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WETwin: A structured approach to evaluating wetland management options in data-poor contexts

R. Johnston [a,*], J. Cools [b,c], S. Liersch [d], S. Morardet [e], C. Murgue [e,f], M. Mahieu [a,c,f], I. Zsuffa [g], G.P. Uyttendaele [c]

[a] International Water Management Institute (IWMI), Sri Lanka
[b] University of Geneva, enviroSPACE Laboratory, Switzerland
[c] ANTEA Group, Belgium
[d] Potsdam Institute for Climate Impact Research (PIK), Germany
[e] Irstea, UMR G-eau, France
[f] SupAgro, France
[g] VITUKI Environmental and Water Management Research Institute Non-profit Ltd, Hungary

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ABSTRACT

This special issue of Environmental Science and Policy presents the outcomes of the WETwin project (*enhancing the role of wetlands in integrated water resources management for twinned river basins in EU, Africa and South-America in support of EU Water Initiatives*), an international research project funded by the FP7 programme of the European Commission. The project aimed to improve wetland management by maximising benefits from wetland use while maintaining ecological health, using case studies from Europe, Africa and South America.

In much of the less developed world, data on wetland functions, processes and values are scarce even while wetlands often provide a critical component of livelihoods. Management decisions on balancing competing demands for wetland use must often be made in the absence of comprehensive information. This paper introduces the approach developed and tested under WETwin to evaluate wetland management structures and solutions in data-poor contexts, summarising a conceptual framework which has evolved from seven very diverse case studies. A structured, modular approach was devised which combined multi-criteria analysis, trade-off analysis and vulnerability analysis, drawing on best available information, including quantitative modelling, qualitative ''expert opinion'', and local stakeholders' knowledge and values. The approach used in WETwin has three important strengths: it involves stakeholders at all stages of the decision process, it combines qualitative and quantitative data (and therefore allows inclusion of poorly known and potentially important system components) and finally, it provides a relatively simple and structured approach to evaluate wetland management interventions and integrate impact, feasibility and institutional assessments, vulnerability analysis and trade-off analysis. The overall conceptual framework developed for WETwin was found to be robust and transferable to different contexts.

* *Corresponding author*. Tel.: +94 112880044.
E-mail address: r.johnston@cgiar.org (R. Johnston).
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1. Introduction

This special issue of the journal Environmental Science and Policy presents the outcomes of the WETwin project (*enhancing the role of wetlands in integrated water resources management for twinned river basins in EU, Africa and South-America in support of EU Water Initiatives*), an international research project funded by the FP7 programme of the European Commission from 2008 to 2011. The overall objective of WETwin was to enhance the role of wetlands in basin-scale integrated water resources management, with the aim of improving the community service functions while conserving good ecological status. The project consortium consisted of research, educational and governmental institutions from Africa, South-America and Europe, and the project drew on case studies from the three continents, supporting the global exchange of expertise on wetland management.

This paper introduces the overall approach developed under WETwin to evaluate wetland management structures and solutions in data-poor contexts. It is primarily a theoretical discussion, summarising a conceptual framework which has evolved from seven very diverse case studies. A structured, modular approach was devised which combined multi-criteria analysis (MCA), trade-off analysis (TOA) and vulnerability analysis (VA), drawing on best available information, including quantitative modelling, qualitative ''expert opinion'', and local stakeholders' knowledge and values.

Details of implementation of the approach in the case studies are presented in other papers in this volume. Depending on the concerns and skills of the stakeholders involved, individual case studies focused on specific components of the framework, and this is reflected in the diversity of the papers in this volume. Arias-Hidalgo et al. (2013) describe application of MCA to prioritise management measures for the Abras de Mantequilla wetland in Ecuador. Liersch et al. (2013) and Pataki et al. (2013) focus on vulnerability assessment in the Inner Niger Delta (IND) and Gemenc wetlands respectively, while Cools et al. (2013a) extend the concepts of VA to analyse adaptive capacity in the IND, specifically in the context of human health. Namaalwa et al. (2013) illustrate the process of characterising the ecosystem services provided by the Namatala wetland in Uganda, and the current trends in land use and management that jeopardise those services. Other papers report on technical studies which underpin management approaches – for example, ecological niche models (Funk et al., 2013) and floodplain restoration options (Baart et al., 2013) for the Lobau wetlands in Austria; and a study of the impact of water quality on aquatic biota in Abras de Mantequilla (Alvarez-Mieles et al., 2013). Two papers contrast experiences from the developed and developing worlds relating to integrating wetlands into broader catchment management (Rebelo et al., 2013), and the impact of institutional capacity on wetland management in different contexts in Africa and Europe (Ostrovskaya et al., 2013). Finally the outcomes and conclusions of the project, drawing from all the case studies, are synthesised in a closing paper (Cools et al., 2013b).

2. Project context and objectives

Wetlands are amongst the world's most threatened ecosystems (MA, 2005). The reasons behind this are complex, related not only to land and water use within the wetland, but also to management of upstream catchments, external pressures such as climate change and population growth, and institutional factors affecting management such as unclear or overlapping spheres of authorities and lack of effective power to enforce laws and regulations (Finlayson et al., 2005; IPCC, 2007). The multiple benefits provided by wetlands often mean that there are competing priorities for wetland use (Verhoeven and Setter, 2010; McCartney et al., 2010). Management must thus balance the competing needs of different uses and users, as well as the threat of degradation from external pressures.

In much of the developing world, data on functions, processes and values of particular wetlands are scarce and management decisions on balancing competing demands for wetland use must often be made in the absence of comprehensive information. Thus WETwin aimed specifically to establish methods that could be applied in data-poor contexts, by combining best available local information and knowledge with understanding of wetland processes garnered from international experience. The project drew on case studies from wetlands in Africa, South America and Europe. The location of these wetlands is shown in Fig. 1, and their characteristics are summarised in Table 1. The focus of the WETwin project is on inland wetlands that are closely linked to the river basin, and where there are potential or actual conflicts and trade-offs between different ecosystem services. Sites were selected to reflect the diversity of inland wetlands and a range of management challenges and issues.

3. WETwin conceptual framework

WETwin starts from four basic premises of wetland management: wise use; adaptive management; integrated water resource management (IWRM); and participation of local communities and stakeholders. ''Wise use'' (Ramsar Convention Secretariat, 2007) encapsulates the understanding that wetlands provide a wide range of ecosystem services and are an important component of livelihood systems. As such, the aim is to manage for a range of functions, but to do this in ways that protect and enhance ecological status. Adaptive management recognises management as an on-going cyclical process, not an end point; the critical components of such an approach for wetlands have been described by Dickens et al. (2004) in the ''Critical Path'' approach, adopted by Ramsar as a standard for wetland management (Ramsar Convention Secretariat, 2007). Integrated water resource management acknowledges that wetlands function within a hydrological context, where the management of the catchment impacts on the health of the wetland; and the wetland contributes to the overall functioning of the catchment (CIS, 2003; UNESCO, 2009). Participatory planning and management recognise that local communities and stakeholders are ultimately both the actors and the beneficiaries of management, and must be involved at all stages (UN, 1994).