

Using modern Decision Support Systems for evidence-based policy making in IWRM in low-income countries

Introduction

An IWRM approach promotes the co-ordinated development and management of water, land-based and related resources. Given the complexity of this framework, DSS tools have been developed, usually in the form of hydrologic simulation models that include functionalities to support decision making and analysis, and to assist in participatory processes. These have been used extensively to deal with water supply management, water quality and environmental regulation, assessment of land use change impacts or flow regime regulations, risk assessments of flood and drought, and climate change effects. Their greatest potential is in supporting the decision making process more than delivering conclusions. However, the majority of DSS tools developed so far have had limited implementation.



The purpose

The purpose of this study is to investigate the successful use of Decision Support Systems (DSS) for evidence-based policy making in Integrated Water Resources Management (IWRM) in low-income countries, and to provide recommendations on how their potential can be enhanced. This contributes towards the overall aim of SPLASH to increase the uptake of research in policy and practice. The study includes: an overview of recent DSS developments and applications; a typology of existing IWRM-DSS tools; and barrier analysis for policy making, with guidelines to overcome this.



Headline facts

- A Decision Support System is a combination of the tool and the process of structuring problems and aiding decisions, with great potential to facilitate participatory processes and an emphasis on strengthening institutional implementation (see Figure 1).
- Sustainable management of water resources requires the support of integrated methodological frameworks, processes and tools to go beyond the limits of human capacity in managing complex dynamic systems, such as river basins and their socio-ecological systems.
- DSS tool developments to date have produced limited impacts on IWRM, due to a range of constraints on their successful implementation. Careful consideration of these barriers is needed in the development of more successful future applications.

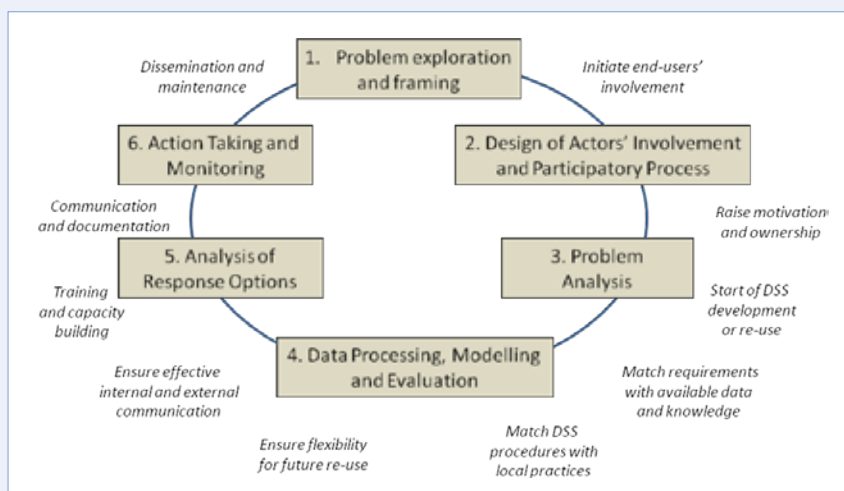


Figure 1. The decision making cycle with recommendations for DSS development

Key references

- Courtney, J.F., 2001. Decision making and knowledge management in inquiring organizations: toward a new decision-making paradigm for DSS. *Decision Support Systems* 31(1) 17.
- Giupponi, C., 2007. Decision Support Systems for Implementing the European Water Framework Directive: the MULINO approach. *Environmental Modelling and Software* 22(2) 248-258.
- Global Water Partnership, 2000. Integrated Water Resources Management. TAC Background Papers No.4. GWP, Stockholm (S).
- McCartney, M. and J. King. 2011. Use of decision support systems to improve dam planning and dam operation in Africa. Colombo, Sri Lanka: CGIAR Challenge Program for Water and Food (CPWF). 74p. (CPWF Research for Development Series 02).
- McIntosh, B., Voinov, A., Smith, C., Giupponi, C., 2006. Bridging the gaps between design and use: developing appropriate tools for environmental management and policy, In: Voinov, A., Jakeman, A., Rizzoli, A. (Eds.), *Proceedings of the iEMSs Third Biennial Meeting: "Summit on Environmental Modelling and Software"* CdRom. iEMSs: Burlington (USA), p. 6.

Recommendations

Barriers to successful IWRM-DSS implementation

Ongoing and future IWRM-DSS development should consider these main constraints:

- lack of enabling policy environment that promotes participatory and transparent decision making processes;
- lack of multi-disciplinary coverage and integration;
- inadequate communication between researchers, policy makers and practitioners in all phases of the development cycle and the decision making process;
- shortage of relevant data to fully exploit the potential of DSS;
- lack of adequate capacity and trained technical personnel; and
- inadequate research into water resources.

How to improve the use of IWRM-DSS tools for policy making

Given the constraints identified, the issue is how to improve the effectiveness of these tools. Priority areas for improvement are:

- understanding current practice and future needs of end users as the first steps in DSS development;
- strengthening the applicability of IWRM legislative and planning frameworks;
- increasing organisational ownership through timely and effective communication with users;
- investing in training and capacity building;
- sourcing long term financial support;
- networking, cooperation and exchange of experiences, tools, models and data;
- harmonising transnational data infrastructures; and
- learning from past problems and limitations to implement best practices.

Further information

This is one of a series of SPLASH fact sheets available on the SPLASH website www.splash-era.net

If you would like to receive the quarterly SPLASH newsletter 'Making a SPLASH', please contact era-net@dfid.gov.uk