

A Comparison of IWRM Frameworks: The United States and South Africa

Jeffery A. Ballweber

Department of Agricultural and Resource Economics, Colorado State University

There is increasing global interest in Integrated Water Resources Management (IWRM) as an approach to address a myriad of water resources issues in a more effective and efficient way. Although there are a growing number of individual IWRM and watershed management successes that reflect technical cooperation on a regional or local scale, broader, international and national efforts to implement IWRM are often hampered by inadequate or inefficient political and institutional environments. Accordingly, it is helpful to compare alternative national IWRM approaches to better understand the strengths and weaknesses of different political and institutional environments for IWRM. This paper examines two national IWRM approaches that were adopted in the late 1990s. The United States has a growing number of collaborative grassroots level watershed management initiatives, but little or no national political, legal, or institutional framework to guide and coordinate those efforts. Conversely, the Republic of South Africa was extremely proactive in codifying a formal IWRM strategy at the national level, but has limited experience with collaborative institutions. This paper compares these alternative bottom-up and top-down approaches to identify and assess some common challenges to the long-term sustainability of IWRM institutions.

IWRM-Ideal vs. Reality

Basically, IWRM is blending or integrating actions and objectives favored by different players to achieve the best total result within a river basin or watershed (Grigg 1998). This blending is a process for land and water resources planning and management that encourages participants to consider a wide array of social and environmental

interconnections. Therefore IWRM supersedes traditional multi-purpose natural resources management by explicitly encompassing societal goals and ecosystem functions. In short, IWRM will ideally include the full range of physical, biological, and socioeconomic variables necessary to manage or develop a region to protect environmental values and provide sustainable human use (Hooper 2003).

As IWRM concepts are accepted as part of international or national goals, the issue becomes: what critical elements are necessary to implement or enable IWRM? Without discounting the growing stress to water resources in certain areas of the world, the true crisis may be in water governance, management capacity, and financing to satisfy human and environmental water needs (Hooper 2003). Potentially, IWRM institutions, if they have a fairly unique blend of representative stakeholder bodies and ability to implement actions, could blend complicated top-down and bottom-up management approaches to IWRM (Schad, 1998, Ballweber 1999, Hooper 2003, Ashton et al. 2005). The Netherlands Ministry of Foreign Affairs (1998) recognized this by identifying three pillars to support IWRM at the international level: (1) Political, (2) Technical Cooperation, and (3) Legal/Institutional. These pillars are equally applicable at the national level.

1. *Political* – includes vertical integration of national, provincial/state and local officials to develop clear IWRM policy statements and implement legislation and appropriations to initiate and sustain IWRM.
2. *Technical Cooperation* – includes vertical (federal, provincial/state, local) and horizontal (public, non-public, academic, etc.) integra-

tion to identify, share and integrate data and technical expertise to prioritize data gaps for IWRM. Recent advances in Geographic Information Systems and related information technologies have significantly simplified technical cooperation and remote data sharing among parties (Yang, et al. 1999).

3. *Legal/Institutions* – in conjunction with the political pillar, laws may have to be amended or enacted to integrate legal and financial authority for new river basin institutions, joint commissions or other river basin organizations. As part of a broader devolution of governance, decentralized river basin institutions must have some autonomy to set priorities and obtain funding independent of existing governments (fees and taxes) and agencies (grants and loans).

Locally-lead IWRM efforts may emerge in response to specific water crises or disasters that unite stakeholders even in the absence of these pillars. Yet together, the three pillars create a very supportive environment for sustained IWRM.

Alternate National IWRM Approaches

Water issues vary from one area to another, and often within a single nation. A nation's approach to IWRM may depend on whether it is located upstream or downstream within a river basin, the number and size of international river basins within its borders, and how well developed its national water resources infrastructure is. As such, IWRM approaches adopted for one international basin or by one nation may be inappropriate or unworkable in another. In addition, IWRM must be extremely sensitive to national political, cultural, and social conditions. Still, a general comparison of the initial success of different national approaches to the IWRM pillars can provide beneficial insight into alternative approaches (De Coning and Sherwill 2004). South Africa and the United States represent perhaps two extremes in their approaches to IWRM. While the former adopted a very formal top-down approach, the later has been unable to provide substantive national leadership for IWRM, despite a multitude of collaborative watershed management efforts with strong technical cooperation and grassroots support.

