

Reconciling livelihoods with ecosystem integrity in Ga-Mampa wetland, South Africa

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Despite their national and international protection status at levels (e.g. under the Ramsar Convention), wetlands are amongst the world's most threatened ecosystems. Complex and various reasons explaining this situation include not only inadequate land and water use within the wetland, but also harmful 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. As their multiple benefits accrue to a variety of users, management must thus balance these competing needs, as well as the threat of degradation from external pressures.

The Ga-Mampa wetland, located in the Olifants river basin, is an example of the many small wetlands used for multiple purposes in South Africa. It is mainly fed by groundwater from the surrounding mountainous catchment, and also submitted to seasonal river floods, and runoff and seepage from one of the local gravity irrigation schemes. The wetland has traditionally supported livelihoods of neighbouring rural community, through natural vegetation collection for food, crafting and building activities, playing a role of safety net for the poorest. Since the mid-1990s, it has been progressively drained and the natural vegetation cut and burned for subsistence maize cultivation. As a result, its ecological integrity is jeopardized and traditional provisioning services and current farming opportunities are put into question.

A participatory decision support framework was developed under the WETwin project (funded by the 7th European Framework Programme) to assess the trade-offs between wetland ecosystem services provision and ecosystem integrity and to support decision makers and stakeholders in wetland planning and management. In this case study, a particular focus was given to stakeholder involvement in the assessment process. Their knowledge, opinions and preferences were requested at several stages of the research, through individual interviews, focus group discussions, role-playing game sessions and multi-stakeholder workshops.

Stakeholder and problem analysis showed that institutional change in the resource system of the whole valley (including not only the wetland but also the irrigation schemes and upland grazing areas) after the end of apartheid regime, is the main cause behind the breakdown of local irrigation schemes, the encroachment of the wetland for maize cropping, and more generally the abandonment of resources management policies. This was compounded by several flooding events, which destroyed part of the irrigation infrastructure and drained a significant portion of the wetland.

Based on this diagnosis, potential management options were identified and characterized through stakeholder consultation, literature review and expert interviews. Several sets of Management Solutions, combinations of options targeting different balances between the three pillars of sustainable development were proposed to stakeholders' assessment. A specific set of evaluation criteria was developed based on stakeholders' value principles for wetland management. Management solutions were then assessed through qualitative assessment techniques complemented when possible by various modelling tools (system dynamic model and farming system models). Finally, analysis of trade-offs between ecosystem services was performed using the DSS software.

The analysis confirmed potential trade-offs initially identified. It showed that all the proposed solutions could induce improvement in terms of environment sustainability and social equity.

However, regarding economic development, a clear trade-off appeared between food production and cash cropping both in the wetland and irrigation schemes.

All proposed solutions present a theoretical reduction of land concentration. However, such achievements are questioned by the traditional importance of landholding, which makes land redistribution among farmers rather unlikely. Therefore although it is possible to find wetland management solutions that improve ecosystem health while increasing economic development and enhancing social equity, such solutions display higher capital costs and require a high degree of collective action and institutional change, which make them risky and difficult to implement. Ranking of management solutions appeared to be little sensitive to the set of weights or decision rule. This is probably due to the high number of criteria and resulting homogeneity of corresponding weights, as no stakeholder dared to give extreme weight to any criteria. Direct ranking of solutions by groups or individual stakeholders and expert based scoring gave different results, e.g. the preferred solution in the expert MCA was almost never chosen directly by stakeholders. These differences can be explained either by the complexity of such exercise leading stakeholders to focus on a limited number of criteria, a lack of understanding by stakeholders of the potential impacts of the proposed solutions, or inaccuracy in expert based scoring of solutions. Because of the cognitive complexity of the multi-criteria decision process, revealed by the last stakeholder workshop, it was not possible to reach a unique compromise solution accepted by all stakeholders. In order to develop a functional wetland management plan further work is necessary to make sure that all stakeholders i) understand the consequences of options and their combined effects in proposed solutions; ii) are aware of the implementation hurdles associated with each of the solutions; and iii) if necessary, elaborate new combinations of options more adapted to their objectives of development. This process would need to be led by a neutral and well accepted organisation.

The participatory MCA conducted in Ga-Mampa allowed initiating and strengthening dialogue between very diverse stakeholders, from local farmers to representatives of sector departments at municipal and provincial levels up to conservation organization at national level. The exercise also provided reflective material for decision makers in the form of a diagnosis of stakes, and documented management options and solutions adapted to the situation and validated by stakeholders, some of which proposed by local stakeholders. The process itself was more useful than its outcome, as it raised external stakeholders' awareness of the complexity of the socio-ecological system and accompanied local farmers in building their own project. Finally, the exercise showed that if it is possible to undertake participatory MCA with various levels of stakeholders at different scales, the stakeholder engagement process requires a careful and progressive approach.

Discrepancies between individual direct ranking of management solutions and ranking based on expert scoring and stakeholders' criteria weights suggest reducing the number of valuation criteria for multi-criteria analysis. It also demonstrates that sound information on management options, in a format adapted to various audiences, is crucial.

In terms of solutions, the research made clear to all stakeholders that the origin of wetland problems lay outside the wetland, and the necessity to consider the Ga-Mampa valley resources system as a whole. Rehabilitation of the adjacent irrigation systems and livestock management are therefore at the core of all proposed solutions. The research results recommend taking into account the diversity of farmers' situations and objectives when implementing technical, economic or institutional changes in the valley, and implementing pilot projects with small groups of volunteer farmers. Additional research on sustainable wetland farming practices would help fine tuning the wetland plan.

Institutional empowerment and stimulation of collective action appear necessary to move towards a balance between private, intensive cropping use of the wetland and community driven, multiple uses that ensure resilience of the ecosystem and maintenance of wetland capacity to support livelihood of the poorest. This entails assisting the local community in collective action plans and projects and long term capacity building.