

# Water Resources Management: Ensuring Water Security for Future Generations



Inefficient management of water impacts all aspects of human life, ecosystem health, and economic activity. Expanding populations, economic growth, climate change, and environmental contamination are putting ever-greater stress on water resources. For any society to grow and thrive, it must manage its water resources skillfully. This requires government, businesses, other institutions, and individual citizens to use water efficiently and wisely; protect water quality; collaborate with neighboring states to manage shared resources; and maintain well-designed monitoring and research programs.

RTI International offers unique capabilities, tools, and project experience to support improvements in water resources management in developing countries. For over 50 years, our multidisciplinary team of professionals have applied skills in engineering, hydrology, economics, anthropology, health, governance, agriculture and animal sciences, geographic information systems (GIS), and other disciplines to successfully implement water management projects. We support integrated water resources management (IWRM) approaches and have extensive experience in the areas detailed below.

## River Basin Planning (RBP)

Comprehensive RBP is an essential process for promoting long-term protection and sustainable use of water resources through adaptive management. Well-developed plans assess the current condition of water resources, document water uses, and set environmental objectives. They allow flexibility in the future use of water resources within a context of responsible economic and social development and ensure accountability through participatory monitoring.

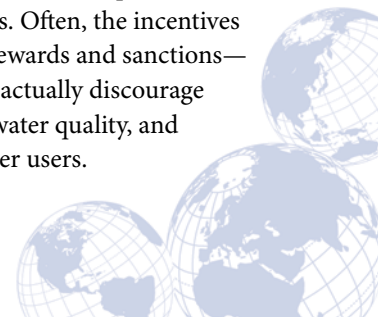
RTI's RBP tool uses a 10-step process modeled after the European Union's Water Framework Directive, with

modifications designed for use in developing countries. The process accommodates less complete data and allows flexibility for adapting to a broad set of current conditions. It supports integrated analysis of water quality and quantity, surface and ground water, and all water uses, including water to preserve ecosystem integrity and services. RTI uses the planning tool in a participatory approach that involves all key stakeholders.

The recent efforts of an RTI expert in Armenia, Azerbaijan, and Georgia supported adoption of an agreed river basin management strategy that reflects an IWRM approach, including coordination and data sharing among the three riparian countries.

## Water Governance

The challenges for good water governance are to reconcile the conflicting demands of water users, establish order in the relations among stakeholders, minimize potential conflicts and maximize mutual gains. Often, the incentives created by law and practice—both rewards and sanctions—have unintended consequences and actually discourage efficient use of water, protection of water quality, and cooperative engagement among water users.



RTI has developed a practical method—the Water Resources Incentive Compatibility Analysis—to help stakeholders evaluate the compatibility of current incentives in a country’s water sector, with the overall goals of IWRM and the country’s specific national water strategy. The analysis produces a template for effective dialogue on needed changes to water sector policies and incentives. The tool includes the following four steps:

1. documenting IWRM goals and objectives
2. determining the essential services and service relations within the network of stakeholders
3. identifying the governance mechanisms currently applied to order those relations
4. assessing the effectiveness of current incentives for producing the desired behaviors and achieving the IWRM goals and objectives.

Another critical factor in water governance is the locus of authorities and liabilities for operating water systems. In many countries, water user associations (WUAs) are the primary institutions for managing irrigation systems. However, most WUAs are underperforming and many are inactive for lack of internal capacity, sustainable revenue, and a supportive external environment. RTI has extensive experience helping WUAs improve their functional capacities, from managing productive dialogue with governments and service entities; holding regular membership and management meetings; and keeping proper records, to formulating annual activity plans; collecting water users’ fees; and developing secondary WUA federations at the subnational and national levels.

RTI also works directly with governments to help create a transparent and comprehensive environment of support, opportunity, and incentives for irrigation WUAs and water supply user associations. Our technical assistance includes reforms in agency duties, new roles for the private sector, rehabilitation of irrigation systems, financing mechanisms for improving on-farm systems, and instituting new regulations and social marketing to promote rational pricing of water and electricity.

In Nepal, an RTI study of household demand for improved water services became a valuable resource to the South Asian Water and Sanitation Program, Private Sector Participation Committee, and World Bank in developing recommendations and guidelines for water tariffs to be implemented by the Government of Nepal.

## Water Monitoring, Data Management, Modeling and Research

RTI has advanced capabilities for water monitoring, data management, water quality and runoff modeling, and landscape analysis used within the context of decision support systems. We develop functional database systems and GIS that are vital for monitoring and assessment programs and for developing indicators to track the progress of water quality management programs.

RTI has over 20 years’ experience working with the U.S. Environmental Protection Agency and the U.S. Geological Survey to develop and apply the U.S. National Hydrography Dataset (NHD), a national resource used by federal, state, and local governments; universities; research institutes; companies; and NGOs for water quality and water quantity modeling.

In China, RTI helped establish a sustainable integrated water management system in Hebei Province through workshops with the Chinese Ministry of Water Resources and the State Environmental Protection Administration. RTI explained the data structure, standards, and use of the NHD, and made recommendations to construct a database model in the province.

For the Inter-American Development Bank (IADB), RTI is developing an integrated modeling system for evaluating the potential impacts of global climate change on water availability. The model will help IADB staff and member countries anticipate future conditions to which new water supply, wastewater treatment, and irrigation projects must adapt.

In addition, we have experience analyzing links between surface water, groundwater, and air deposition issues involving conventional pollutants, such as nitrogen and hazardous air pollutants. We apply economic cost-benefit analysis approaches to develop valuation measures for major ecosystem services to help decision makers select effective management alternatives. We have an impressive track record helping to develop, manage, and protect groundwater resources by providing valuable tools and advisory support to clients, including municipalities, utilities, industrial facilities, regional water authorities, and economic development agencies.

### More Information

Robert Cardinali  
Water and Environment for Development

RTI International

+1.571.232.7894

[rcardinalli@rti.org](mailto:rcardinalli@rti.org)

[www.rti.org/idg](http://www.rti.org/idg)

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