Republic of South Africa

The Republic of South Africa (RSA) is justifiably proud of its peaceful transition from apartheid to democracy. Not surprisingly, in an arid county that primarily receives erratic rainfall, and depends largely on seasonal river flow from shared river basins, freshwater availability has been included in national political discussions. The Country's 1996 Constitution contains a de facto statement of IWRM principles by embracing environmentally sound, sustainable economic and social development. This policy was expanded and codified in the National Water Law of 1998 (Republic of South Africa 1998), with the ultimate responsibility for IWRM vested in the Department of Water Affairs and Forestry (DWAf). Allan (2003) provides a detailed legal discussion of the Constitutional provisions and the National Water Law. Clearly, at the national level, the RSA enthusiastically embraced IWRM's political pillar by pursuing a policy of "Some [water] for all, for ever" (Allan 2003, MacKay et al. 2003, Hattingh et al. 2004, MacKay and Ashton 2004, Ashton, et al. 2005, Waalewijn et al. 2005).

Notwithstanding these clear demonstrations of South Africa's political support for IWRM, the legal/institutional pillar has some unresolved vertical and horizontal integration issues. Taking vertical integration as an example, legally, the National Water Act recognizes national jurisdiction over water resources protection, use, development, conservation and management (Republic of South Africa 1998). However, the Water Services Act recognizes that local municipal governments are responsible for potable water supply and wastewater management within their municipalities (Republic of South Africa 1997). As for horizontal integration, DWAf's IWRM efforts under the National Water Act will need to be closely coordinated and integrated with the Department of Environmental Affairs and Tourism's Strategic Region-Based Management approach authorized under the National Environmental Management Act of 1998 (Republic of South Africa 1998a, Hattingh, et al. 2004, MacKay and Ashton 2004). These are challenging integration and coordination issues that are the subject of considerable research and review (Allan 2003, MacKay et al. 2003, De Coning and Sherwill 2004, Hattingh et al.



Figure 1. Republic of South Africa's Process to Appoint a Catchment Management Agency Governing Board (Republic of South Africa 1998b).

2004, MacKay and Ashton 2004, Ashton, et al. 2005, Waalewijn et al. 2005).

It appears that all stakeholders recognize that an evolving process is necessary to develop new institutional and professional relationships. Trust is necessary in resolving these detailed legal jurisdictional issues and all are working in good faith to that end (MacKay et al. 2003). Similarly, stakeholders are working together to implement the National Water Act's institutional provision for river basin-scale IWRM—a mandate for DWAF to organize and approve the creation of 19 new Catchment Management Agencies (Republic of South Africa 1998 § 79). DWAF has a critical, leadership role in establishing and approving these agencies and their Governing Boards (Republic of South Africa 1998b). The DWAF has adopted an open process with strong stakeholder involvement to solicit nominations to the Catchment Management Agency Governing Boards. Nominations are supplemented with additional members if necessary to ensure broad representation of stakeholders and user groups (Figure 1). This process is critical to ensure public and stakeholder buy-in and trust in the Catchment Management Agencies and allow them to serve a quasi-legislative function. After it is established and has a board in place, each Catchment Management Agency must develop a Catchment Management Strategy, following

DWAF guidelines. Once that strategy is approved, DWAF will delegate significant operational authority for the Catchment Management Agencies to implement the Strategy (Allan 2003). These agencies then become the focal point for technical cooperation within the catchment area.

The Republic of South Africa has taken bold political and legal/institutional steps to create an environment to support technical cooperation for IWRM. While it is still early in the implementation stage, like many new management initiatives, this new IWRM approach is facing challenges from the top to meet bureaucratic deadlines and reporting requirements; while local stakeholders still need additional time to fully understand the process and its responsibilities, and to build relationships and understand how they will impact their activities (Maharaj and Pietersen 2004, Waalewijn 2005). These issues will be discussed further below.

