



Policy brief

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The water-food-energy security nexus: Where do freshwater ecosystems fit in?

Key points

- Managing the hybrid identity of freshwater – as both a medium for all life and a resource for humanity - is an interdisciplinary and cross-sectoral challenge linking ecological and cultural systems.
- Freshwater ecosystems are essential to providing for all levels of human needs, but contemporary policy only focuses on the delivery of *basic* human needs.
- Long-term investments are necessary for large-scale design experiments, research on key water-dependant sectors, and communication activities aimed at reframing the public's perception of water.

Water lives!

Managing the hybrid identity of water – as both a medium for all life and a resource for humanity – is a huge challenge for politics, philosophy, ecology and economics. Significant steps have been made in this direction: the EU WFD focuses on the ecological state of freshwaters, the TEEB initiative seeks to quantify the value of ecosystems and the services they provide, and the water-energy-food security (W-E-F) nexus offers the prospect of cross-sector policy integration. Together they construct a framework of connections for holistic water governance.

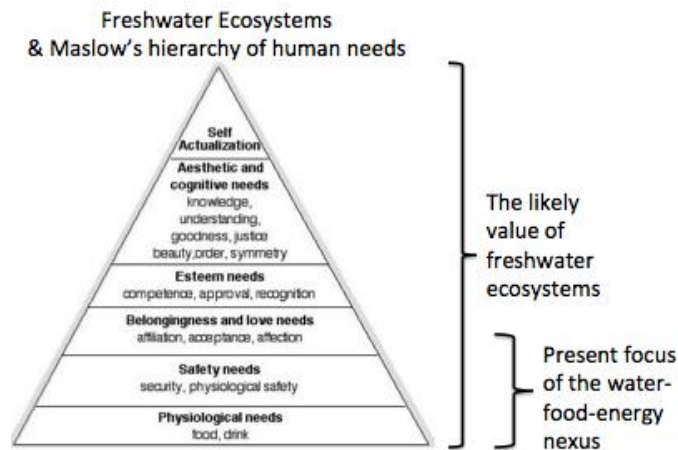
The current challenge is to create synergies between the institutional cultures of different sectors involved with water and move beyond a 'thin' policy framework towards a 'deep' implementation assembly. The 'big' sectors are focused on uses of water for direct human benefit - drinking water, sanitation & flood control, agriculture & food processing, mining activities, aluminium, nuclear & hydropower production. These sectors are defined by instrumental world-views and institutions co-produced by engineering, technocratic and economic imperatives. In contrast, the biodiversity and ecosystem 'sector' also identifies with moral-aesthetic worldviews and Earth-system imperatives. Integrating the later into the nexus is a critical policy need, but achieving this requires a phase of deep thinking and a process of scholarly and inclusive reflection and experimentation.

Living well, within the limits of our planet

Water permeates through all life on Earth and humanity is a key beneficiary of freshwater ecosystems. However, science can only offer preliminary understandings of the relations between living and inert system elements and economics can only provide a partial quantification of their value. While freshwater ecosystems are essential to providing for all levels of human needs, contemporary policy only focuses

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on the delivery of basic human needs (the security framing of the nexus underlines this point). This sometimes comes at a significant cost to freshwater ecosystems and the

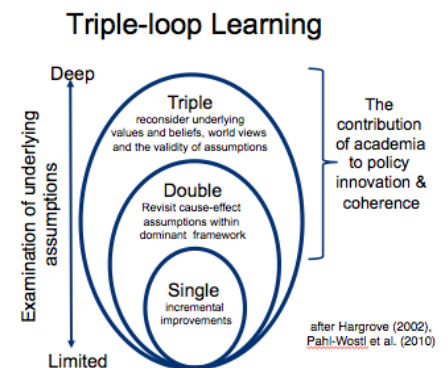


additional benefits they provide to people. The focus of the W-E-F nexus is understandable considering the euro-zone crisis and renewed anxieties concerning population and resources. However, political vision, as captured in the strapline of the 7th Environmental Programme, is more expansive. 19th century transformations in worldviews concerning the

human-nature relationship catalysed the emergence of social movements and a set of social values that underpin nature conservation policy and have provided a wise decision making 'steer' for a "century of more."¹ Thus, the value of freshwater ecosystems can be included in management decisions by revisiting and up-dating the foundational social values of conservation in light of new understandings of planetary boundaries.

Triple-loop thinking

A scientific problem-solving approach cannot adequately integrate the value of freshwater ecosystems into management decisions. Rather, directions need to be thought of as emergent outcomes of scholarly interactions across disciplines and sectors that engage interested publics. This is a call for a wider framing of the Innovation Union - one where the intellectual capital of Europe is not only seen as a resource to innovate to get the economy back on track but also as a capacity to reformulate underlying world-views and policy frames. Put differently, policy is locked into forms of institutional path dependency that may constrain capacity for the triple-loop thinking that is vital if we are to (1) develop governance modes that will deliver on the vision, targets and commitments of the 7th EP, the W-F-E Nexus, the WFD and (2) form a basis for refreshing ageing instruments, such as the Birds and Habitats Directives.



