WATER FOOTPRINT: REFLECTIONS AND VISIONS OVER ITS APPLICATION[1]

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A review of the publication: "Pegada Hídrica – Inovação, corresponsabilização e os desafios de sua aplicação" (Water footprint - Innovation, shared responsability and the challenges of its application). Ed.: Vanessa Empinotti and Pedro Roberto Jacobi. Annablume Editorial. Sao Paulo. 176 pages, 2012.

The book *Water footprint - Innovation, shared responsibility and the challenges for its application,* organized and edited by Prof. Pedro Roberto Jacobi and Dr. Vanessa Empinotti is the result of the international seminar "Water footprint and its application in the public and private sector: National and international experiences" held in Sao Paulo, Brazil, in 2011. On it, brazilian and international experts from academia and the private sector put together their views and reflections over the water footprint concept, bringing their backgrounds from the fields of sociology, economics, engineering, environmental or political sciences.

The water footprint concept was developed out of the virtual water concept at the beginning of the 2000's, and refers to the amount of water needed to obtain a specific product (ALLAN, 1998). It is a multidimensional indicator of water consumption that includes both direct consumption and that of the production chain, resembling thus the ecological footprint. In addition to this, another main difference with traditional water accountings is that it only takes into account water consumption, and not water use, aside from the inclusion of indirect water use (HOEKSTRA et al., 2011).Up to now, it has been appropriated by different sectors of society, specially the private sector and academia (CHAPAGAIN and TICKNER, 2012).

Another interesting side of the method is that it separates and classifies water consumption according to its participation in the hydrological cycle into the so-called "water colours", blue, green and grey water. In this classification, green water is the amount of water stored in soil, coming from precipitation, that is evaporated or consumed by plants.

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Blue water is the fraction of water consumed that originates from surface or groundwater bodies. Grey water is an indicator of the impact of water use over the quality of receiving water bodies, conceptualized as the water needed to dilute all pollutants to its respective legal maximum concentration.

The water footprint of a place, process, product, or even an individual, a city or a country is the sum of its blue, green and grey water footprint, measured at a specific site and time.

Even though it is a relatively new concept, it has attracted great interest, particularly in the private sector, with many initiatives and experiences being undertaken. As a result, appears a need for an analysis of the strengths and limitations of the method. Despite being one methodology among many others of corporate water accounting, its wide use may impact corporate water use and influence water management, depending on how it is used.

It is for this reason that the editors organized the event and the ensuing publication with the aim of "presenting a series of discussions around the water footprint topic, its application and its impact over water governance practices"

According to the editors of the book, once the relevance of virtual water fluxes resulting from international trade is recognized, new perspectives on water management appear, demanding new ways of thinking about the resource, and inserting previously unaware stakeholders in the environmental governance process.

The book is divided in eight chapters written by different professionals and researchers (including the editors) who have been recently working with the water footprint concept and more broadly with water governance. Each chapter approaches the methodology from a different angle, covering the whole arch from its practical application to more theoretical discussions over the possibility of water footprint as a tool for advancing environmental education. As a matter of fact, this is one of the main contributions of the book.

The first chapter, from Ashok Chapagain and David Tickner, presents a thorough and critical classification of the various applications of the water footprint method. The authors bring various ideas on its use by the private sector, and discuss its application in a specific geographic area, such as a river basin. They also look at its applications from the perspective of a consumer or a NGO, reinforcing the potential of the methodology for public discussion on water management.

In the next chapter, Wilson Cabral de Sousa Jr and Bruna Vieira look into some critical points identified in the methodology, presenting them and discussing its main limitations by means of examples. Simultaneously, they present the possibilities that the tool may bring for water management. The authors uphold that it offers potential synergies towards water scarcity and drought management, resource use efficiency, water quality protection or land use management, allowing for a more integrated and broader view over the complexity of water resources.

Related to the field of ecosystem services analysis, Paulo Sinisgalli and Natalia Dias Tadeu introduce an interesting adaptation of the original use of the Water Footprint as accounting of water appropriation for human uses. Their argument , relates water needs of

natural ecosystems to the provision of water -related ecosystem services provided by these ecosystems, such as biodiversity, flow regulation, quality provision or sediment control.

