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Peer reviewed

Review: Globalization of Water: Sharing the Planet's Freshwater Resources

By Arjen Y. Hoekstra and Ashok K. Chapagain

Reviewed by Matthew Aaron Tennant
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Hoekstra, Arjen Y. and Chapagain, Ashok K. *Globalization of Water: Sharing the Planet's Freshwater Resources*. Malden, MA: Blackwell Publishing, 2008. 208 pp. ISBN 9781405163354. US\$64.95, hardcover. Alkaline paper.

One cup of coffee requires one hundred and forty (140) liters of virtual water (p. 15). This is one of the attention-grabbing statistics Arjen Hoekstra and Ashok Chapagain provide in their new book *Globalization of Water*. Virtual water is the *invisible* water contained in export crops and products, and it is distributed around the world through international trade. Using this definition and quantitative analysis of statistical data, the authors examine the relationship between water poor countries and water rich countries. They write, "Water use for producing export commodities for the global market significantly contributes to changes in local water systems" (p. 1), and in a reasonably accessible and well-written account, the authors devote the majority of the book to explaining virtual water transfer.

The book is organized into eleven chapters and five appendices. The first chapter is an introduction, setting out the approach for the rest of the book. The authors divide a nation's water footprint into blue, green, and gray water components. Respectively, these colors represent rainwater, ground or surface water, and "water use as a result of pollution" (p. 4). Chapter two seeks to answer the question "how much water is used for producing our goods and services" (p. 7), and chapter three examines virtual water flows between nations. Chapter four and five are about water saving through trade and national water footprints, respectively.

In chapter six, the authors closely examine the relationship between water footprints in Morocco and the Netherlands. In a book of this nature, there must inevitably be an analysis of China, and this is provided in chapter seven. The global average water footprint is 1243 m³ per capita, per year. In China, the water footprint is 702 m³ per capita, per year, and the United States water footprint is 2483 m³ per capita, per year (Table 5.2). The chapter starkly illustrates the impact of continuing development in China. Chapters eight and nine are closer examinations of two different water footprints: coffee and tea consumption and cotton consumption. Chapter ten examines water as a geopolitical resource and chapter eleven looks at sustainable water use. These two chapters are an excellent summation of the arguments presented in the rest of the book.

Hoekstra and Chapagain provide ample charts, tables, and maps to illustrate their argument, while leaving the formulas and mathematical proofs to the appendices. I would have liked the authors to devote some attention to the cost of transporting virtual water, whether expressed in real cost or in terms of virtual consumption. When a good is produced in an environment in which it takes less water than it would to produce it domestically and then transported to a water-poor country, thus saving some virtual water, there is still a virtual water cost associated with transporting the goods. Even though importing some goods can save real water by producing those goods in an environment that takes less water, the cost of importing those goods might be a relevant factor in considering the value of using virtual water (e.g. coffee produced in an environment suitable to coffee production). Even with this minor criticism, *Globalization of Water* is an excellent book that will challenge readers to consider the amount of water that has gone into the production of various products.

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