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Integrating Water Management in the Anthropocene

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Integrated water resources management (IWRM) has been the dominant discursive frame for global water governance since the 1992 Rio Declaration. Yet it is increasingly criticized as inadequately incorporating ethical or political contexts in governance coordination. This policy review considers the two main iterations of IWRM: rational planning and economic decentralization. It recasts the claimed "failings" of IWRM with respect to each by arguing that governance programs need to internalize the notion that we live in the Anthropocene, wherein humans are understood as major drivers of planetary systems. This requires keeping both technical and ethical-political contexts at the fore of water governance.

Keywords complex systems, ethics, integration, science–society, water management

In the context of Rio +20, a question looms for water governance: What has happened to integrated water resources management (IWRM) since the Rio Declaration, *Agenda 21* (United Nations 1992, section 18.3), declared, "The widespread scarcity, gradual destruction and aggravated pollution of freshwater resources in many world regions, along with the progressive encroachment of incompatible activities, demand integrated water resources planning and management"?

Despite lack of consensus in the water governance literature, IWRM has crystallized around safeguarding vital ecosystems while coordinating the development and management of water to maximize social and economic welfare (GWP 2000). Yet critics argue it remains a normative ideal that has not been, perhaps cannot be, made operational with respect to coordinating governance (Biswas 2004; 2008; Jeffrey and Geary 2006). Such critiques identify how IWRM has been conceived of in technical terms, with less emphasis on the political dimensions of governance. For instance, it is often noted that the geographic scale for achieving IWRM is key to bounding problems in terms that capture both biophysical and governance considerations, yet critics have argued IWRM fails to address the political ways that "watersheds," "river basins," or even "water" itself are defined and that this leaves the sociopolitical

structure generating many policy gaps intact (Linton 2010; Molle 2009; Warner et al. 2008).

This essay engages two iterations of IWRM since Rio—rational planning and economic decentralization—that critics argue reveal the "failure" of the concept. It recasts these "failings" by asking what kind of failure they are and suggests both are tied to ethical considerations that, if addressed explicitly, offer an important corrective to governance. It then argues that in view of humanity's entrance into the Anthropocene—a geologic era marked by humanity's quantitatively established impact on the evolution of planetary systems (Steffen et al. 2010)—it is imperative to work toward a new normative understanding of governance (cf. Lövbrand et al. 2010). Further, because human appropriations of water are already transforming the global water system (Vörösmarty et al. 2004), it is necessary to craft a water ethic without a qualitative divide between society and nature. For one example of why this is so we can consider the recent rejection of stationarity: the idea that water systems fluctuate within a natural envelope of stability (Milly et al. 2008). This has significant consequences because stationarity formerly supported key propositions, such as "renewable water," that linked science to policy by suggesting that (while variable) there are perennial stocks and annual flows of water. Without stationarity, the concept of "renewable water" is difficult to defend. Moreover, because stationarity was rejected based on human impacts, it necessitates rethinking the normative claims that legitimated such large interventions into the water cycle. Further, it reveals that the human–water system is already integrated in ways that have yet to be internalized as part of our position within the Anthropocene.

Two Failures of IWRM

IWRM has many historical antecedents (see Rahaman and Varis 2005), but its roots in global water governance have been framed through international network building in the water sector (Conca 2006): an era that began with the 1977 UN Conference on Water in Mar del Plata and that helps to contextualize the call for IWRM at Rio. As Grigg (2008) notes, IWRM is a conceptual framework for describing complex water decisions and balancing competing viewpoints. In this regard, at least two iterations of IWRM have operated as models for addressing complexity and balancing views, yet both, according to critics, fail to deliver.

