Devising a Decision Support Framework

Factsheet 3

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Paving a 'Critical Path'

The WETwin project starts from four basic premises of wetland management:

- Wise use (Ramsar Convention Secretariat 2007): since wetlands provide a wide range of ecosystem services and livelihood benefits, they must be managed in ways that protect and enhance wetland ecology and health.
- Adaptive management recognizes management as an ongoing cyclical process, not an end point; the components of adaptive management for wetlands are set out in the Ramsar 'Critical Path' approach.
- Integrated water resources management embeds wetland management into a catchment context, taking account of the impacts of catchment management on the wetland, and the contribution of the wetland to the functioning of the catchment (UNESCO 2009).
- Participatory planning and management recognizes that local communities and stakeholders are ultimately both the actors and the beneficiaries of management, and must be involved at all stages.

The Conceptual Framework for wetland management developed in the WETwin project nests adaptive management of the wetland within the adaptive management cycle of the river basin, with ongoing feedback between the two.

Management should enhance wetland health

The WETwin project focused on the preparatory and planning stages of the Critical Path; implementation and monitoring of plans is the responsibility of local authorities and stakeholders, and was not part of the project.

Creating the DSF

A Decision Support Framework (DSF) was developed to help planners and stakeholders build-up and evaluate different wetland management solutions (Figure 1).

Involving the stakeholders

Stakeholder involvement plays a fundamental role in the decision support process. Knowledge, opinions and preferences of stakeholders are requested at several stages. Stakeholder involvement has to be organized on the basis of the results and conclusions of stakeholder analysis.

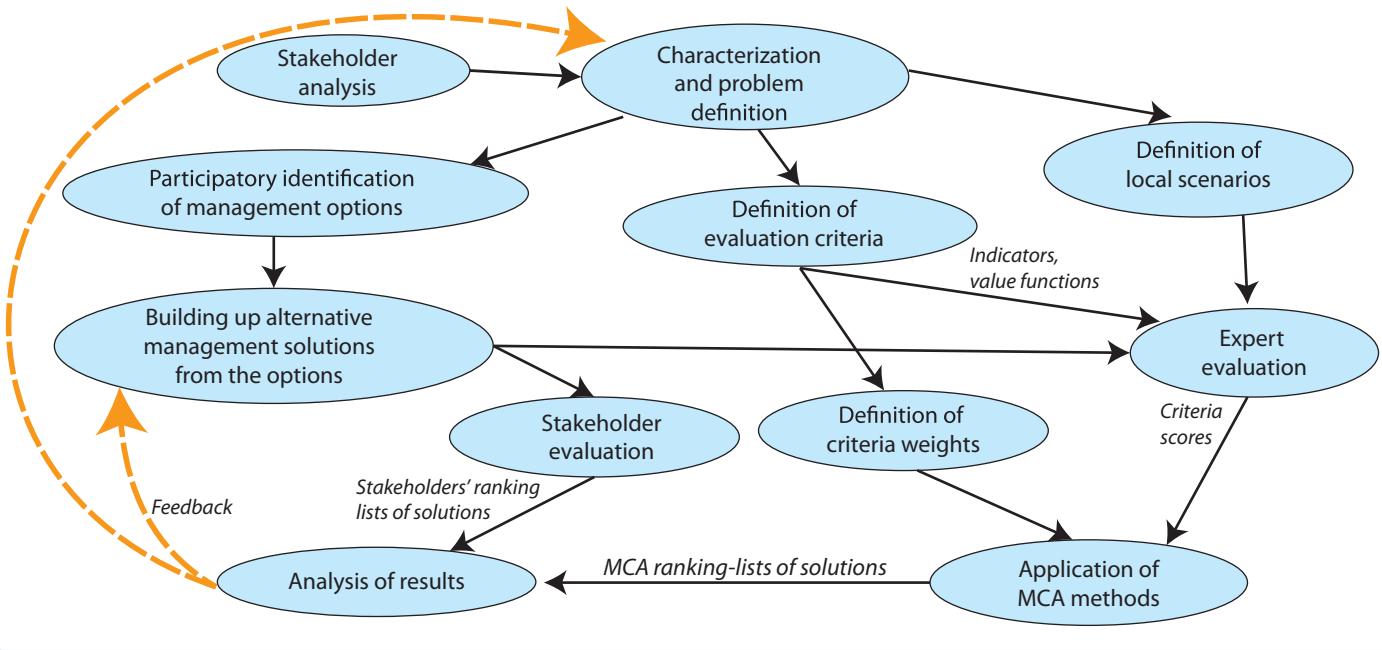

Figure 1: WETwin Decision Support Framework (MCA = Multi-Criteria Analysis)

