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Hydrology and Water Law – Bridging the Gap, edited by J. Wallace & P. Wouters

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though its value is limited by the omission of basic reference material. It is not the book to pull from the shelf for lessons applicable to other arid regions unless you are willing to take the time to evaluate each essay on its own merit and discern for yourself which management innovations in Arizona are applicable to other urbanizing, arid regions.

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Hydrology and Water Law – Bridging the Gap. Edited by J. Wallace & P. Wouters. London: IWA Publishing, 2006. Pp. 360. \$140.00 hardcover.

Freshwater is a fundamental resource integral to all ecological and societal activities. After a century of development, the water sector has faced a number of serious challenges such as degradation and depletion of the resource; a sheer increase of actors competing for the same resource; and a lack of communication between scientists and the broad spectrum of water stakeholders including river basin communities, water policy experts, lawyers, and water resource managers. Against this background, the book by J. Wallace and P. Wouters comes up as a collection of case studies with an objective to demonstrate the successful and less successful examples of how water law, policy, and science interact in responding to these challenges in real basin management practices.

Integrated Water Resource Management (IWRM) has been introduced as a concept and a strategy for policy change in the water sector, taking over from the traditional understanding and practice of water resources development mainly directed at policy, legislative, and institutional changes on a sub-national, national, and international level. IWRM is bringing forward approaches, including participation, consultation, and inclusive political institutions, to enable the mediation of the conflicting interests of water users and agencies that manage water. Despite the abundance of literature on IWRM, achieving this goal is very difficult in practice. It is clear, however that water law must be considered as an integral part of the process.

Water law, particularly with its performance at the international level, has been relentlessly criticized in many circles for being vague, useless, and impotent. Yet, whenever a dispute arises at the local, national, or international level, water law has often been introduced as a panacea that can be used to design the framework for negotiations that will reach agreed settlements between competing stakeholders. It is also

argued that, by leveling the playing field for all stakeholders and permitting the consideration of all relevant factors, water law is a valuable instrument that provides the framework necessary to set the fundamental principles, priorities, approaches, and objectives of the integrated water resource management at the required level. Despite these merits associated with water law, poor communication between hydrologists (i.e., water scientists) and lawyers has been seen as a major impediment to setting and implementing robust policies and laws that encourage integrated water resources management.

Hence, this book is comprised of interdisciplinary research targeted at critically examining the operational interface between water law, policy, and science. The book originates from the Hydrology for the Environment, Life and Policy (HELP) initiative, which is a joint program of the U.N. Educational, Scientific and Cultural Organization (UNESCO) and the World Meteorological Organization led by the UNESCO International Hydrological Program. As the editors have delineated in the introductory chapter, HELP was initiated to fill an important gap: the marked absence of a comprehensive international hydrological program that addressed water issues and integrated these with policy, law, and management needs in the field at the catchment (i.e., river basin) scale. The HELP program has established an extensive global network of catchments; more than 100 river basins have been evaluated, and 67 of them have been identified as HELP basins.

The book comprises a collection of articles on selected river basins from around the world that are also known as HELP basins. This series of case studies is preceded by an introductory chapter in which the editors first identify the challenges linked with the effective management of the world's freshwater resources. Here, the figures illustrate a broad global picture of where the pressures on aquatic ecosystems may be the greatest now as well as in 2050. Secondly, in this opening chapter, the HELP initiative/program is introduced as an innovative response to improve the link between hydrology and the needs of society. Moreover, the eleven case studies presented in the book are summarized with a view to searching for a new methodology for engaging water scientists and lawyers so as to meet the needs of the catchment stakeholders. Thirdly, the chapter identifies a way forward—an operational methodology to facilitate the effective interface of water law, policy, and science so as to meet the global imperatives.

Eleven case studies represent a panorama of experiences from around the world, including transboundary river basins such as the Upper San Pedro Basin, the Great Lakes, the Aral Sea Basin, and the West Bank and Gaza, along with the national endeavors of developed and developing countries such as Australia, New Zealand, Scotland,

Ghana, Panama, Ecuador, and China to implement the IWRM approach, with specific emphasis on the interactions between hydrology and law.

The editors assert in the introductory chapter that these case studies are compiled and described to devise a new operational methodology for engaging water scientists and lawyers to respond to the needs of the basin communities. In view of that, the case studies are analyzed both in content as well as method to examine this linkage. Each chapter begins with a discussion on the physical characteristics of the international or national water resources. The salient features and the distinct characteristics of the basins are especially discussed. In this respect, some basins are subject to degradation of water quality (e.g., Murray-Darling), while others are facing ecological disasters (e.g., Aral Sea, Great Lakes). Others have experienced legal and institutional shortcomings recently and have passed water reforms in response (e.g., Panama, Ghana, Tarim). For instance: the chapter on the Tarim river basin in China demonstrates how hydrological information has facilitated the formulation of local and national regulations, and how important these data are for the future implementation of IWRM.