Failure 1: Rational Planning

The initial model for IWRM suggested in Mar del Plata was an objective, scientifically informed program of rational planning (Biswas 1978). This view coupled the principles of water development (i.e., Wiener 1972) with utilitarian management practices aimed at achieving optimal outcomes for society (see Blatter and Ingram 2001; Feldman 2007). However, determining what is "rational" depends on the weight and relevance assigned to different criteria, and this implies that any integrative platform premised on optimizing for one group comes at the expense of what others consider a rational alternative (Lindblom 1999). As Espelund (1998) showed, the idea of applying a single standard of rationality to adjudicate water use decisions assumes that the values of different actors are commensurable with each other and, therefore, that they can be subsumed under a single calculus for objective comparison. But this assumption is often not met. As such, there is an intractable political

facet to rational planning insofar as it turns on the narrative used to identify and frame governance problems. Molle (2008) has argued that in this regard IWRM is a "nirvana concept" because it employs a certain version of rationality that may itself be a vehicle for promoting particular political agendas and, hence, perpetuating the institutional barriers that IWRM is intended to overcome.

Failure 2: Economic Decentralization

Problems in rational planning helped motivate the introduction of economic tools for IWRM as a decentralized way to ensure water was accorded to its highest value in society (Dublin Statement 1992). As part of the broader shift from "government to governance," the economic valuation of water and the creation of appropriate economic institutions have both been difficult (see; Bauer 2004; Dellapena 2005; Hanemann 2006). And while there are numerous accounts for and against economics as a tool for integration (Dinar 2000; Swyngedouw 2004), one of the strongest inhibitors to its uptake has been the ways in which the rights and practices of existing water governance programs form initial conditions for decentralization that may exacerbate, rather than resolve, policy gaps (cf. Dinar et al. 2007). For instance, economic tools and associated institutional changes, such as the private rights required for many versions of market transfers of water, often do not fit with certain cultural considerations or communal forms of tenure (Boelens et al. 2010). In this regard, economic tools require formal rights, yet codifying practices into uniform property regimes may not respect customary traditions or livelihood considerations (Meinzin-Dick and Nkonya, 2005). Alternately, formalization can actually remove some rights altogether (Swyngedouw 2005). Further beclouding the issue is the manner in which the debate over economics and water often stagnates into a "human rights versus privatization" narrative that can be unhelpful for characterizing nuanced governance problems (Bakker 2010).

Why Does Integration Still Matter?

Ingram (2008) argues that the technical aspirations of IWRM—identified here in terms of rational planning and economic decentralization—fail in part because they do not adequately account for the political and ethical contexts in which IWRM is implemented. This prompts the question: What are those contexts and what kind of failure should we take IWRM to be in light of them? Rather than jettison IWRM straightaway, we might give a prudent recasting to its failings to see what they reveal about the political and ethical challenges of achieving coordinated water governance. In this regard, the shared presupposition of both rational planning and economics is that an optimal state of "integration" may be found. And although each defines what is "optimal" differently, they both reveal key assumptions about how political and ethical judgments are expected to fit with IWRM. For instance, rational planning presupposes that there is a neutral position from which to determine the state of complex systems; however, the selection of relevant variables, the determination of the frequency and periodicity at which they are measured, and the rules chosen and applied to determine optimum outcomes are not free from human judgment. Alternately, economic programs define optimality in terms of maximizing within a certain set of constraints. However, in order to generate those constraints they uniformly close social systems (by formalizing the kind of rights needed for economic

transactions) without always addressing the practices that govern the actual, and at times inequitable, relationships at work in the communities populating socioecological systems.

These failures suggest two key science–society points for integration. First, there is no value-neutral program for "integrated" water governance. Second, integration is unlikely when humans are conceptualized apart from socioecological systems. Recasting the failures of IWRM reveals the need to orient "integration" away from the effort to find a neutral calculus for decision making and toward a view that incorporates both positive and normative aspects of governance policies within a view of complex social and ecological systems (cf. Pahl-Wostl et al. 2008). Such a view would also allow for the overlapping normative spheres that affect governance to be considered in attempts to "optimize" governance outcomes (cf. Pradhan and Meinzin-Dick 2003).

When the human–water relationship is construed through the lens of socioecological systems, the normative views that contextualize water management may be understood for their reciprocal feedback on governance systems. This view has led water experts to rethink how scientific classifications of water—such as in "environmental flows" (Annear et al. 2002) or in "blue" versus "green" water (i.e., of surface waters versus evapotranspiration) (Falkenmark and Rockström 2004)—affect what are considered to be ethical programs for integrating human welfare with environmental health (Falkenmark and Folke 2010; Postel and Richter 2003). In this way, water governance is itself part of a coupled human–water system and the project of integration is one that recovers the science–society link through a policy framework that recognizes its normative effects.