Outlining potential problems

Rapid, qualitative assessment methods are used to summarize and structure existing knowledge on wetland health and ecosystem services (Figure 2). The problems and issues to be dealt with are characterized through an analysis of Drivers – State – Impacts – Responses (DSIR, modified from the DPSIR approach) (Figure 3).

cooperation with the stakeholders. Options form the building blocks for management solutions, which are elaborated strategies for developing the system. Formulating alternative solutions from a list of potential options requires a pragmatic approach when selecting feasible combinations and narrowing them down, based on stakeholder preferences and practical considerations (Table 1).

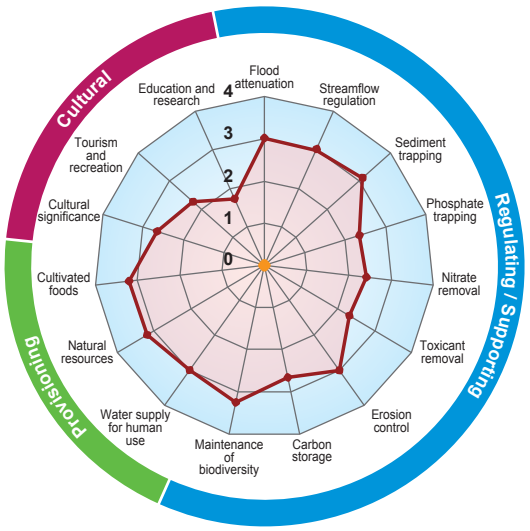

Figure 2: Example results from rapid appraisal of the relative importance of different ecosystem services

Options	Solution 1	Solution 2	Solution 3
Irrigation Scheme	Drip and gravity	Drip	Gravity
Wetland use	75% natural	35% natural	50% natural
Livestock	Current	Grazing control	Current
Wetland cropping	Improved	Current	Current
Ecotourism	Yes	Yes	Yes
Local institutions	Integrated committee	Specialized committee	Integrated committee
Wetland management plan	Coordinated government plan	Coordinated government plan	Local plan

Table 1: Decision-makers must select solutions that fit the specific local context

