There is hardly a day when news items do not cover water as an issue of survival. The news items deal with many issues such as the supply of fresh water in any of the world’s regions; problems with contamination of water with pathogens such as salmonella or e-coli or other forms of deadly pathogens; draughts or floods due to environmental change; water scarcity and health issues and the widely divergent price of water in its many different forms.

One thing is for sure: we need to conserve and to utilize new technologies for solving our problems in areas such as desalination, waste water treatments and to stop contamination in areas such as faulty waste disposal, releases of industrial pollutants, fertilizer runoff and the influx of salt water into aquifers.

We can make sure that our water is used for its best potential use by applying good economic principles such as economic comparative advantage to produce agricultural and industrial products in areas where comparative water usage is in the globe’s favor. Water prices might have to reflect the realities of demand and supply while everyone’s access to water.

So how do we balance these issues? This issue is the result of a conference, Water Innovation, Technology and Sustainability (WITS 2009) that was held in November 2009 in Manaus, Brazil to examine questions such as:

1) The Application of Technology to preserve and conserve. One of the papers in the conference presented the idea of a technology that can measure leakage and address it to conserve water.

2) Papers at the conference covered technologies that sense pollutants and manage systems that can identify pinpoint sources and remove the threat of pollutants whether they are chemical waste or nitrates from fertilizers causing the blue baby syndrome.

3) Innovation where we can use new methods such as bio de-nitrification of water using bacteria to consume the nitrates from the water.

4) In all of these cases, the economics need to work. We need to provide water for people but we also need to make sure that we have the right mix of activities in conservation, monitoring, removal of salt, removal of chemicals and other ways to have a larger supply of clean water.

At different levels of economic development we have different water issues. At the developing stage, water is needed for survival and basic needs. At the semi developed stage, water is needed for basic needs and economic development issues. When we get to the developed stage, it is the ultra pure water needed for
semiconductor and clean manufacturing operations that is a key ingredient. Although needs are different at different levels, technology to sustain activities that require water is essential.

The conference focused on water stress as one of today’s most pressing global issues. In the past fifty years, the global population has doubled, however demand for water has expanded three times. Water is a resource that is essential for economic development, and survival in the developed, emerging and developing economies. Fortune magazine (May 15, 2005) stated that “Water promises to be to the 21st century what oil was to the 20th century: the precious commodity that determines the wealth of nations”. Water is the commonest commodity on earth, however, 97% is seawater, 2% is found in glaciers, ice, and snow, and only 1% is actually available.

In the near future, more than ever, technology and innovation will play a major role in reducing water stress around the globe and in increasing the productivity of water use. Although different groups of nations, depending on their level of economic & social development, face different levels of water stress, it is clear that innovation and technology play a major role in addressing water issues in their respective nations. The conference tried to address the role of technology and innovation affecting the five dimensions of the water diamond: safety, quality, security, availability, and sustainability.

Water management will play a vital role in countries’ economies as water sees multiple uses, from manufacture, health care, agricultural, energy, to urban centers. New technologies may lead to increases in the productivity of water usage, reuse of industrial and wastewater, water-saving technologies, desalinization, among other technological and innovative impacts. These innovative and technical solutions for water involve many different approaches that will have to be developed to fit the needs of different economic and business environments.

The conference was organized in different tracks, addressing the impact of innovation and technology on the different dimensions of the water diamond model and focused on issues such as:

- Global Warming & Water Resources
- Exploration of Megawatersheds
- Remediation of Groundwater
- Pollution Prevention
- Produced Water Treatment
- Environmental Management
- Energy Production & Power Generation
- Water Stress and Water Efficiency
- Industrial, agricultural, mining, oil & gas, use and remediation
- Leisure Activities
- Identification and removal of pathogens (arsenic, potential security threats, etc)
- Desalination and other forms of remediation
- Industrial pollution and cleanup
- Economics of water
- Availability, safety, security, and sustainability of water
- Financing technological/innovative solutions for water projects
- Sanitation
- Disease control
- Health Care issues
- Economic development

These issues are important for the world community and to many research and scientific organizations in general. The ability to create new methods to solve these problems in a technologically feasible yet economically viable way will insure world health and stability.

In this issue we have papers by Novelli, Vianello and Weimin entitled “New Developments in Real-time Kinematic Water Quality Monitoring of Lakes and River Basins,” where they apply the measurement system first developed for the Lagoon of Venice to many other water bodies. The AQUARIUS system can handle monitoring for issues such as safety control of freshwater reservoirs, assessment of the impact of urban and agriculture use on inland waters and an early warning detection of man-made accidents.

Another paper by Cakmak entitled “Irrigation Management and Water pricing in Turkey,” describes the stress caused by using 75% of the water resources on agriculture and the transfer from a governmental system of allocations to one managed by the farmers. Cakmak recom-
mends the use of pricing mechanisms that reflect scarcity value of water.

The paper by Bessa and Brasil entitled “Integrated Strategy of Water Quality Monitoring and Simulation for Amazon Reservoirs” describes the use of simulation modeling coupled with monitoring systems to understand the pressures faced by Brazilian reservoirs in the Amazon region.

deGouvea and Kassicieh’s paper entitled “Building an Eco-Innovation Cluster: Water Cluster in the Brazilian Amazon Region which examined the effect of water on economic development. The paper develops a model that link sustainability to safety, security, availability and quality. It suggests a water cluster in the Amazon region that is an example of the type of sustainable development that impacts water availability as well as economic development in a region.

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Elias Carayannis
Editor-in-Chief
IJSESD

Raul De Gouvea
Sul Kassicieh
Guest Editors
IJSESD