Just evoking "science" to move beyond the impasse of integration in water governance, however, is not what is required to orient governance projects within the nonlinear, constantly evolving systems that water is frequently the predicate for and critical medium of. Rather, it must be recognized that from within complex systems there is no "right" place from which to narrate an objective, value-free account linking science to policy (Kay 2000). In this regard, the global turn toward ethics by scientists, governance practitioners, and conflict mediators presents one of the most promising avenues for coordinating water governance because it suggests that we are not entering the Anthropocene from nowhere (see Brown and Schmidt 2010; Chamberlain 2008; Delli Priscoli 2004; Feldman 2007; Llamas et al. 2009; Postel 2008; Whiteley et al. 2008; Wolf 2008). Rather, our trajectory into the Anthropocene conditions the very project of global water governance. Hence, a new disposition toward "integration" must include the contextual and political specificities of different cultural orientations (i.e., Akpablo 2011) and the manner in which norms are deployed for decision-making under conditions of uncertainty (Pahl-Wostl et al. 2011).

Integrating Water Management in the Anthropocene

There are no panaceas for fitting new water management approaches to previous efforts in state planning or different programs for devolving governance (Meinzen-Dick 2007). Yet in view of the increasing interest in water ethics and the political norms at play in governance, it is helpful to begin by conceiving of ethical considerations not in abstract terms, but as reflecting a mutual coevolution of social and hydrological systems. As Delli Priscoli (2000) has argued, by using history we can

build a kind of ecological realism that operates without the human/nature divide. In this regard, one of the basic challenges for internalizing our position in the Anthropocene is to begin to see how all water governance programs make value judgments regarding how to narrate and define governance tasks (Schmidt 2010), while the multiple feedbacks from water systems reveal them to already be integrated across socioecological systems, often in surprising ways (Folke 2003).

Internalizing our position within the Anthropocene, and drawing attention to how we narrate the human–water relationship, removes one policy roadblock regarding the search for "integration" in neutral terms. Yet it puts the broader social question to the fore: What are we integrating with? From the perspective suggested here, the dual failures of IWRM reflect strategies to "regulate from nowhere" by removing the appearance of subjectivity in environmental governance (cf. Kysar 2010). As an alternate, one potential candidate for reorienting integration is to fit water governance to a narrative compatible with, but not reducible to, a scientific framework that is capable of identifying feedback mechanisms in coupled socio-ecological systems (i.e., Wheeler 2006). Others have raised concerns that such an approach may reduce or misconstrue the complex problems of individual and collective agency (see Davidson 2010). One response to this concern is to address the way in which the shift toward a new narrative is here proposed: as part of a broader set of ethical and political deliberations. In this respect, the challenge of integrating water governance in the Anthropocene is to offer and defend normative reasons for maintaining particular policy narratives in view of growing evidence of how humans are fundamentally altering the systems in which we evolved, and of which we are an interdependent part.

The "failures" of IWRM in recent decades offer feedback and learning opportunities and point to how contemporary efforts have yet to internalize our position within, and the ethical norms that led us into, the Anthropocene. Moving forward in the project of water governance requires rethinking the science–society link through a narrative wherein human agency, whether individually exercised or communally enacted, is understood as a non-eliminable facet of governance coordination. In this sense, the recognition of human impacts on the global water system can lead to a reconceived idea of integration where our position within the Anthropocene affords us with new scientific and social possibilities for understanding the implications of governance on complex systems. By placing ethical and political considerations at the fore of efforts toward "integration," purchase is gained against reductionist programs for characterizing complex human–water dynamics while the choice of how we narrate human–water relationships keeps the important role of agency as part of governance decisions.

References

Akpablo, E. 2011. Water and people: Perception and management practices in Akwa Ibom State, Nigeria. *Society Nat. Resources* 24:584–596.

Annear, T. C., I. Chisholm, H. Beecher, A. Locke, P. Aarrestad, N. Burkhart, et al. 2002. *Instream flows for riverine resource stewardship*. Cheyenne, WY: Instream Flow Council.

