

# Water and Health



The United Nation's Millennium Development Goals highlight water, sanitation, and hygiene as priority issues threatening the human condition worldwide. Consistent with our mission, improving the human condition by turning knowledge into practice, RTI International is tackling global water and sanitation challenges using multi-sector expertise, including public and environmental health, epidemiology, engineering and statistics, risk assessment, geographic information systems (GIS), social behavior, technology development, community development and education, economics, and public policy.

## Public and Environmental Health

For more than 30 years RTI has supported the development of regulatory and non-regulatory standards that protect public health and the environment. Drawing from our diverse skillset, we help local, regional, and national governments assess and manage traditional and emerging environmental issues that affect human health. Our experience includes

- Providing water and sanitation planning, utility management, local government service delivery and financing, and environmental health and water resource management support
- Helping governments develop and review environmental policies, conduct environmental risk and economic assessments, and evaluate and measure willingness to pay
- Improving water and waste management, recycling, and remediation technologies
- Developing methods and performing modeling and monitoring to assess baseline conditions and evaluate mitigation strategies to minimize exposure and risk.

## Health Technologies

Creating new health interventions that address unmet needs in the developing world is critical for improving global health. RTI provides an infrastructure to help our clients design and implement product development programs, including

- Performing product assessment and developing commercialization strategies
- Developing tailored product development strategies that are appropriate and feasible
- Performing social, economic, and behavioral research
- Conducting measurement and evaluation of product performance.

## Epidemiology and Special Populations Research

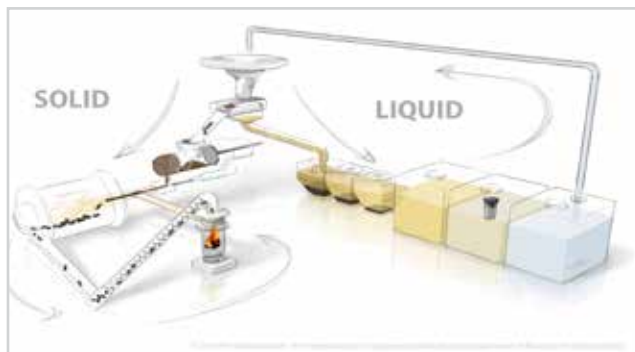
RTI's research programs are directed at populations that may bear a disproportionate burden of disease and injury or may face social, economic, or institutional barriers to accessing health-related services. Our expertise includes

- Managing data collection centers for complex multinational studies
- Conducting community-based health research, which has led to the development of innovative methods to study marginalized and hard-to-reach populations
- Coordinating complex multisite studies, randomized clinical trials, and research networks
- Designing and developing surveys across a range of focus areas, including military health and disease control registries
- Collecting, processing, and storing biospecimens.

## Project Highlights

### Sustainable Sanitation

RTI is working to address sanitation solutions through the development of a better toilet and an on-site sanitation treatment system under the Bill and Melinda Gates Foundation's Reinvent the Toilet Challenge. RTI is developing a toilet that converts human waste into burnable fuel, stored energy, and disinfected, non-potable water. The system is designed as a closed loop, applying technology that treats and reuses the liquids and generates power for the system through the combustion process. The system will not require piped-in water, a sewer connection, or outside electricity.



## Sanitation Technology Platform (STeP)

STeP was established to provide private- and public-sector partners with a broad array of services to support development and launch of new sanitation technologies by streamlining and de-risking field testing and commercialization. For partners, STeP is field-testing prototype technologies through hands-on, in-country logistics and management, as well as integrating market intelligence, user insights, and technology transfer in the business planning and commercialization process.

## Optimal Non-Revenue Water Management

Without access to safe water, 1.5 million children die from diarrhea each year. Meanwhile, ~45 million cubic meters of clean water are lost per day from pipe leaks, and 35 million cubic meters per day are not paid for. Better management of these losses could increase the number of households receiving safe water, produce positive health and economic benefits, and improve service sustainability. RTI recently developed a computer model to assist utility managers, regulators, ministries, and donors in determining optimal water losses and to plan loss reduction programs. The model provides valuable guidance for increasing revenue, which can be used to finance expanding coverage of water and sanitation services in developing countries.



### Community-Based Sanitation

RTI is addressing the sanitation crisis in Indonesia through a decentralized approach to wastewater treatment in the city of Tangerang, just outside of metropolitan Jakarta. Through a simple and efficient community-based planning process, and a training program for local masons, toilets and community wash facilities with proper wastewater treatment have been installed. The project follows the community sanitation, or SANIMAS approach, a well-proven model in Indonesia. This program takes the SANIMAS approach one step further by combining community-based sanitation initiatives with simultaneous hygiene promotion programs for schools. The newly trained masons provide a skilled workforce for scaling up and replicating in other areas of their community.

### USAID Millennium Water and Sanitation Program

RTI led a consortium to implement the 5-year USAID/PEPAM Program (2009–2014), which sought to improve sustainable access to water supply and sanitation (WSS) and promote better hygiene in targeted rural and peri-urban areas of Senegal. Through an integrated approach, USAID/PEPAM's five components sustainably address the challenges of improved water and sanitation—by educating rural populations to improve their hygiene practices, setting up a support framework for local governments, and training local businesses and management committees to meet the demand for installation and maintenance of WSS infrastructure.