United States of America

The IWRM situation in the United States of America (USA) is nearly the exact opposite of South Africa, with a wealth of ad hoc collaborative watershed management efforts that reflect a high degree of technical cooperation (Taylor and Gerath 1996, Ballweber 1999, Sabatier et al. 2005). However, there is a desperate need for national leadership and guidance from the political

and legal/institutional pillars to ensure the long-term sustainability of these efforts (Schad 1998, Viessman, Jr. 1998, Ballweber 1999, Galloway 2003).

In 1998, the President and Vice President attempted to provide leadership for watershed management and many elements of IWRM through a Clean Water Action Plan (United States of America 1998, 2000). The Plan had three goals: (1) enhance public health protection from water pollution threats, (2) more effective control of polluted runoff, and (3) promote water quality protection on a watershed basis. Regarding the political pillar, Congress did not have a single authorizing or appropriating committee to debate the entire plan. So despite general support from impacted interest groups and stakeholders, there was no opportunity for Congress to conduct a comprehensive review of the plan or consider funding tradeoffs between agencies and similar programs (Copeland 1998, 2000). The Plan was largely abandoned when a new administration took office in the Executive Branch.

Notwithstanding the lack of a national IWRM strategy, the national government has shown political, legal and institutional support for some high profile, “great waterbody” initiatives with strong state and local political support such as the Florida Everglades, Great Lakes, and Chesapeake Bay (Hughes and Burke, Jr. 1996, Ballweber 1999, Copeland 2000). Reflecting the importance of vertical integration in the political and legal/institutional pillars, state and local political support on a multi-state or regional scale can spark federal political support for legal/institutional flexibility and funding for watershed management efforts (Hughes et al. 1996). The country’s largely informal bottom-up, collaborative approach to watershed management still struggles as individual watershed partnerships attempt to gain legitimacy with federal and state agencies in adopting management plans, or to wean themselves off of agency grant funding (Ballweber et al. 2005, Sabatier et al. 2005). Agencies are quick to participate in such collaborative efforts, but are often legally prohibited from delegating any of their authority or responsibilities to these new partnerships.

Near-Term Opportunities for IWRM

In evaluating IWRM, it is vital to remember that it is a process and not an event (Hooper 2003, MacKay 2003). Despite the fact that South Africa has created a very sound top-down framework to support Catchment Management Agencies, it is still experiencing challenges in effectively empowering local collaborative initiatives or partnerships (Hattingh et al. 2004, MacKay and Ashton 2004, Maharaj and Pietersen 2004, Waalewijn et al. 2005). A formal national IWRM framework needs to have sufficient flexibility to realize that not all catchments are equally ready for IWRM, or to create and participate in a Catchment Management Agency. Chess and Gibson (2001) identify three fundamental attributes for successful, sustainable watershed management efforts that are equally applicable to IWRM:

1. *Scientific Feasibility* – management must include specific actions with a clear causal relationship between actions taken and measurable improvements in meeting priority water issues;
2. *Social Feasibility* – agency agendas must address local priorities and needs reflected by strong civic engagement and leadership; similarly a statutory framework to delegate authority, establish planning procedures and prioritize technical and financial assistance resources is important; and
3. *Motivational Feasibility* – as they evolve, watershed management may need different approaches to maintain strong local participation including incentives (regulatory flexibility), norm-based (stakeholders want to conform to new norms) or other emotional responses (civic pride).

Much like watershed management, IWRM is more likely to succeed and be sustainable in catchments with all three attributes. Agencies and other organizations can lay the groundwork for successful future implementation of IWRM plans by working to strengthen individual attributes at the local level as part of international or national IWRM approaches. By recognizing river basins where these attributes are already in place, agencies and other organizations can help prioritize areas for early or fast track IWRM efforts while working to build or strengthen local

attributes in others (Chess and Gibson 2001). Often a neutral third party or university can play a key role in this type of local capacity building (Breen et al. 2004, Ballweber et al. 2005).