Bakker, K. 2010. *Privatizing water: Governance failure and the world's urban water crisis*. Ithaca, NY: Cornell University Press.

Bauer, C. 2004. Results of Chilean water markets: Empirical research since 1990. *Water Resources Research* 40:W09S06. doi:10.1029/2003WR002838:1-11.

Biswas, A., ed. 1978. *United Nations water conference: Summary and main documents*. Oxford, UK: Pergamon Press.

Biswas, A. 2004. Integrated water resources management: A reassessment. *Water Int.* 29:248–256.

Biswas, A. 2008. Current directions: Integrated water resources management—A second look. *Water Int.* 33(3):274–278.

Blatter, J., and H. Ingram, eds. 2001. *Reflections on water: New approaches to transboundary conflict and cooperation*. Cambridge, MA: Massachusetts Institute of Technology.

Boelens, R., D. Getches, and A. Guerva-Gill, eds. 2010. *Out of the mainstream: Water rights, politics and identity*. London, UK: Earthscan.

Brown, P. G., and J. J. Schmidt, eds. 2010. *Water ethics: Foundational readings for students and professionals*. Washington, DC: Island Press.

Chamberlain, G. 2008. *Troubled waters: Religion, ethics, and the global water crisis*. Lanham, MD: Rowman and Littlefield.

Conca, K. 2006. *Governing water: Contentious transnational politics and global institution building*. Cambridge, MA: MIT Press.

Davidson, D. 2010. The applicability of the concept of resilience to social systems: Some sources of optimism and nagging doubts. *Society Nat. Resources* 23:1135–1149.

Dellapena, J. 2005. Markets for water: time to put the myth to rest? *J. Contemp. Water Res. Educ.* 131:33–41.

Delli Priscoli, J. 2000. Water and civilization: Using history to reframe water policy debates and to build a new ecological realism. *Water Policy* 1:623–636.

Delli Priscoli, J. 2004. What is public participation in water resources management and why is it important? *Water Int.* 29:221–227.

Dinar, A., ed. 2000. *The political economy of water pricing reforms*. Washington, DC: World Bank.

Dinar, A., K. Kemper, W. Blomquist, and P. Kurukulasuriya. 2007. Whitewater: Decentralization of river basin water resource management. *J. Policy Modeling* 29:851–867.

Dublin Statement. 1992. *The Dublin statement on water and sustainable development*. http://www.wmo.ch/pages/prog/hwrp/documents/english/icwedece.html (accessed 10 April 2012).

Espelund, W. 1998. *The struggle for water: Politics, rationality, and identity in the American Southwest*. Chicago, IL: University of Chicago Press.

Falkenmark, M., and C. Folke. 2010. Ecohydrosolidarity: A new ethics for stewardship of value-adding rainfall. In *Water ethics: Foundational readings for students and professionals*, ed. P. G. Brown and J. J. Schmidt, 247–264. Washington DC: Island Press.

Falkenmark, M., and J. Rockström. 2004. *Balancing water for humans and nature: The new approach in ecohydrology*. London, UK: Earthscan.

Feldman, D. 2007. *Water policy for sustainable development*. Baltimore, MD: Johns Hopkins University Press.

Folke, C. 2003. Freshwater for resilience: A shift in thinking. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 358:2027–2036.

Global Water Partnership. 2000. *Integrated water resources management*. Stockholm: Technical Advisory Committee Background Papers, No. 4. http://www.gwptoolbox.org/index.php?option=com_content&view=article&id=36&Itemid=61 (accessed 10 April 2012).

Grigg, N. 2008. Integrated water resources management: Balancing views and improving practice. *Water Int.* 33:279–292.

Hanemann, W. M. 2006. The economic conception of water. In *Water crisis: Myth or reality?*, ed. P. Rogers, M. Llamas, and L. Martinez-Cortina, 61–91. London: Taylor & Francis.

Ingram, H. 2008. *Beyond universal remedies for good water governance: A political and contextual approach*. Paper presented to the Rosenberg International Forum on Water Policy, Zarazoga, Spain, June 24–27.

