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WWDR4 – Background Information Brief

Global water resources under increasing pressure from rapidly growing demands and climate change, according to new UN World Water Development Report

As demand for water increases across the globe, the availability of fresh water in many regions is likely to decrease because of climate change, warns the latest edition of the United Nations' World Water Development Report (WWDR4). It predicts that these pressures will exacerbate economic disparities between certain countries, as well as between sectors or regions within countries. Much of the burden, it says, is likely to fall on the poor.

Demand for water increasing dramatically in all major use sectors

The demand for water originates from four main sources, namely, agriculture, production of energy, industrial uses and human consumption.

Production of crops and livestock is water-intensive, and agriculture alone accounts for 70% of all water withdrawn by the combined agriculture, municipal and industrial (including energy) sectors. The booming demand for livestock products in particular is increasing the demand for water. The global demand for food is expected to increase by 70% by 2050.

However, according to the Report, the main challenge the world now faces is not as much growing the 70% additional food in 40 years, but making 70% more food available on the plate. Best estimates of future global agricultural water consumption (including both rainfed and irrigated agriculture), are of an increase of about 19% by 2050, but this could be much higher if crop yields and the efficiency of agricultural production do not improve dramatically. Much of the increase in irrigation will be in regions already suffering from scarcity of water. Responsible agricultural water management will make a major contribution to future global water security.

All sources of energy and electricity require water in their production processes: the extraction of raw materials, cooling in thermal processes, in cleaning processes, cultivation of crops for biofuels, and powering turbines to generate hydroelectricity. Already, over one billion people lack access to electricity and other clean sources of energy. Global energy consumption is expected to increase by about 50% between now and 2035 due to population growth and increasing economic activity, with non-OECD countries accounting for 84% of this increase.

Programme Office on
Global Water Assessment,
Division of Water Sciences, UNESCO
Villa la Colombella
Località Colombella Alta
06134, Colombella, Perugia, Italy

Office tel.: +39 075 591 10 11
Fax: +39 075 591 33 23 / 075 691 96 67
www.unesco.org/water/wwap

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Water is an integral part of many industrial processes and increasing demand for water for industrial uses will result from increasing economic activity. 'Virtual water' (also known as embedded water) refers to the volume of water used in the production of a good or service, and it is through the billions of tonnes of food and other products that are traded globally that countries inadvertently partake in water trading.

As regards human consumption, the main source of demand comes from urban communities requiring water for drinking, sanitation and drainage. The urban population of the world is forecast to grow to 6.3 billion people in 2050 from 3.4 billion in 2009, representing both population growth and net migration from countryside to city. There is already a backlog of unserved urban populations, and the number of people in cities who lack access to improved water supply and sanitation is estimated to have grown some 20% since the Millennium Development Goals were established.

Nearly 1 billion people still do not have access to improved sources of drinking water and there are more people without access to tap water in cities today than there were at the end of the 1990s. In addition, 1.4 billion people do not have electricity in their homes, and nearly 1 billion suffer from malnutrition. As reported in 2010, 2.6 billion people in the world did not have access to improved sanitation facilities. Of the approximately 1.3 billion people who gained access to improved sanitation during the period 1990–2008, 64% live in urban areas. However, urban areas, although better served than rural areas, are struggling to keep up with urban population growth. Although there has been progress in achieving some of the water-related Millennium Development Goals (MDGs) in certain countries and regions, much work remains, particularly to address the special needs of the most vulnerable members of society – women and children – who bear the brunt of poverty worldwide.

Water and Climate change

Water is the primary medium through which climate change influences Earth's ecosystem and thus the livelihood and well-being of societies.

Global climate change is expected to exacerbate current and future stresses on water resources from population growth and land use, and increase the frequency and severity of droughts and floods.

It is anticipated that climate change will affect the availability of water resources through changes in rainfall distribution, soil moisture, glacier and ice/snow melt, and river and groundwater flows.

Water-related hazards account for 90% of all natural hazards and their frequency and intensity is generally rising, with serious consequences on the economic development. Between 1990 and 2000, natural disasters in several developing countries had caused damage representing between 2 and 15% of their annual GDP.