With this in mind, it is appropriate to compare IWRM to the process used to plan, fund operate and maintain a large water resources development project such as levee construction, irrigation, or flood control projects on US waterways. Despite significant federal involvement, water resources development projects are initiated by a local sponsor in response to some water resource issue of concern. The local sponsor builds local and state political support by engaging local stakeholders. If it has some national significance and sufficient local support, it is likely that over time, the state's Congressional delegation will champion the project. The federal government created a legal framework of primacy agencies and interagency and federal-state consultations to provide the federal/state cooperation the project needs. Over time, single purpose projects gave way to broader, more integrated multi-purpose/multi-use projects. The local stakeholders and political officials were actively engaged with a clear goal: get their project built. Potentially, IWRM could provide a logical continuation of the local enthusiasm for a project to satisfy the sponsor's long-term operation and maintenance commitment (Ballweber 1999).

Conclusion

From the discussion above it is apparent that a strong formal IWRM framework in a nation without a history of informal technical collaboration faces challenges. Similarly, an assortment of ad hoc watershed management partnerships with minimal federal or state guidance is not ideal either. It seems that IWRM is best characterized as a voluntary approach to national, provincial/state and local relations with stakeholders and the public at large, in which the process is possibly even more important in the short-term than the goal.

Given the obstacles nations face in developing and implementing IWRM, it is important to recognize and applaud any progress toward IWRM. Public acceptance of and support for IWRM and new management institutions will require that they see added value from these new efforts. There is no better marketing for IWRM than having a successful IWRM institution that has measurably

improved the local quality of life or brought in new economic development opportunities. Accordingly, to the extent possible, it is advisable to link or "boot strap" IWRM initiatives with the political and legal/institutional framework for water resources development projects. Local stakeholders, funding agencies and other donors are familiar with development institutions and procedures.

Author Bio and Contact Information

JEFF BALLWEBER is the Associate Director of the Mississippi Water Resources Research Institute at Mississippi State University. Effective September 2006 he has accepted a position as Community Development Specialist in the Department of Agricultural and Resource Economics at Colorado State University. In Mississippi he has researched and published on inter-jurisdictional legal and policy issues related to integrated water resources development and management. Mr. Ballweber has applied his research interest by actively assisting in organizing formal and informal watershed management organizations and developing watershed implementation plans in the southeastern United States. He is also actively assisting several rural counties in Mississippi to plan and implement water resources development projects for regional economic development. Often, these development projects provide a foundation for subsequent and ongoing integrated water resources management efforts. Jeff can be reached at Colorado State University, Dept. of Agricultural and Resource Economics, B308 Clark, Ft. Collins, CO 80523-1172, Jeff.Ballweber@ColoState.edu.

References

- Allan, A. 2003. A comparison between the water law reforms in South Africa and Scotland: Can a generic national water law model be developed from these examples? *Natural Resources Journal* 43(2):419-489.
- Ashton, P. J., M. J. Patrick, H. M. MacKay and A. B. Weaver. 2005. Integrating biodiversity concepts with good governance to support water resources management in South Africa. *Water SA* 31(4):449-456.
- Ballweber, J.A. 1999. A critique of watershed management efforts in the Lower Mississippi alluvial plain. *Journal of the American Water Resources Association* 35(3):643-654.
- Ballweber, J. A., M. L. Tagert, W. D. Jones, K. Griffin. 2005. *Upper Pearl River Watershed Advisory Group as a Model for Mississippi*. Final Report for Clean Water Act § 319 Award No. 991221153. Mississippi State, Mississippi.

