



## **Water challenges of the future; how scientific understanding can help**

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Demands for water resources are diverse and are increasing as human populations grow and become more concentrated in urban areas and as economies develop. Water is essential for many uses including the basic human needs of food and the maintenance of good health, for many industries and the creation of electrical energy and as vital for the sustenance of the natural ecosystems on which all life is dependent.

At the same time threats from water – floods, droughts – are increasing with these extreme events becoming more common and more intense in many regions of the world and as more people locate in flood- and drought-prone regions.

In general, the challenges for water managers are thus becoming greater; managers not only are having to make increasingly difficult decisions regarding allocation of water resources between competing uses as demand outstrips supply, but they also have to take measures to protect societies from the ravages of extreme events. The intensity of the challenges facing water managers is not uniform throughout the world – many nations in the less developed world experiencing far greater problems than most highly developed nations – but the trend towards greater challenges is clear.

Decision-makers, whether at the international, national, provincial or local level benefit from reliable information on water resources. They need information on the availability in quantity and quality of water from a variety of sources – surface waters, aquifers or from artificial sources such as re-cycling of wastewater and desalination techniques. Managers also need reliable predictions on water availability for the various uses to which water is put – such predictions are needed on time scales from weeks to decades to inform decision-making. Predictions are also needed on the probabilities of occurrence of extreme events.

Thus hydrological scientists developing predictive models and working within a fast-changing world have much to contribute to the needs of society.