TOOLS FOR RIVER BASIN MANAGEMENT

LES OUTILS DE LA GESTION DES BASSINS VERSANTS

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(Belgium, 1977) holds an Engineering degree in land and water management (2000, KULeuven, Belgium) and a Master degree in cultures and development studies, anthropology (2001, KULeuven, Belgium). He currently has more than 10 years of experience, of which the last 5 years in coordination of European funded international projects. He started as a researcher at the University of Brussels (VUB, 2001-2005) where he worked amongst others on hydro-geological mapping and surface water quality modelling. Between 2005-2011, he was project manager at the consulting company ANTEA Group (previously named Soresma). There he coordinated European research projects: FlaFloM (early warning system for flash floods in Egypt), WETwin (enhancing wetland management in 7 sites in Africa, South-America and Europe), Twin2Go (adaptive governance under climate change for 28 river basins worldwide), FREEMAN (flood resilience), ENVIROGRIDS (Black Sea observation system) and AFROMAISON (natural resources management in Africa). He is currently associated with the Belgian company Milieu Ltd where he provides technical and scientific support to the European water policy. He is co-author of the policy options for the Blueprint to safeguard Europe's waters and is coordinator of the technical and scientific support for the European Commission, specifically for the implementation of the Marine Strategy Framework Directive (MSFD) and the Water Industry Directives (drinking water, urban waste treatment and bathing water). Jan Cools has 4 publications in international peer-reviewed journals and 5 more are forthcoming (accepted).

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Water resources management can be challenging when confronted with pollution, water shortage, floods, and water-related diseases. In addition, the quality and quantity of the available water is expected to deteriorate further by climate change and variability and population growth, especially in developing countries. Water resources management are best managed at the scale of the geographic river basin. By doing this, following aspects can be addressed: the impact of upstream water users on the downstream users, the need for water resources management across administrative boundaries and the allocation and control of the available water resources between the different sectors spread over the river basin, including households, agriculture, energy production, industry, tourism and ecosystems.

In this thesis, it is assessed how the management of a multi-functional river basin can be facilitated through the development and testing of analytical tools in data-poor and data-rich context. This thesis focuses on the selection of the most appropriate tools and best management options to address the context-specific challenges in river basin management. A variety of tools and strategies is developed and tested on a variety of stakeholder selected themes: cost-effective improvement of water quality in the Nete river (Belgium), an early warning system for flash floods in hyper-arid Egypt and integration of human health in wetland management in the Inner Niger Delta (Mali).

This thesis argues that the development of tools can support integration and cooperation between experts and decision-makers. Transparency on limitations, assumptions and expected outcomes can generate trust of the scientific tools with decision-makers. Important elements for this are where and how to involve stakeholders in tool development. If there is a perceived lack of data and capacity, besides questioning the tool complexity, equally important is the process used for model development and stakeholder involvement. In data-poor context, in order to be effective, tools and information must be simplified to a level where they can be understood and used by managers, not only by technical experts, although this does not preclude the need for specialist input.

Invitation to the public defense to obtain the degree of

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Prof. dr. Martin Beniston, Université de Genève, Climate Change and Climate Impacts, Geneva, Suisse

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