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Editorial

Scarcity on a Water Planet

For many in the environmental research community, the first week of December 2008 focused on the International Conference on "Water Scarcity, Global Changes, and Groundwater Management Responses" convened by the United Nations Educational, Social and Cultural Organization, the University of California, Irvine, and the United States Geological Survey. The conference theme was "Water Unifies, as if to negate the prevailing sentiment among certain sectors that water scarcity will be responsible for the "fourth world war" (http://www.waterunifies.com/). The conference was attended by scientists and policy makers (from more than 55 countries) who marveled, debated, argued, and contemplated topics ranging from governance for sustainability to education and capacity development, and public health impacts. The program culminated in the "Irvine Action Framework" to promote the necessity of moving from knowledge to demonstrable impact to reduce the current and impending global water crisis. The main question is why are we talking about a "crisis" on a planet dominated by water?

It is well established that approximately 70% of planet Earth's surface area is under water. However, humans as well as most organisms are very picky about the quality of water that we can use directly for normal growth and development. As it turns out, only 2.5% of the 1.386×10^9 km^3 of water on Earth is freshwater, suitable for drinking, but then, not all of this freshwater can be used directly, as more than two-thirds of freshwater is frozen in the polar regions. What is not frozen is bound in soil moisture and aquifers where it is relatively expensive to produce. After we account for inaccessibility, less than 0.1% of Earth's water is directly usable. Unfortunately, this scarce resource is not evenly distributed on the land, and not necessarily where people want to live. So, we end up with a huge burden of disease associated with water quantity and quality. Inadequate water supply and wastewater management is possibly the single most solvable category of environmental burden of morbidity and mortality in the world today. Environmental science and technology researchers and engineers have made tremendous progress in water production and purification. Yet, more than 1 billion people alive today lack access to safe water. This translates into more than 2 million deaths and 3 billion cases of illness every year, mostly among children younger than 5 years. If we do not take action to correct the situation now, it will get worse, with projections that more than two-thirds of the human population will be living under significant water stress by 2025 (Figures 1 and 2).

According to the International Water Management Institute and most participants in the Irvine conference, we already have the necessary tools and resources to deal with the situation of water scarcity and poor quality. We must, however, deploy these tools effectively to reach the most vulnerable populations. Or we work to invent local solutions that do not need sophisticated technology transfers, or the a priori blessings financial organizations that may want to extract blood in exchange for providing water. Desalinization is an option that could be available to many countries on the ocean-surrounded African continent. But, first and foremost is better management of water resources already available in places with adequate rainfall, extensive run-off systems, and aquifers. The situation in Africa is particularly urgent, as numerous pressures of industrial development, population growth, and political management combine to exert a serious toll on public health. We must relieve the pressures at all points, but we must also prioritize the implementation of solutions that rely only on effective translation of available science and technologies into an abundance of clean freshwater.

