ground water

Guest Editorial/

# The Silent Revolution of Intensive Ground Water Use: Pros and Cons

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In the 1970s, the word ''hydroschizophrenia'' was used to describe the attitude of decision makers, who played down the role of ground water relative to surface water resources. More than 30 years later, this situation has not changed. Take as an example the Ministerial Declaration signed by more than 100 ''Water Ministers'' at the Third World Water Forum (Kyoto, March 2003) in which ground water is not even mentioned.

While ignorance or unethical attitudes on the part of governmental water agencies have sometimes resulted in the neglect of ground water resources, a spectacular increase in the use of ground water for irrigation has taken place in the past decades, mainly in arid and semiarid countries. This development has occurred through the personal initiative of millions of farmers in pursuit of the socioeconomic benefits ground water can trigger. In that sense, intensive ground water use has been a kind of ''silent revolution.''

The total direct cost of abstracting ground water for irrigation is, in most cases, only a small fraction of the economic value of the crops obtained. Furthermore, advances in hydrogeology and well-drilling techniques as well as the invention of the submersible pump have significantly contributed to reduced costs of ground water abstraction. Even if the price of ground water is usually higher than that of surface water (which is often heavily subsidized), many farmers still prefer ground water because it tends to be easier to obtain. Besides, ground water also provides a valuable backup resource when surface water cannot be used, e.g., due to drought.

Another important benefit of ground water use is a positive effect on the social transition of many farming families. Low pumping costs, and mainly security against drought, have allowed poor farmers to progress into a middle-class status and enabled them to provide a better education for their children. Thus, after one generation, their children are trained as teachers and technicians, while those who continue as farmers have access to a better technology and grow cash crops that demand less water and result in a higher economic revenue.

Uncontrolled abstraction has sometimes led to problems; the most important of which is usually degradation of ground water quality. However, this problem is usually related to changes in land use rather than to ground water withdrawals per se. Other associated problems are excessive drawdown of ground water levels, land subsidence, reduction of springflow and base flow, and the degradation of ground water–dependent ecosystems.

Nevertheless, there are practically no documented cases where intensive ground water abstraction from medium or large aquifers has caused serious social or economic disturbances like those caused by soil waterlogging and salinization, or the serious social conflicts in relation to people displaced or ousted by the construction of large dams.

Social progress due to ground water development has in turn strengthened the capacity of farmers to form powerful lobbies with political clout, although the lobbies may not be concerned with ground water sustainability but with the short-term benefits. For instance, in India, electric energy necessary for pumping is heavily subsidized. The immediate consequence is that the technical irrigation efficiency in the field is lower than in places like Spain, where the subsidies for irrigation energy are minimal. In Spain, farmers' lobbies convinced the government that problems related to depleted aquifers need to be solved by importing surface water from other basins. Several demonstrations (over 300,000 participants) have taken place both for and against the transfer. In order to provide a solution to these problems and to bridge the gap between farmers and governmental agencies, the following suggestions, inspired by the Valencia Declaration (Valencia, Spain, December, 10–14, 2002; published in *Selected Papers on Intensive Use of Groundwater,* Sahuquillo et al., eds., 2004, Balkema Publishing Co., The Netherlands, p. 399–400) are suggested:

- Public Administrations must play a key role in the planning and integrated management of water resources but a ''command and control'' approach is not appropriate.
- Immediate ground water decision making must be performed by local ground water management institutions with active and democratic participation of all the users or stakeholders. It is essential to educate the stakeholders on the fundamental principles of ground water resources.

A universal solution does not exist. International organizations should recognize the diversity of the world's hydrogeological and socioeconomic situations. Unique regional and local conditions ultimately determine management objectives, the specific ground water management tools, and how the tools will be applied to achieve the objectives.

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