- Breen, C. M., J. J. Jaganyi, B. W. van Wilgen and E. van Wyk. 2004. Research projects and capacity building. *Water SA* 30(4):429-434.
- Chess, C. and G. Gibson. 2001. Watersheds are not equal: Exploring the feasibility of watershed management. *Journal of the American Water Resources Association* 37(4):775-782.
- Copeland, C. 1998. *The Clean Water Action Plan: Background and Early Implementation. Congressional Research Service Report* 98-150 ENR. Washington, D.C.
- Copeland, C. 2000. *Clean Water Action Plan: Budgetary Initiatives. Congressional Research Service Report* 98-745. Washington, D.C.
- De Coning, C. B. and T. Sherwill. 2004. *An Assessment of the Water Policy Process in South Africa (1994 to 2003)*. Republic of South Africa, Water Research Commission Report No. TT232/04.
- Galloway, G. E. 2003. Perspectives on a national water policy. *Water Resources Update* 126:6-11.
- Grigg, N. S. 1998. Coordination: The key to integrated water management. *Water Resources Update* 111:23-29.
- Hattingh, J., G. Maree, A. Turton, E. Van Wyk, and S. Oelofse. 2004. Environmental governance and equity in a democratic South Africa. In: *Water Governance for People & Nature: What Roles for Law, Institutions, Science and Policy?* American Water Resources Association International Specialty Conference. (August 29-Sept. 2, 2004). Dundee, Scotland.
- Hooper, B. P. 2003. Integrated water resources management and river basin governance. *Water Resources Update* 126:12-20.
- Hughes, H. R. and T. W. Burke, Jr. 1996. The cleanup of the Chesapeake Bay: A test of political will. *Natural Resources & Environment* 11(2):30-34.
- MacKay, H.M., K.H. Rogers and D.J. Roux. 2003. Implementing the South African Water Policy: Holding the Vision While Exploring an Uncharted Mountain. *Water SA* 29(4): 353-358.
- MacKay, H. M. and P. J. Ashton. 2004. Towards co-operative governance in the development and implementation of cross-sectoral policy: Water policy as an example. *Water SA* 30(1):1-8.
- Maharaj, V. and T. Pietersen. 2004. Consulting South Africa's diverse population about the country's proposed National Water Resources Strategy. *Water SA* 30(5):125-132.
- Netherlands Ministry of Foreign Affairs. 1998. *The Management of Shared River Basins: Experiences for SADC and EU*. Focus on Development 8. SADC-EU Conference on the Management of Shared River Basins. Maseru, Lesotho. (May 20-21, 1997). The Hague, Netherlands.
- Republic of South Africa. 1996. *The Constitution of the Republic of South Africa (Act No. 108 of 1996)*. Government of the Republic of South Africa, Pretoria, South Africa.
- Republic of South Africa. 1997. *Water Service Act (Act No. 390 of 1997)*. Department of Water Affairs and Forestry. Pretoria, South Africa.
- Republic of South Africa. 1998. *National Water Act (Act No. 36 of 1998)*. Department of Water Affairs and Forestry. Pretoria, South Africa.
- Republic of South Africa. 1998a. *National Environmental Management Act (Act No. 107 of 1998)*. Department of Environmental Affairs and Tourism. Pretoria, South Africa.
- Republic of South Africa. 1998b. *Task Group for the Establishment of a Catchment Management Agency Information Document*. Department of Water Affairs and Forestry. Directorate of Project Planning. Pretoria, South Africa.
- Sabatier, P. A., W. Focht, M. Lubell, Z. Trachtenberg, A. Vedlitz and M. Matlock. 2005. *Swimming Upstream: Collaborative Approaches to Watershed Management*. Massachusetts Institute of Technology Press, Cambridge, Massachusetts.
- Schad, T. M. 1998. Water policy: Who should do what? *Water Resources Update* 111:51-61.
- Taylor, W. E. and M. Gerath. 1996. The watershed protection approach: Is the promise about to be realized? *Natural Resources & Environment* 11(2):16-20.
- United States of America, 1998. *Clean Water Action Plan*. Federal Register 63(56):14109-14112 (March 24, 1998).
- United States of America. 2000. *Unified Federal Policy for a Watershed Approach to Federal Land and Resources Management*. Federal Register 65(202):62566-62572 (October 18, 2000).
- Viessman, Jr., W. 1998. Water policies for the future: Bringing it all together. *Water Resources Update* 111:104-110.
- Waalwijk, P. P. Weser and K. van Straaten. 2005. Transforming river basin management in South Africa: Lessons from the lower Komati River. *Water International* 30(2): 184-196.
- Yang, M., C. J. Merry, and R. M. Sykes. 1999. Integration of water quality modeling, remote sensing, and GIS. *Journal of the American Water Resources Association* 35(2):253-263.