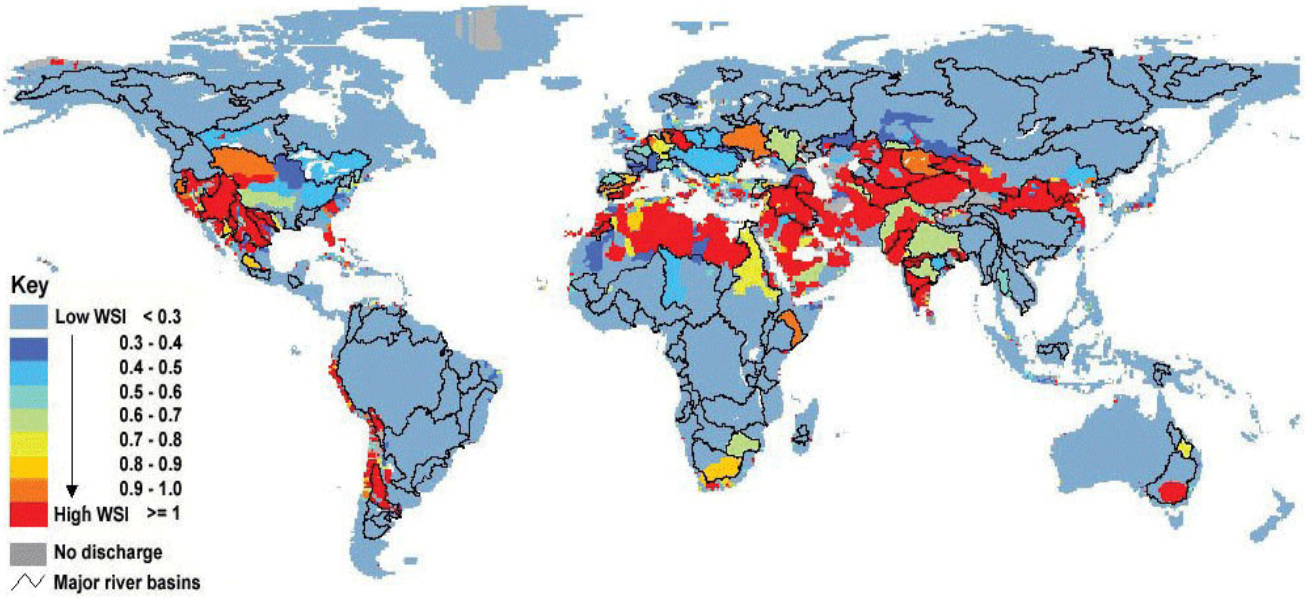

Figure 1. World map of Water Stress Indicator (WSI), which takes into consideration the amount of water needed for ecosystem sustainability. Map reproduced by courtesy of the Consultative Group on International Agricultural Research (CGIAR) http://www.cgiar.org/enews/june2007/story_12.html .

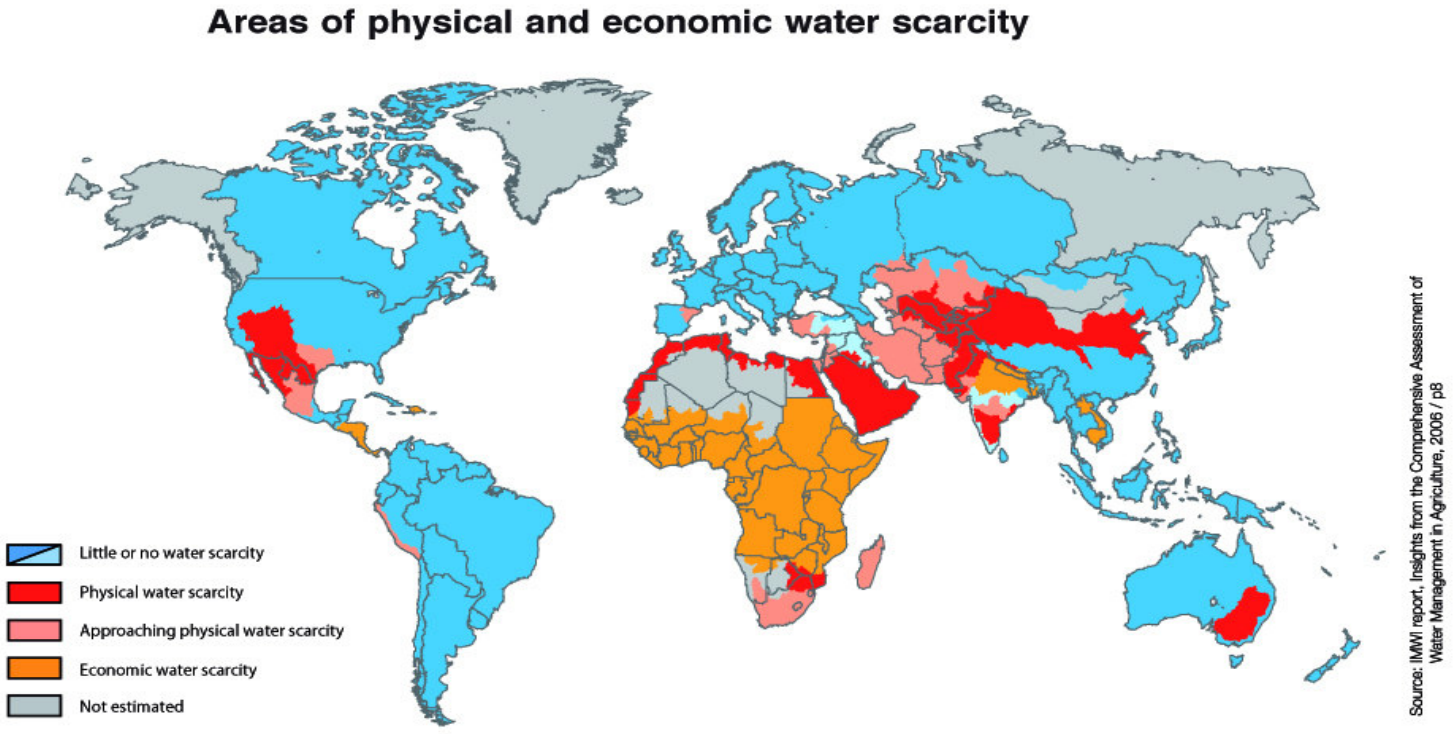

Figure 2. Global map of water scarcity based on physical and/or economic constraints. Map by courtesy of the International Water Management Institute (IWMI), which is one of fifteen international research centers supported by the Consultative Group on International Agricultural Research (CGIAR). The institute has offices in 12 countries across Asia and Africa (http://www.iwmi.cgiar.org/index.aspx).

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