

Prioritizing “No Significant Harm” over “Reasonable and Equitable” in Governance of Aquifers

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The concept of governance as the process by which decisions are made suggests that rather than defining institutional models or structures in advance (de Loë et al., 2009; Linton & Brooks, 2011; Plumptre, 2009;), the main focus should be on facilitating steps by which various stakeholders can participate in forging structures and rules appropriate to their particular circumstances. Regardless of whether the focus is surface water or groundwater, based on our experience it is critical that all co-basin states agree on a few principles for the use of water by all parties. With specific respect to transboundary aquifers, the Bellagio Draft Treaty (Hayton & Utton, 1989) describes eight factors, ranging from hydrogeological and meteorological considerations to comparative costs and alternative sources of supply that must be considered in defining equitable and reasonable in any specific case. Even this level of generality is qualified by noting that additional factors may also be considered, and by indicating that the weight given to any factor has to be determined by its importance relative to the importance of other factors.

A more useful approach than that reflected in the Bellagio Draft Treaty may lie with prior attention to political and social equity. Equity in some form is essential to negotiation and ultimate adoption of any agreement related to the governance of shared water resources (Rahaman, 2009a, 2009b; Wohlwend, 2001; Wolf, 1999). Rather than a simple quantitative sharing of water resources, a more nuanced form of equity is required in order to take into account what is politically acceptable to each side (Brooks & Trottier, 2012). Wolf (1999) reports that successful agreements for sharing water have generally proceeded as each side gradually recognizes the demands of the other side(s), rather than by establishing a priori principles or rights. Lautze and Giordano (2006) argue that most successful agreements favour a needs-based approach rather than a prior-use basis. They also find (2006) that international water agreements that appeal to principles of equity tend to be more successful because they generally include provisions important to a treaty's resilience, as with conflict resolution mechanisms.

Two principles of both transboundary aquifer management and transboundary aquifer governance have come to have pre-eminent positions in negotiations:

- In all operations to reduce as far as possible any significant harm to other portions of the aquifer and to other natural resources with which it is related.
- Ensure that use of the aquifer water is reasonable and equitable by comparison with other possible uses and other possible users.

To be sure, almost every word in these principles requires both definition in general and application to specific cases. However, taken together they go far toward providing operational meanings of political and social equity, and they now appear in almost all modern water treaties or conventions, whether for surface water or ground water. Other principles, such as priority to demand management and economic efficiency, are generally considered supplementary to or supportive of these two.

The development of two powerful principles for management and governance of water is a major achievement in international law. Unfortunately, there is little, if any, agreement on how to balance the two. Which gets priority, when and with what constraints? The International Institute for Sustainable Development (IISD) recognises the opportunity to resolve the dilemma of balancing reasonable and equitable use with the prevention of substantial harm by giving priority to the latter for one particularly important set of conditions.

Dr. Salman M. A. Salman was until recently lead counsel with the Legal Vice Presidency of the World Bank, and the bank's adviser on water law and on environmental and social policies. It is no exaggeration to say that he is the dean of researchers working on international water law. Dr. Salman devotes a large part of a 2007 article to concerns about balancing reasonable and equitable use with no significant harm in designing rules for internationally shared water. He shows how differing formulations of the text of proposed agreements and conventions seem to give priority to one or the other principle, or, as in the case of the Berlin rules, indicate that they have equal standing. He even suggests that the reluctance of many nations to sign the recent draft conventions on sharing transboundary water may stem from their concern about the ambiguity of this point.

Is there a way to avoid conflicts between two such important principles as reasonable and equitable use and avoidance of significant harm? Perhaps there is no way to avoid conflicts in general, but there may be in the case of aquifers, or at least transboundary aquifers. We believe that the principle of avoiding significant harm should take precedence over use that is reasonable and equitable. Indeed, giving priority to avoidance of significant harm may be essential to the continued value of the aquifer to ecological and human needs.