Jeffrey, P., and M. Geary. 2006. Integrated water resources management: Lost on the road from ambition to realisation? *Water, Sci. Technol.* 53:1–8.

Kay, J. 2000. Ecosystems as self-organizing holarchic open systems: Narratives and the second law of thermodynamics. In *Handbook of ecosystem theories and management*, ed. S. Jørgensen and F. Müller, 135–160. Boca Raton, FL: Lewis.

Kysar, D. 2010. *Regulating from nowhere: Environmental law and the search for objectivity*. New Haven, CT: Yale University Press.

Lindblom, C. 1999. A century of planning. In *Planning sustainability*, ed. K. Meadowcroft, 39–65. New York, NY: Routledge.

Linton, J. 2010. *What is water? The history of a modern abstraction*. Vancouver, BC: UBC Press.

Llamas, R., L. Martinez-Cortina, and A. Mukherji, eds. 2009. *Water ethics: Marcelino Botin water forum 2007*. London, UK: CRC Press.

Lövbrand, E., J. Stripple, and B. Wiman. 2010. Earth system governmentality: Reflections on science in the Anthropocene. *Global Environ. Change* 19:7–13.

Meinzen-Dick, R. 2007. Beyond panaceas in water institutions. *Proc. Natl. Acad. Sci. USA* 104(39):15200–15205.

Meinzen-Dick, R., and L. Nkonya. 2005. *Understanding legal pluralism in water rights: Lessons from Africa and Asia*. Presented at International Workshop: African Water Laws: Plural Legislative Frameworks for Water Management in Africa, January 26–28, Johannesburg, South Africa.

Milly, P., J. Betancourt, M. Falkenmark, R. Hirsch, Z. Kundzewicz, D. Lettenmaier, and R. Stouffer. 2008. Stationarity is dead: Whither water management? *Science* 319: 573–574.

Molle, F. 2008. Nirvana concepts, narratives and policy models: Insights from the water sector. *Water Altern.* 1(1):131–156.

Molle, F. 2009. River-basin management: The social life of a concept. *Geoforum* 40:484–494.

Pahl-Wostl, C., J. Gupta, and D. Petry. 2008. Governance and the global water system: A theoretical exploration. *Global Govern.* 14:419–435.

Pahl-Wostl, C., P. Jeffrey, N. Isendahl, and M. Brugnach. 2011. Maturing the new water management paradigm: Progressing from aspiration to practice. *Water Resources Manage.* 25:837–856.

Postel, S. 2008. The missing piece: A water ethic. *The American Prospect.* http://prospect.org/cs/articles?article=the_missing_piece_a_water_ethic (accessed 10 April 2012).

Postel, S., and B. Richter. 2003. *Rivers for life: Managing water for people and nature*. Washington, DC: Island Press.

Pradhan, R., and R. Meinzin-Dick. Which rights are right? Water rights, culture and underlying values. *Water Nepal* 9/10:37–61.

Rahaman, M., and O. Varis. 2005. Integrated water resources management: Evolution, prospects and future challenges. *Sustainability Sci., Pract. Policy* 1:25–21.

Schmidt, J. J. 2010. Water ethics and water management. In *Water ethics: Foundational readings for students and professionals*, ed. P. G. Brown and J. J. Schmidt, 3–15. Washington, DC: Island Press.

Steffen, W., Grinevald, J., Crutzen, P., and McNeill, J. 2011. The Anthropocene: Conceptual and historical perspectives. *Philos. Trans. R. Soc. Lond. A* 369:842–867.

Swyngedouw, E. 2004. *Social power and the urbanization of water*. New York, NY: Oxford University Press.

Swyngedouw, E. 2005. Dispossessing H_2O: The contested terrain of water privatization. *Capitalism Nat. Socialism* 16:1–18.

United Nations. 1992. *Agenda 21*. http://www.un.org/esa/dsd/agenda21 (accessed 10 April 2012)

Vörösmarty, C., D. Lettenmaier, C. Lévqêue, M. Meybeck, and C. Pahl-Wostl. 2004. Humans transforming the global water system. *EOS* 85:513–516.