### Public Health Protection at Recreational Beaches

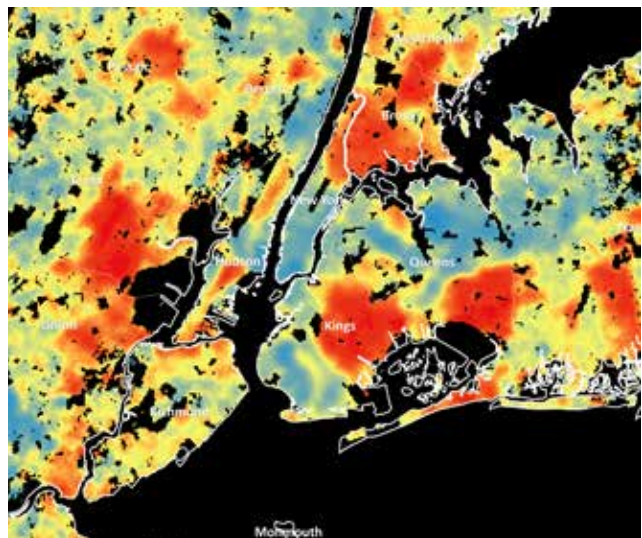
RTI provides technical support to the United Arab Emirates to perform field-based research, stakeholder outreach, and policy development to help protect public health at their numerous beaches. This rapidly developing country located along the Arabian Gulf derives great value from the coastal waters, including tourism at the beaches. RTI has performed intensive pilot studies to gather baseline data and developed recommended recreational beach monitoring guidelines and standards for microbiological indicators of contamination in marine waters. RTI also leads and facilitates a technical working group of stakeholders to identify and address key issues inhibiting implementation of robust monitoring and response programs.

### Food Safety Risks from Farm to Fork

RTI is assisting the Food and Drug Administration (FDA) in developing applications and models and performing systems analysis to prioritize and characterize food safety risks (e.g., contamination from irrigation water) and support decision making around food safety. FDA will use these methods to better understand food-related threats to public health, identify research priorities, and select optimal strategies to achieve the greatest reduction in health risks throughout the life cycle of a food product from farm to fork. RTI developed the Quantitative Predictive Risk Assessment Model to predict and characterize exposure and risks from consumption of fresh produce.

### RTI Synthetic Household Population™ Modeling

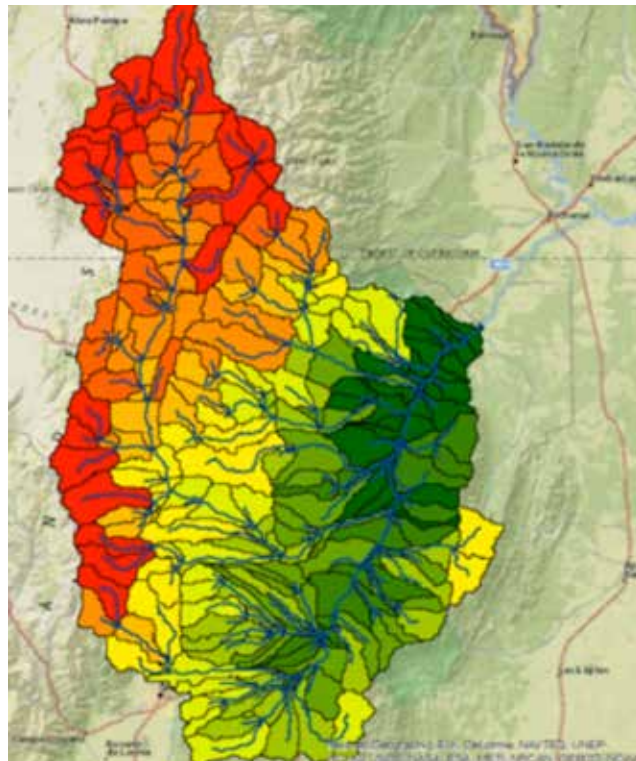
RTI uses GIS-based tools to analyze the geospatial nature of risk and to visualize risk through space and time. RTI developed a synthesized, geospatially explicit, human agent database that represents the U.S. population (“synthetic population”). Agent-based models simulate large-scale social systems and assign behaviors and activities to “agents” (individuals) within the population being modeled, and allow them to interact with the environment and each other in complex simulations. The RTI U.S. Synthetic Population allows users to explore various scenarios, including planning for emergency response, assessing environmental exposures, calculating the effects of public health interventions, and optimizing the distribution of resources. In one application, RTI overlaid synthetic population data with ground water modeling results to provide a powerful visual to depict the population at risk, for example, from a contamination event.





### Analytical Hydrography Dataset (AHD)

Climate change and population growth are exacerbating access to and the availability of fresh water. To support optimal decision making about current and future water resource allocation, RTI developed a global data series known as the Analytical Hydrography Dataset. AHD serves as a source of connected surface water hydrography containing detailed stream flowlines and linked polygon catchments to enable complex regional water modeling anywhere in the world. AHD's data production methods allow for the creation of stream segments and linked catchments at a consistent and high-resolution scale across continental areas. RTI has completed AHD for Latin America, the Caribbean, and Asia.



### Integrated Water Resources Management (IWRM)

In the face of a changing climate and increasing demands on water resources, there is a growing need to simulate how water resources will be affected by natural or anthropogenic events. RTI designs and implements IWRM plans to help solve global water challenges. Focus areas include watershed modeling; hydro-economic analysis; adaptive water quality assessment; and capacity building for sustainable water supply, sanitation, and hygiene services. RTI has developed an innovative hydrologic model called the Watershed Flow and Allocation model, or WaterFALL®.

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#### More Information

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