As can be established by even a cursory survey of the literature, one of the distinguishing features of aquifers by comparison with surface water bodies is their sensitivity to pollution, together with the near impossibility of decontamination. For example, overuse of an aquifer close to the sea or to other saline bodies of water may reduce water pressure in the aquifer to such a degree that salt water can penetrate the aquifer. In the least serious cases, the effect will be adverse changes in the quality of water pumped. In more serious cases, where the aquifer is made up of limestone or dolomite (as many are), gradual solution of the rock will decrease porosity and, in the worst cases, will destroy permeability. Any of these results is bound to reduce the value of aquifer water and, if the process continues, to render it useless. Reasonable and equitable use will cease to have any meaning if pumping becomes too expensive

because of blocked passages or if the pumped water is too saline for use.

Two specific cases can be mentioned: the Disi Aquifer, which lies under Saudi Arabia and Jordan, and the Ogallala Aquifer, which lies under several states in the United States.

The al-Disi Aquifer (information summarized from Long, 2003)

- The al-Disi aquifer is located in the Arabian peninsula and, although most of its mass lies underneath Saudi Arabia, a section also lies underneath Jordan. It is particularly valuable as it is made up of a permeable sandstone layer that lies between a pair of non-permeable layers that limit both evaporation and recharge. The aquifer was not subject to significant use in Jordan until efficient pumps were available to bring the water to Amman, nearly 1000 metres of the level of the aquifer in Jordan. In the meantime, aquifer water in both Jordan and Saudi Arabia was mainly used for irrigation of grain crops, a highly questionable use from an economic perspective. The full potential of the Disi Aquifer is still unknown, but it is known to be large enough to provide enough for the needs of Amman for many years. However, because the aquifer is not recharged and water it contains is 20,000-30,000 years old, it has to be considered as an interim solution for Amman. Since about 1980, both Jordan and Saudi Arabia began to use more accessible portions of the aquifer as a source of irrigation water for cereal crops, a highly questionable practice because of the cost. However, so long as one of the two countries was going to make use of the water, so too was the other. Unfortunately, there is no agreement between the two countries concerning the Disi and its usage. . . . Jordan has signed onto the U.N. Convention on Non-Navigational Uses of International Watercourses, the most relevant international agreement to the al-Disi. To date, Saudi Arabia has not signed the treaty, leaving the conflict unresolved and no negotiations expected for at least the next couple of years.

The Ogallala Aquifer (information summarized from an Iowa State University web page: www.meteor.iastate.edu/gccourse/issues/society/ogallala/ogallala.html)

- This aquifer underlies approximately 225,000 square miles of the Great Plains region, particularly in the High Plains of Texas, New Mexico, Oklahoma, Kansas, Colorado and Nebraska. The depth of the aquifer from the surface of the land, and its natural thickness, vary from region to region. The aquifer has long been a major source of water for agricultural, municipal and industrial development. Use of the aquifer began at the turn of the century, and since World War II reliance on it has steadily increased.
- The withdrawal of this groundwater has now greatly surpassed the aquifer's rate of natural recharge. The rates of drawdown and recharge of the aquifer vary from one locale to another. As a result, not all counties within a state or all states within the Ogallala region face the same degree of crisis. For example, Texas is being more concerned than Nebraska. As a result, in time we may see a Texas strategy or a southern High Plains strategy emerge as opposed to a six-state High Plains strategy being developed and pursued.
- The drawdown of the aquifer raises an important issue that permeates discussions about the social and political responses to global warming: discounting the future. Here is a good example of a choice that society must make: consume the groundwater resource today or conserve it for future generations when climate in the region might not be as favourable to agricultural production as it is today. At which time would the groundwater resource be of most value? And to whom? Today, other factors have slowed down the rate of drawdown, including relatively higher energy prices, low crop prices, large stockpiles of rain and so forth. Nevertheless, the issues of intergenerational equity should be addressed now when there is less pressure to decide one way or another.

There is a corollary to the conclusion that when dealing with aquifers the principle of reasonable and equitable use has to take second place to the principle of avoiding significant harm to neighbouring states or users. This corollary stems from the generally accepted observation that cooperative governance of transboundary aquifers depends on a process of mutual trust-building between the states involved. Happily, the joint benefits of avoiding significant harm are a lot easier to demonstrate and even quantify than are the benefits of reasonable and equitable use. This conclusion flows not only from the logic of cooperation and the importance of water, but also from much of the experience to date in governance of transboundary aquifers.

In conclusion, IISD believes that when dealing with aquifers, the principle of avoiding significant harm to neighbouring states or users should take precedence over that of insisting upon reasonable and equitable use.

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