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## Foreword

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**Biographical notes:** Olli Varis from Aalto University, Finland, has a broad and interdisciplinary experience on water, environment and development research and consultation. His research and teaching concentrates on sustainable development, environmental and social impacts of water policies and integrated water resources management in developing countries.

Human activities have disturbed the water cycle in massive ways in the past, but never as much as today. Where we are now is, however, just an overture to what will come in coming decades. Many of the mighty rivers such as the Yellow River or the Indus do not bring much water to the seas any more. Groundwater aquifers are being overdrawn with alarming rates. The water quality problems of surface and groundwater are growing increasingly severe. Land use changes and climate factors cause the increase of damage and calamity due to floods, storms and droughts. With increasing urbanisation and congestion of people to very small land areas, the above problems as how they are created and felt by humans are notably amplified. Already over one billion people are living in slums neither having appropriate water and sanitation services nor other prerequisites for decent everyday life.

Everybody agrees that water supply and safe sanitation are critically important in everyday welfare, dignity and security. Whereas those are of crucial importance, water is intertwined in the daily life of humans in many other crucial and very basic functions, too, both in rural and urban areas.

The importance of water and sanitation as drivers for health, food security and quality of life and as a pillar for economic development is unique. As water affects human lives, the human kind also effects the hydrological cycle of this planet, in all dimensions from the very local to the global scale. The production of 1 kg of grain consumes 1,000–4,000 L of water. Food production – although not being enough for all – already accounts for 90% of water use in the developing world. Increasingly, agriculture is competing from water allocations with swelling urban and industrial uses, not to talk about the massively growing pressure from the direction of the energy sector. Hydropower production by damming rivers evokes grand emotions; yet sustainable energy production is among cornerstones of economic development. According to the World Energy Council, 96% of the renewable energy production occurs currently either in hydropower plants or by combusting of biomass and biofuels: these both sources of energy are deeply linked to water. The damage caused by floods and droughts is escalating, particularly, in the Asian continent. The human impact on ecosystems is catastrophic in immeasurable ways. Water is largely a political good since a bulk of the human kind lives in river basins shared by two or more nations.

Water is a backbone of economy in very many countries of the world. Water resources management provides the foundation of the agricultural sector, much of the energy sector, an important part of urban infrastructure, healthcare and many other functions of the society. Economic growth is desperately needed in poverty reduction, but growth alone is not sufficient. The well-being must reach the poor, otherwise the growth only polarises the economies.

The urbanising societies are hungry for ever more food and thirsty for water and water consuming goods. In addition, the waste that used to be largely a resource in traditional livelihoods now grows in bulks and pollutes the environment in an unprecedented manner. In traditional agricultural societies, it was enough to produce food for the farmers themselves plus a modest surplus for the market. Now, half of the world's population is already urban, and the food reaches those mainly through markets. After less than a generation from now, already two-thirds of the population will be urban, and the agricultural intensification and the importance of markets keep soaring.

As if these human-influenced changes would not already be enough, changing climate is modifying the availability and predictability of water around the world. The role of water circulation in the climatic system is unique, and the impacts of climate change come very much through the water system. Changing rainfalls, storm occurrences, dry spells, floods, rise in the sea level and melting glaciers are all examples of these.

Given water's crosscutting role in the development of societies as well as in the shaping of decent quality of everyday life of people, water is a target of soaring demand and equally mounting rivalries, degradation and pollution. It is not surprising that water has become a very political subject throughout the planet. It is increasingly a contested, combated, conflicted and luckily also cooperated natural resource. Nobody damages nor overuses water for fun – everybody has a reason. Pressures and needs are many and huge, yet much could be improved and should be improved to reach a more secure and sustainable human society on this planet.

This Special Issue draws together a highly valuable set of analyses on the role of developments in river basin organisations, on international water law and water use agreements from an assortment of conflict-prone cases from different parts of the world. The analyses show ways to mitigate conflicts, tensions and rivalries through improved water governance and enhanced institutional development, particularly in an international setting, and build up security, peace and sustainability.