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Response – What Do Virtual Water and Water Footprint Conceal?

Response to: Wichelns, D. 2015. Virtual Water and Water Footprint: Overreaching into the Discourse on Sustainability, Efficiency and Equity. Vol. 8, No. 3, pp. 396-414.

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The article recently published by Dennis Wichelns '*Virtual Water and Water Footprint: Overreaching into the Discourse on Sustainability, Efficiency and Equity*' analyses why the notions of Virtual Water (VW) and Water Footprint (WF) cannot provide helpful insight in the sustainability of water use, economic efficiency, or social equity. The author's starting point is that the studies on WF and VW flows have moved from insights provided by descriptors of the volumes of water used in production, to prescriptions regarding the topics of sustainability, efficiency and equity. Wichelns discusses the usefulness of these prescriptions examining recent papers that estimate the water footprints of different regions. He concludes that VW and WF approaches contain limited information. Hence, they are not appropriate for determining the optimal use of land and water resources, allocating water among competing users, or analysing the impacts of policy choices on livelihoods and on natural resources. Therefore, additional information regarding the opportunity costs, the scarcity value of water, and the impacts on water availability are needed to provide meaningful assessments on the topics of sustainability, efficiency and equity.

Although Wichelns' research question is timely and appropriate, the author does not address the core of the problem: Why do WF and VW analyses contain such limited information? This response attempts to shed light on that question.

Firstly, most analyses on WF and VW flows are undertaken from a quantitative perspective which does not take into account that VW flows are a physical manifestation of institutional, political and social processes, which both coexist with the flows and affect them. While the wider socioeconomic and environmental context is currently missing from most WF applications and assessments (Chenoweth et al., 2014) these quantitative estimations require political, social, economic and environmental contextualisation in order to portray the complexity involved in the optimal use of water. The WF and VW approaches continue to consider water only as a 'factor of production' (Hoekstra and Chapagain, 2008: 140), just like oil. In other words, from this perspective, water is an 'economic good' (Hoekstra and Chapagain, 2008: 145) that enables the production of other goods and services. Therefore, the WF and VW approaches, thus applied, reinforce the idea that water has only a productive function. This purely mercantilist representation leaves out the rest of the many functions performed by water, such as its social cohesion dimension in communities where relations are structured according to the management of water, or its landscape-related aspects, among others. VW and WF analyses treat water as if it originated from a place where it is not already embedded in complex social, economic and political interactions (Barnes, 2013).

Secondly, Wichelns overlooks the fact that VW and WF analysis, when disembedded of all institutional and political processes, conceal the fact that scarcity may be socially constructed and that

the objective of efficiency in water use measured in relative terms may have very high social and environmental costs.

For example, Wichelns criticises the prescriptions resulting from the estimations of WF across Latin America and the Caribbean by Mekonnen et al. (2015) which conclude that several regions suffer from 'water scarcity'. The ratio these authors construct for assessing water scarcity, Wichelns argues, does not describe how imbalances between water supply and demand arise, how they are resolved or what impacts the imbalances have on households or the environment. In other words, Wichelns criticises the concept of scarcity used by Mekonnen et al. (2015) and its potential social and environmental consequences. However, in his criticism he does not consider the current discussions on the social construction of scarcity. I argue that when the prescriptions resulting from VW and WF estimations conclude that a region suffers from 'water scarcity', it is crucial to examine the concept of scarcity that has been used in these analyses. Depending on which concept of scarcity is used, different economic (and water) policies will be suggested, which have different social and environmental consequences (Kaika, 2006). Yet it is important to remember that 'scarcity' has often been used to increase the expansion of the water supply (Swyngedouw et al., 2002). Thus without the examination of the power relations and social constructions that lie at the heart of VW and WF analyses, these studies might promote a discourse that does not challenge the hegemonic construction of water scarcity in nature.

The VW and WF studies often include recommendations for the improvement of water management that are based on maximising the efficiency and productivity of the water used for different crops. For instance, Wichelns argues that improving the efficiency of rain-fed production, as proposed by Mekonnen et al. (2015), will not necessarily lead to a reduction of water use in rain-fed or irrigated agriculture. Rather, increases in efficiency might lead to an expansion in rain-fed production. In other words, the author claims that increases in efficiency might provoke a rebound effect. Wichelns also analyses the paper by Schyns and Hoekstra (2014) on the WF of Morocco which concludes that this country can save 939 million cubic metres of water annually by moving all maize production to a particular river basin in the country. He criticises these authors for not discussing the implications of this change in land use and cropping patterns on livelihoods. However, Wichelns does not mention that in VW and WF studies the concept of efficiency is often presented as objective and neutral, thus concealing the potential social and environmental impacts caused when water is managed *only* according to relative indicators (euros produced per cubic metre consumed, for instance). I argue that when the prescriptions resulting from VW and WF studies include recommendations on the efficiency of water resource use it is important to consider the ways in which the idea of efficiency has been employed to serve certain interests (Swyngedouw, 2009). Thus, unravelling the concept of efficiency may show how power is distributed in society. Therefore, the VW and WF studies, depoliticising the idea of efficiency, reproduce a view of the world that obscures power relationships and other values unrelated to efficiency.

In short, Wichelns does not address what are the power relations and social constructions that shape VW and WF concepts. This is a key aspect for assessing the potential usefulness and limitations of VW and WF analyses regarding the sustainability of water use, economic efficiency, or social equity. An examination of the underlying ideas that structure the discourse resulting from VW and WF studies suggests that these concepts involve a representation of water as a factor of production that does not challenge the hegemonic construction of water scarcity in nature, and propose an approach to water management that merely focuses on maximising the efficiency in the use of the resource (Beltrán and Velázquez, 2015).

To assess whether the prescriptions that result from VW and WF studies provide insight regarding the topics of sustainability, efficiency and equity we need to focus on the discourse promoted by VW and WF methodologies and the underlying ideas that lie at the heart of VW and WF concepts. Much effort has been devoted to developing these methodologies but very little to critically examining the implications of the use of VW and WF estimations as policy tools, and little (or no) attention has been

devoted to analysing both VW and WF concepts as constructions supported by pre-existing ideas or ideologies, rather than a part of an independent objective reality.

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