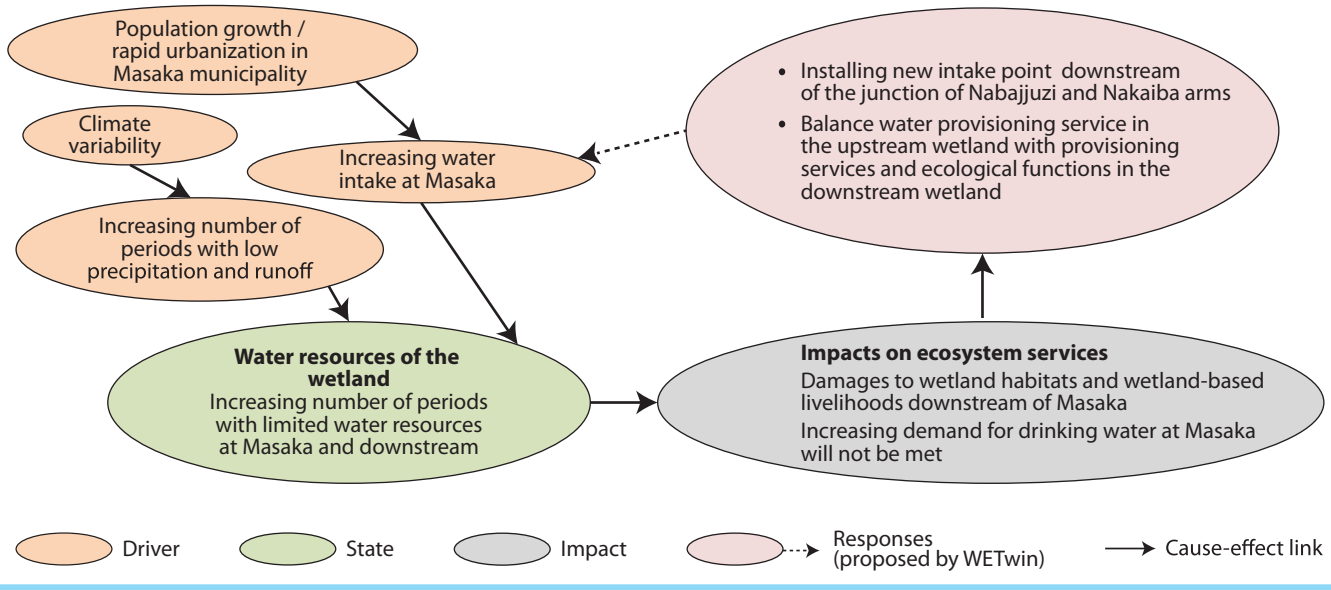

Figure 3: Example of problem chain analysis using DSIR (Drivers, State, Impacts and Responses)

Identifying management options and solutions

Management options are sector-specific (land use, administrative, technical, etc.) measures for improving the health and ecosystem services of the wetland. Options are included (as 'Responses') during the DSIR analysis, and afterwards described more detail in

Evaluating the management solutions

Management solutions are evaluated against criteria chosen to represent three key domains. These are:

- ecosystem services;
- ecosystem health and integrity, including hydrology, geomorphology, vegetation and biodiversity; and

- factors influencing feasibility of implementation, including technical difficulty, cost, policy, and organizational and institutional factors.

Some criteria are assessed qualitatively (using expert opinion) and some quantitatively using models, depending on the availability of data and the nature of the criteria. Qualitative tools developed in South Africa to assess wetland health (WET-Health – Macfarlane et al. 2008) and ecosystem services provision (WET-EcoServices – Kotze et al. 2008) were adapted for use. These tools have structured, transparent approaches that use scoring rubrics, which describe in detail the logic behind allocating particular scores. The raw indicator values and scores generated by the tools are translated into criteria values (0-1) with the help of value functions (Figure 4). Zero (0) means that the investigated management solution is unacceptable or very bad from the point of view represented by the criterion; 1 means that the solution is optimal.

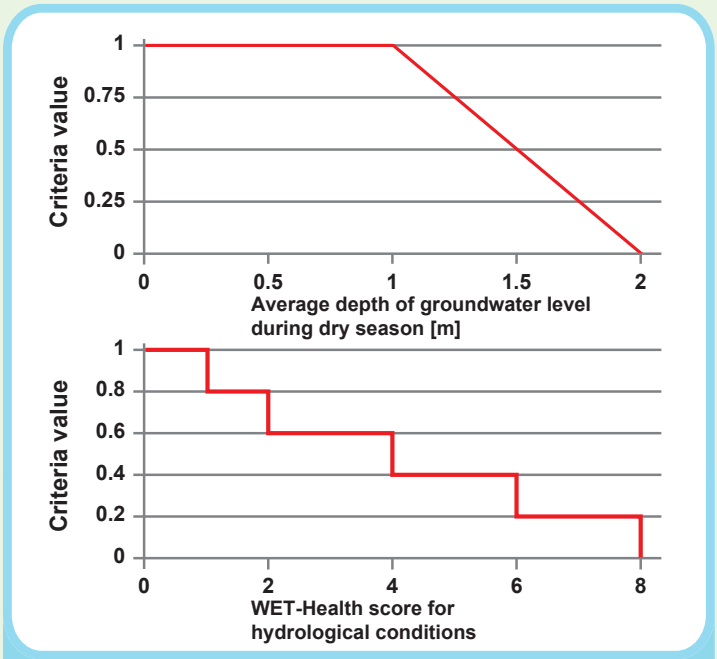

Figure 4: Examples of different types of value functions used to normalize indicator values/scores

Conditions of the wetland can also be changed by drivers, which are not parts of the management solutions. Climate change is a typical example. These drivers are taken into consideration as scenarios during the evaluation process.

