005-2006	867	55.23	11.98	1.38	1.00

The tool

The WIBIS tool is an open-source web application with which the user can evaluate the implications of land use scenarios. The interactive tool is accessible to any authorized user, whereas others can freely browse through the existing data presented in the tool. It generates on-line an extensive set of maps with land and water indicators, which are continuously updated as long as the user is working with the tool.

In the current version 15 land use types are distinguished. These include 9 cultivated land uses (agricultural crops and forest plantations) and 6 other uses (nature lands and built areas). The Incomati basin is subdivided in 24 regions.



Whilst working with the tool the user can adapt any land use. The tool will then calculate the expected water consumption (mm), biomass water productivity (kg/m³), crop water productivity (kg harvestable yield/m³) and economic water productivity (R/m³) in each region, as well as the available water to downstream regions. This is done on an annual basis, through water accounting. The economic water productivity is calculated on the basis of market prices and production costs (per region).

The user can compare the value of various land and water indicators in a wet, dry and average year. For the 15 land use types the regional differences in water consumption, biomass production and water productivity can be presented. For the 24 regions the rainfall, reference evapotranspiration, rainfall surplus and existing monitoring data can also be displayed.

The WIBIS tool can assist in prioritizing land uses and can also be used in a trans-boundary context.

The WIBIS tool is based on a consistent method and impartial information, using satellite images. Actual evapotranspiration and biomass production are calculated on a monthly basis with the SEBAL algorithm applied on MODIS images, having a spatial resolution of 250x250 m. Rainfall is retrieved from the Tropical Rainfall Measurement Mission (TRMM), which carries a precipitation radar. All these monthly (as well as annual) data can be consulted with the WIBIS tool (hence at grid level).

Projectleader

Dr. Petra Hellegers
LEI, Wageningen UR,
P.O. Box 35, 6700 AA Wageningen, The Netherlands
Tel: +31-317-484788
Fax: +31-317-484490
Petra.Hellegers@wur.nl



Project organization

LEI

LEI is part Wageningen UR. Within the Netherlands, it is the leading institute for economic research in the field of agriculture, horticulture, fisheries, management of rural areas, agribusiness and the production and consumption of foodstuffs. The research supports the decisions that government bodies need to make.

For more information please visit: www.lei.wur.nl/UK

WaterWatch

WaterWatch is a Wageningen based - scientific advisory firm, active in the niche of remote sensing and water resources management. Satellite image analysis to support water management applications is the core activity of WaterWatch. The portfolio covers essentially irrigation and drainage studies throughout the world, but also environmental studies towards the quantification of soil and land degradation. WaterWatch is the intellectual owner of the Surface Energy Balance Algorithm for Land (SEBAL), which has become one of the internationally leading algorithms for estimating actual evapotranspiration. For more information please visit: www.waterwatch.nl

Alterra

Alterra is part of Wageningen UR. It co-operates with the school of Environmental Sciences of Wageningen University. With this partner Alterra contributes to a high quality and sustainable green living environment. The exchange of expertise and capacity and the match between fundamental and practical research in various projects gives Alterra a scientific advantage.

For more information visit: www.alterra.wur.nl/UK/

DGIS-WUR partnership programme

The project is funded by the DGIS-Wageningen UR partnership, which aims at effectively contributing to poverty alleviation, food security and livelihood improvement for the (rural) poor. Taking the trends in globalization into account, and acknowledging the role which science, technology and institutional development can play in addressing the complex issues involved, DGIS and Wageningen UR established a partnership that aims at developing recommendations for policy development and tools for resource management.

The DGIS-Wageningen UR partnership programme aims at:

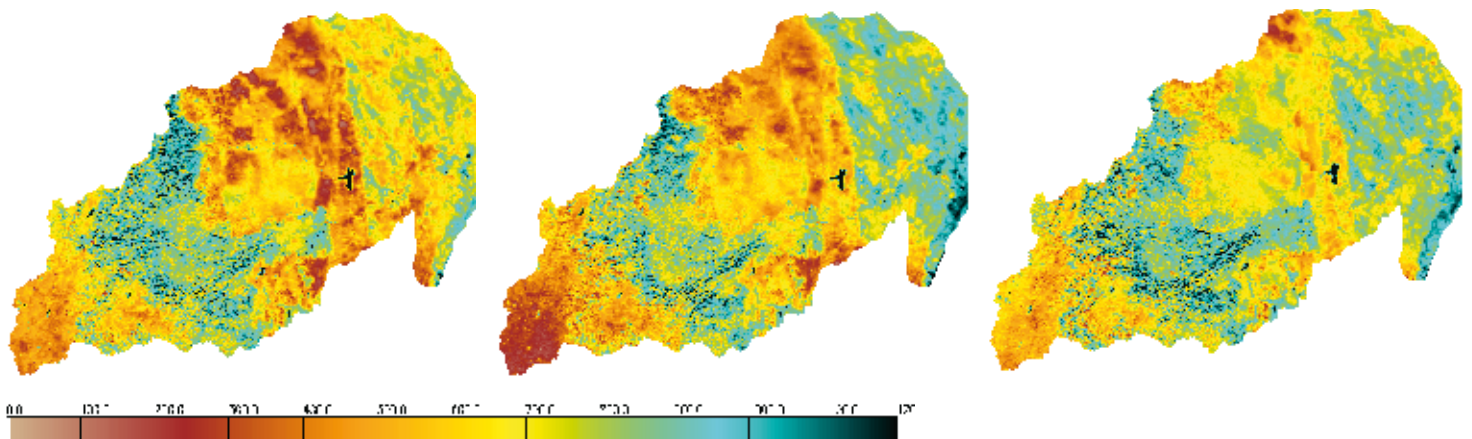
- Supporting a better understanding in the South of the linkages between globalization and natural resource based sustainable development
- Translating this understanding into policy recommendations for developing countries, for Netherlands' development co-operation and for stakeholders in the development process
- Developing scenarios for sustainable development
- Strengthening national capacities and institutions to cope with globalization and to implement the scenarios and mechanisms developed.

Through the Partnership Programme, DGIS and Wageningen UR want to make tangible contributions to three of the major Millennium Development Goals:

- Eradicating extreme poverty and hunger (MDG 1)
- Ensuring environmental sustainability (MDG 7)
- Developing global partnerships for development (MDG 8) through active involvement of multiple stakeholders.

Planning

The project is running from the 1st of March 2008 until the 1st of Jun 2010.



Calculated water use (evapotranspiration) in mm/yr in a dry (2002-2003), average (2003-2004) and wet (2005-2006) year

Consortiumpartner

Prof. Dr. Wim Bastiaanssen, Dr. Wouter Meijninger, Steven Wilmink
WaterWatch
Generaal Foulkesweg 28A, 6703 BS Wageningen, The Netherlands
Tel: +31-317-423401
Fax: +31-344-693827
W.Bastiaanssen@waterwach.nl

Consortiumpartner

Herco Jansen (MSc), Bas Vanmeulebrouk, Robert Smit, Co Onderstal and Christian Siderius
Alterra, Wageningen UR
P.O. Box 47, 6700 AA Wageningen, The Netherlands
Tel: +31-317-486577
Fax: +31-317-419000
Herco.jansen@wur.nl