

Guest Editorial/

## Role of Ethics in Groundwater Management

by Jie Liu<sup>2</sup>, Maosheng Zhang<sup>2</sup>, and Chunmiao Zheng<sup>1,2</sup>

Researchers are now breaking traditional subject boundaries to embrace comprehensive and interdisciplinary studies. Ethics is a major branch of philosophy that is usually studied by social scientists. As an important sub-discipline of ethics, environmental (water) ethics defines a set of moral values that guide human interactions with natural resources (water). With the advance of interdisciplinary research, the role of ethics in groundwater management has drawn increasing interest from hydrogeologists.

As part of the UNESCO program “Ethics of Science,” a multidisciplinary research team consisting of hydrogeologists and social scientists from Peking University examined the ethical issues in the current groundwater management practices of Yulin Municipality, Shaanxi Province, China (Zheng, C., 2007, “Role of Ethics in Water Resource Management: Yulin, Shaanxi”, Report to UNESCO, Beijing). Yulin is a semiarid area in northwestern China with an annual rainfall of 300 to 500 mm. Yulin is typical of the surrounding region where surface water is limited and groundwater is relied upon heavily for water supplies. Yulin is also rich in coal and natural gas, and has become one of China’s major bases for energy and heavy chemical industries. There is an urgent need for new fresh water sources to support the booming economy and population growth. The competition among various water users exacerbates the water shortage and brings up ethical issues in water management practices. Diverting water from the Yellow River is one of the possible countermeasures to resolve the conflict between finite water resources and competitive water uses; however, this raises ethical questions, especially with respect to transboundary water transfer. The research team conducted field visits to Yulin and met with local water managers, stakeholders, and residents. By using questionnaires, holding roundtable discussions, and organizing workshops, the researchers identified the existing gaps, unequal or unjust practices in current water management, and provided policy recommendations aimed at propagating the principles of water ethics.

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From the Yulin case it is evident that water ethics is still a fuzzy concept for most people, and has not played a major direct role in current water development and management. Most people are unfamiliar with “water ethics,” even though ethical considerations have been reflected somewhat in water management practices and water-related studies unconsciously or with other motivations. Knowledge is the basis for making ethical decisions and judgments. At this stage, natural scientists play an important role by providing objective information. Broadly speaking and in the philosophical context of Aldo Leopold, a founder of environmental ethics who developed the concept of “the Land Ethic,” the ethical community should be expanded from a human dimension to include all living and possibly also inanimate components of the environment. Yet, this broad definition of ethics will increase ethical dilemmas because aggravated water scarcity and pollution will increase the conflict between human and environmental concerns.

At present, groundwater management is still pursued from a human-centric viewpoint, and water ethics is also defined in an anthropocentric way (Anderson, M.P., 2007, “Ground Water Ethics”, *Ground Water*, v. 45, no. 4). But humans are trying to preserve the resource for future generations and to avoid adverse effects such as land subsidence, sea water intrusion, and degradation of vegetation and water quality by advocating sustainable groundwater development. To be effective, water ethics should be incorporated into regulations. Conscientious enforcement of regulations can set the “rules of the game”; regulations can greatly enhance the power of water ethics. For example, in the United States, various laws regulate the discharge of pollutants to water and establish goals for water protection. Enforcement of such regulations results in better recognition of the intrinsic value of natural resources, and therefore can be very effective at promoting better environmental ethics (Remy Hennes, personal communication). Water managers and policy makers must take the lead to promote environmental ethics by adopting sound regulations and enforcing these regulations.

Water ethics is an important but frequently ignored element in water resources management. Changes in ethics of motivation, behavior, morals, and attitudes are a slow process; therefore, long-term education and communication are needed to increase awareness and adoption of water ethics.

**Editor’s Note:** Opinions expressed in the editorial column are those of the author(s) and not necessarily the NGWA.