Discussion on the San Pedro international river basin displays an exemplary case of building bi-national (the United States and Mexico) policy and legal arrangements to address complex transboundary water issues particularly by means of scientific projects, including the HELP initiative. Yet, the need for greater engagement of a wide range of stakeholders, especially in Mexico, is identified as one of the impediments to improving water resources management across national borders. Similarly, the New Zealand experience highlights the importance of systematic compilation and use of hydrological data (spatial and temporal records of rainfall, river flows, aquifer levels, and water quality) for quantifying critical water management issues and deriving accepted policies and rules for water allocation and quality management.

The chapter on the Murray-Darling river basin begins with a brief discussion on the salinization problems within the agricultural areas. More importantly, the chapter delineates the environmental impacts of reduced flows in the river system and the federal as well as the state water laws that have emerged to address the problem. The authors provide a valuable critique of the current water laws and offer the revision of the Australian Federal Water Act, to have it more closely linked with state water acts in order to make greater progress in a catchment-wide approach to water management.

The Great Lakes case study demonstrates that the complex package of national legislation and international laws and policy affecting the management of the Great Lakes basin has responded

reasonably well to the rapid progression of the scientific and engineering research in the basin.

The Panama Canal case study describes the functions of the Panama Canal Authority (ACP) with its IWRM approach, which entails sound and complete scientific information and a comprehensive and appropriate legal framework as basic pillars.

The Scotland case provides an analytical framework for understanding the legal and policy challenges faced by European states in implementing the European Community Water Framework Directive (WFD). It is important to note that the Scottish Environment Protection Agency has already been determined as the body with primary responsibility for implementing the Directive. Despite the fact that this country does not face the pressures of arid regions of the developing nations or of nations with many contested shared river basins (e.g., West Bank and Gaza, Aral Sea), Scotland has been in a position of developing some elements of the river basin planning process practically from the beginning, with no comprehensive catchment planning and no comprehensive abstraction controls, which are all required by the WFD. Moreover, the chapter reveals that it is difficult to assess the extent of the emerging interdisciplinarity between law and hydrology or water sciences in Scottish water management in general.

Water management in Ecuador is presented with its weak institutional and organizational capacity in the relevant chapter. Yet, the two river basins in Ecuador are described as promising pilot sites where pollution problems associated with the banana industry are being addressed by using a combination of renewed efforts for data collection and modern Geographic Information System (GIS) tools.

The Ghana case illustrates how the water reform process in Ghana and international approaches toward transboundary IWRM in the Volta River basin have affected national, international, and transnational legal water regimes. Furthermore, the importance of a sound hydrological data basis for these efforts has been emphasized. This chapter also incorporates interesting discussions and criticisms on how transnational elements, namely the international donor community, became part of the Ghanaian water reform process by way of using loan conditionalities to induce the privatization of urban water supply systems.

The chapter on the Aral Sea basin describes the inter-state collaboration to implement IWRM. It is argued that collation and sharing of hydrological data and developing decision support models underpin the formulation and adoption of new inter-state multilateral agreements on regional water management. Yet, the chapter is not informative on whether these efforts are sufficient to mitigate the Aral Sea tragedy or not.

Almost no basin studied in the book represents a conflict-prone political situation with the exception of the West Bank and Gaza. Despite the desperate state of affairs that currently exists in the region due to the supply-induced scarcities (semi-arid area with over-exploited and polluted groundwater resources); demand-induced scarcities (a rapidly growing population of Palestinians and a continuous influx of Israeli settlers to the region); and, more important, structural scarcities (inequitable distribution and discriminatory allocation of the resources between Israeli settlements and Palestinian towns under the Israeli occupation since 1967), the author puts forward ambitious suggestions for achieving sustainable development in the water sector. However, the suggestion of the author to mobilize joint technical experts (i.e., lawyers, engineers, and economists) to enhance and improve international cooperation does not seem to be feasible without a conducive political climate in the region.

Even though the editors underline the significance of the HELP program in solving water issues in these selected basins, interestingly only two (the San Pedro and Aral Sea basins) out of eleven case studies presented in the book explicitly mention the contributions and the links to the HELP initiative. Nevertheless, almost all chapters in the book include descriptive or analytical subsections that demonstrate how the gaps between hydrology, water law, and management are actually bridged in practice.

From the case studies described above, it is observed that, despite the immense challenges in water resources management all around the world, IWRM is upheld and is actually evolving from theory to practice through a joint approach encompassing water science, law, and policy. Thus, the book's overall objective to operationalize a truly multidisciplinary approach to the effective management of national and international watercourses is noteworthy.

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Big Coal: The Dirty Secret Behind America's Energy Future. By Jeff Goodell. New York: Houghton Mifflin Co., 2006. Pp. 324, \$25.95.

Jeff Goodell builds his 2006 book *Big Coal: The Dirty Secret Behind America's Energy Future* on hands-on, non-academic research and enjoyable prose. Since Goodell is also a contributing editor at *Rolling Stone* and a contributor to *New York Times Magazine*, the book takes the same fast-paced, easy tone of good journalism, which makes the book a pleasure to read. Goodell builds the story around colorful characters but