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For instance, South Asia and Southern Africa are predicted to be the most vulnerable regions to climate change-related food shortages by 2030. Water stress is also expected to increase in central and southern Europe and by the 2070s, the number of people affected will rise from 28 million to 44 million. Summer flows are likely to drop by up to 80% in southern Europe and some part of central and Eastern Europe.

The cost of adapting to the impact of a 2°C rise in global average temperature could range from US$70 to US$100 billion per year between 2020 and 2050. Of these costs, between US$13.7 billion (drier scenario) and US$19.2 billion (wetter scenario) will be related the water sector, predominantly through water supply and flood management.

Variability and uncertainty of water supplies

Groundwater is crucial for the livelihoods and food security of over 1 billion rural households in the poorer regions of Africa and Asia, and for domestic supplies of a large part of the population elsewhere in the world. During the past 50 years, the global groundwater abstraction rate has at least tripled, significantly boosting food production and rural development. It is now a major source of water for human consumption, supplying nearly half of all drinking water in the world. Groundwater's omnipresence and unique buffer capacity have enabled people to settle and survive in dry areas where rainfall and runoff are scarce or unpredictable. However, no matter how large the volumes of water contained in these aquifers may be, the fact that they are often non-renewable means they can eventually be mined to exhaustion if their use is not managed properly. In some hotspots the availability of non-renewable groundwater resources has reached critical limits.

Glaciers also act as buffers. In the short term, shrinking glaciers add water to streamflow over and above annual precipitation and so increase the immediate local water supply. In the longer term, however, as glaciers continue to slowly disappear – as projected–the water they supply will also diminish, effectively reducing long term water supplies.

The 'availability' of water is also determined by its quality. Polluted water cannot be used for drinking, bathing, industrial purposes or agriculture. It damages human health and degrades ecosystem services. It is estimated that over 80% of waste water worldwide is not collected or treated, and urban settlements are the main source of point-source pollution. The economic costs of poor-quality water in countries in the Middle East and North Africa range from 0.5% to 2.5% of GDP.

The 'centrality' of water

The financial, food, fuel and climate crises are, even individually, serious problems, but in combination their effects could be catastrophic for global sustainability. Water underpins all aspects of development: it is the only medium that links sectors and through which major global crises can be jointly addressed. It is a key element in *green growth* and in achieving *greener economies*.

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It is very unlikely that our increasing demand for water will be able to be met solely through supply-oriented solutions. Rather, the key solutions to the global water crisis reside in our ability to better manage demand while seeking to balance and maximize the various benefits of water.

The 'water-food-energy nexus' illustrates the difficult choices, risks and uncertainties facing policy-makers today. There are many examples of intended or unintended consequences of promoting one cause over others (e.g. food security rather than energy or water security). A key challenge will be to integrate the complex interconnections into response strategies that take into account the various trade-offs and the interests of different stakeholders.

This latest edition of the WWDR provides a new way of looking at our water reality, through the perspective of risk and uncertainty. It seeks to encourage different ways of thinking about the world's collective future by identifying tools and approaches that maximize water's benefits to different developmental sectors and by demonstrating that win–win scenarios are indeed possible. Political and business leaders as well as water managers, water users and ordinary citizens have a unique opportunity to see past immediate challenges and risks and to effect long-term change towards sustainable prosperity for all, through water.

The United Nations World Water Development Report

The United Nations World Water Development Report is a UN-Water flagship report produced by the United Nations World Water Assessment Programme (WWAP), a programme of UN-Water hosted by UNESCO.

UN-Water is the United Nations coordination mechanism for all freshwater related issues, bringing together the work of 29 United Nations member agencies and 25 partner organisations. WWAP works closely with the members and partners of UN-Water in the preparation of the WWDR as a collective product of the widest collaboration in the United Nations system.

This flagship report is a comprehensive review that gives an overall picture of the state of the world's freshwater resources. It analyses pressures from decisions that drive demand for water and affect its availability. It offers tools and response options to help leaders in government, the private sector and civil society address current and future challenges. It suggests ways in which institutions can be reformed.

The 4th edition directly reports from the regions, highlighting hotspots, and has been mainstreamed for gender equality, which is addressed as a critical issue. It introduces a thematic approach – 'Managing Water under Uncertainty and Risk' – in the context of a world which is changing faster than ever in often unforeseeable ways.

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