On the fourth chapter, Pedro Roberto Jacobi uses the idea of social learning (PAHL--WOST and HARE, 2004) and relates it to Water Footprint and water governance. Since water governance practices are complex processes which require integration, negotiation and cooperation among different stakeholders, the author argues that Water Footprint may strengthen the dialogue, and contribute to enlarge its apprenticeship. In this direction, a particular society could be better placed to face the changes needed in current management practices, moving onward towards a socio-environmentally sustainable society.

The following three chapters focus on the private sector, which has appropriated the method for various reasons. Up to now, there has been little exposure about changes brought by the Water Footprint evaluations.

In the fifth chapter, Rita de Cássia Marzullo and Patrícia Helena Matai offer a preliminary idea of the Water Footprint as part of the Life Cycle Analysis (LCA), synthesizing the ISO norms about the LCA now being drafted under the ISO 14046 norm.

In chapter six, Vanessa Empinotti discusses the role of the private sector as an agent capable of promoting change in the current water management practices mentioning Brazilian and international cases of Water Footprint application. For the author, companies may influence decision making if they consider water not just as a production factor, but transform themselves into a relevant actor in the water governance process.

Complementing the former chapter, Ines Francke presents in the seventh chapter the pilot project that Natura, a cosmetics leading company carried out using the Water Footprint tool. The author presents the main factors that influence the Water Footprint accounting of their products.

In general terms, it can be perceived that the private sector has a certain concern and caution as to the publication of their experience and outcomes using the Water Footprint. To the present, several experiences took place mainly linked to the accounting of their products' water consumption. In this regard, Natura is one of the few companies that has published the results of their Water Footprint researches in scientific journals (FRANCKE and CASTRO, 2013) and congresses.

Lastly, in the eighth chapter Vanessa Empinotti and Jeroen Warner examine the ways in which the concepts of Water Footprint and Virtual Water may contribute to the water dialogue and the challenges that come inherently with it. When they analyze the relevance of international trade to water resources, they warn against making decisions regarding only at the economic perspective, overlooking other social, cultural and environmental aspects. Moreover, they put forward a relevant consideration: the emerging ways in which water is appropriated by foreign actors, through international trade of agricultural products or phenomena such as land grabbing.

With these brief description made, we may see how the chapters cover a wide range of approaches to the topic, showing the diversity of ideas that may emerge around the use of this indicator. Another argument in favour of it, is the amount of scientific articles applying the indicator and the methodology to a particular product, region or country.

Nevertheless, there is still a need for a deeper discussion around the use of the indicator, even more after the momentum that the subject is gaining in a variety of international networks. As the academia leads the discussion, exploring the limitations of the tool and improving the methodology for its application, it is important to bear in mind that this methodology is still developing.

It is precisely a representation of this discussion what the reader will find in the book, benefitting from the multiple backgrounds that look at a common topic, the water footprint methodology. This is the main contribution of the book, and its articles are distinctive for its diversity: while some present examples of applications of a specific product, other develop conceptual analyses and theoretical approaches. This expands the field of knowledge as well complements the different authors approach, contributing for an enriched vision over water consumption.

The resulting pluridisciplinary and multidimensional book inserts itself into an approach of environmental problems that recognizes its complexity and the importance of transparency and dialogue among different stakeholders to support decision making. Obviously the problem of sustainable and equitable water use is not restricted neither to this publication nor to water accounting, but it may indicate possible means to improved sustainable management of water resources.

The book brings to the Portuguese-speaking world a topic gaining relevance and appeal at the international level, especially in the corporate-science interface. The recognition of the direct relation between food and water security also increases the attraction to this kind of indicators, all the more in a country like Brazil, called to be one of the breadbaskets of the world (CARMO *et al.*, 2007). Tools like the Water Footprint contribute to answer the question of whether the country's water and land resources will be able to support its increasing role in international commodity trade. These complex challenges need clear, transparent and flexible tools that allow us to analyze the trade-offs that we'll have to face. But just as important, tools that allow us to identify all the directly and indirectly affected individuals or organizations. Then, our societies will be better positioned to deal with potential environmental and socio-politic conflicts. Here lies the interest of this book.

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