Triple-loop learning is slow and uncertain². It needs to be structured into the policy-process in ways that interact with the practices of single double loop learning that are institutionalised in the different sectors with freshwater resource and ecosystems interests. As a departure for discussion, four actions are proposed:

1. **Nexus forums in each of the WFD river basins.** Taking lead from the European Innovation Partnerships and the concept of post-normal science³, it is envisaged that Water Nexus Forums would be convened by a leading University in each basin and involve a group of 20-25 scholars and thought-leaders representing the ecological, philosophical, policy, industry and life-quality dimension of water. Such forums would be independent, meet biannually over an extended period of time, and be tasked with producing outputs that will promote public and policy discussion on futures.

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This policy brief was developed in preparation of the European Commission's "Workshop on Biodiversity and Ecosystem Services: a strategic dialogue between Science and Policy" to be held in Brussels on 14 November 2013.

BioFresh

BioFresh is an EU-funded international project that runs from 2009-2014. It aims to build a global information platform for scientists and ecosystem managers with access to all available databases describing the distribution, status and trends of global freshwater biodiversity.

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2. **Large-scale public experiments exploring novel interactions between freshwater ecosystems, industry, economic and lifestyle.** This proposal is inspired by the Oostvaardersplassen (OVP, Netherlands), which has applied Vera's radical theory⁴ on an alternative European natural archetype. The experiment (and re-wilding projects more generally) has unsettled ecological science and conservation institutions and produced public and political tensions producing innovation in science and visions on alternative futures⁵. The OVP is in an experiment in ecological design. Political and policy support is needed to create institutional spaces where ecologists, engineers, entrepreneurs can design and test novel eco-technological landscapes incorporating, for example hydro and nuclear facilities, agricultural irrigation infrastructure and urban sanitation.
3. **An anthropology of institutional practice research programme.** The EU has leading research groups in the area of Science Technology Studies, a field seeking to understand the social and institutional processes through which science and technology are produced and operationalized. Building a comparative knowledge base of the cultures of science across key water sectors and industries would create an evidence base for 'true' policy integration where organisational cultures and logics begin to converge.
4. **Marketing campaign to bring freshwater biodiversity and ecosystem value into the public, policy and political minds.** Freshwater ecosystems don't lend themselves to environmental campaigning in the same way as terrestrial ecosystems, leading to a weaker sense of connection than with birds, mammals and even some insects. Killing a fish is unremarkable, but killing birds prompts outcry. In addition, humanity knows water as something to contain, purify and control. Achieving the goal of a water-food-energy-ecology nexus will require an understanding of how people frame water, followed by a strategic and active process of 'frame amplification' to bring freshwater biodiversity and ecosystem function into people's understandings of water.

In summary, integrating the value of freshwater ecosystems into decision-making processes involving water use and management will require more than pure science. There is a common sense and a precautionary case for integrating ecology into the W-E-F nexus. However, insights from the BioFresh project and wider academia suggest that the answer will emerge from scholarly reflection and exchange involving thought-leaders from academia, policy and industry. Thus, the topic is best suited to the network model of science-policy interfacing⁶, under which assemblies of innovative, grounded and forward-looking proposals can be developed on ways to integrate the diverse values embedded in freshwater ecosystems into decision-making processes.

Footnotes

1. See Jepson, P & S. Canney (2003). Values-led Conservation. *Global Ecology and Biogeography*, 12. 271-274.
2. See Pahl-Wostl et.al. (2010) Analyzing complex water governance regimes: the management and transition framework. *Environmental Science & Policy*, 13: 571-581.
3. An approach developed by Silvio Funtowicz and Jerome Ravetz for situations where 'facts are uncertain, values in dispute, stakes high and decisions urgent', see Funtowicz, S.O., and J.R. Ravetz (1993) "Science for the Post-Normal Age", *Futures*, 25: 739-755.
4. Vera FWM. 2000. *Grazing ecology and forest history*. New York: CABI. See also: http://www.youtube.com/watch?v=_O99sS6K7RU
5. For an introduction to re-wilding see Navarro, L. M., & Pereira, H. M. (2012). Rewilding abandoned landscapes in Europe. *Ecosystems*, 15(6), 900-912.
6. See Koetz, T., Farrell, K.N., & Bridgewater, P. (2012). Building better science-policy interfaces for international environmental governance: assessing potential within the IPBES. *International environmental agreements: politics, law and economics*, 12(1), 1-21.