Applying Multi-Criteria Analysis methods

In the WETwin project, the Multi-sectoral Integrated and Operational (MULINO) Decision Support System (mDSS) was used to guide the Multi-Criteria Analysis (MCA) process (Giupponi 2007). MCA ranks the alternative management solutions on the basis of evaluation results and stakeholder preferences. These are later articulated by means of weights linked to the criteria. Since different stakeholders may have different preference structures, each stakeholder may have their own MCA ranking of alternative solutions. mDSS provides group decision-making methods for compromising these individual rankings. This results in one compromised ranking of solutions.

Analyzing the results

The soundness of the decision support process can be checked by comparing the MCA-based rankings with the rankings made directly by the stakeholders. Similarities strengthen the trust in evaluations made by both the experts and the stakeholders. Significant differences, on the other hand, indicate deficiencies or errors either in the expert evaluation or in the perceptions of certain stakeholders. To locate and eliminate these problems, the procedure should loop back to the beginning of the Decision Support Framework and redo the steps of the process. The solution ranked first on the compromised ranking list can be recommended as being the best compromise for the decision makers who may accept or reject it. In the latter case, the process loops back for generating and evaluating new, improved solutions. The accepted best compromise solutions form the basis for the management plan of the wetland.

Why WETwin's DSF works

The challenge faced in the WETwin project was to find robust methods to assess management options/solutions that can be used even where data about the wetland is scarce. The approach used in the WETwin project has three important strengths. First, it involves stakeholders at all stages of the decision-making process, and explicitly acknowledges and incorporates different perspectives so that local concerns are reflected in both the choice of options for evaluation and the final rankings. Second, it combines qualitative and quantitative data, so that assessments can be based on all important criteria, whether quantifiable or not. This allows inclusion of information relating to system components that are poorly known (but potentially important), not just components that can be modeled with high confidence. Third, it provides a relatively simple, structured approach to the complex problem of evaluating diverse wetland management interventions and a conceptually coherent framework to integrate impact and feasibility assessment based on evaluation matrices. Ultimately, the strength of the approach was not in the rankings resulting from the analysis, but in the participatory process of exploration, debate and negotiation used to derive them.

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References

Giupponi, C. 2007. Decision Support Systems for implementing the European Water Framework Directive: The MULINO approach. Environmental Modelling and Software 22(2): 248-258.

Kotze, D.; Marneweck, G.; Batchelor, A.; Lindley, D.; Collins, N. 2008. WET-EcoServices: A technique for rapidly assessing ecosystem services supplied by wetlands. WRC Report TT339/08. Pretoria, South Africa: Water Research Commission.

Macfarlane, D.; Kotze, D.; Ellery, W.; Walters, D.; Koopman, V.; Goodman, P.; Goge, C. 2008. WET-Health: A technique for rapidly assessing wetland health. WRC Report TT 340/08. Pretoria, South Africa: Water Research Commission.

Ramsar Convention Secretariat. 2007. River basin management: Integrating wetland conservation and wise use into river basin management. Gland, Switzerland: Ramsar Convention Secretariat.

UNESCO (United Nations Educational, Scientific and Cultural Organization). 2009. IWRM guidelines at river basin level. Part 1 – Principles. A contribution to the United Nations World Water Assessment Programme.

About WETwin

The WETwin project aims to enhance the role of wetlands in integrated water resources management for twinned river basins in the European Union (EU), Africa and South America in support of EU water initiatives. The objective is to improve community service functions while conserving good ecological status.

Partners

VITUKI Environmental and Water Management Research Institute, Hungary (coordinating partner)
Wetlands International, Mali
Antea Group, Belgium
Potsdam Institute for Climate Impact Research, Germany
WasserCluster Lunz, Austria
UNESCO-IHE Institute for Water Education, the Netherlands
National Water and Sewerage Corporation, Uganda
International Water Management Institute, South Africa
Escuela Superior Politécnica del Litoral, Ecuador

Funding

WETwin is a collaborative project funded under the European Commission's Seventh Framework Programme Grant agreement number 212300.

Factsheet topics

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12: Case study: Gemenc floodplain, Hungary

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