



The United Nations World Water Development Report 2015

# WATER FOR A SUSTAINABLE WORLD EXECUTIVE SUMMARY



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**Water is at the core of sustainable development. Water resources, and the range of services they provide, underpin poverty reduction, economic growth and environmental sustainability. From food and energy security to human and environmental health, water contributes to improvements in social well-being and inclusive growth, affecting the livelihoods of billions.**

### **Vision 2050: Water in a sustainable world**

*In a sustainable world that is achievable in the near future, water and related resources are managed in support of human well-being and ecosystem integrity in a robust economy. Sufficient and safe water is made available to meet every person's basic needs, with healthy lifestyles and behaviours easily upheld through reliable and affordable water supply and sanitation services, in turn supported by equitably extended and efficiently managed infrastructure. Water resources management, infrastructure and service delivery are sustainably financed. Water is duly valued in all its forms, with wastewater treated as a resource that avails energy, nutrients and freshwater for reuse. Human settlements develop in harmony with the natural water cycle and the ecosystems that support it, with measures in place that reduce vulnerability and improve resilience to water-related disasters. Integrated approaches to water resources development, management and use – and to human rights – are the norm. Water is governed in a participatory way that draws on the full potential of women and men as professionals and citizens, guided by a number of able and knowledgeable organizations, within a just and transparent institutional framework.*



*Evoluzione  
Painting by Rhae*

## The consequences of unsustainable growth

Unsustainable development pathways and governance failures have affected the quality and availability of water resources, compromising their capacity to generate social and economic benefits. Demand for freshwater is growing. Unless the balance between demand and finite supplies is restored, the world will face an increasingly severe global water deficit.

Global water demand is largely influenced by population growth, urbanization, food and energy security policies, and macro-economic processes such as trade globalization, changing diets and increasing consumption. By 2050, global water demand is projected to increase by 55%, mainly due to growing demands from manufacturing, thermal electricity generation and domestic use.

Competing demands impose difficult allocation decisions and limit the expansion of sectors critical to sustainable development, in particular food production and energy. The competition for water – between water ‘uses’ and water ‘users’ – increases the risk of localized conflicts and continued inequities in access to services, with significant impacts on local economies and human well-being.

Over-abstraction is often the result of out-dated models of natural resource use and governance, where the use of resources for economic growth is under-regulated and undertaken without appropriate controls. Groundwater supplies are diminishing, with an estimated 20% of the world’s aquifers currently over-exploited. Disruption of ecosystems through unabated urbanization, inappropriate agricultural practices, deforestation and pollution are among the factors undermining the environment’s capacity to provide ecosystem services, including clean water.

Persistent poverty, inequitable access to water supply and sanitation services, inadequate financing, and deficient information about the state of water resources, their use and management impose further constraints on water resources management and its ability to help achieve sustainable development objectives.

## Water and the three dimensions of sustainable development

Progress in each of the three dimensions of sustainable development – social, economic and environmental – is bound by the limits imposed by finite and often vulnerable water resources and the way these resources are managed to provide services and benefits.

### Poverty and social equity

While access to household water supplies is critical for a family’s health and social dignity, access to water for productive uses such as agriculture and family-run businesses is vital to realize livelihood opportunities, generate income and contribute to economic productivity. Investing in improved water management and services can help reduce poverty and sustain economic growth. Poverty-oriented water interventions can make a difference for billions of poor people who receive very direct benefits from improved water and sanitation services through better health, reduced health costs, increased productivity and time-savings.

Economic growth itself is not a guarantee for wider social progress. In most countries, there is a wide – and often widening – gap between rich and poor, and between those who can and cannot exploit new opportunities. Access to safe drinking water and sanitation is a human right, yet its limited realization throughout the world often has disproportionate impacts on the poor and on women and children in particular.

### Economic development

Water is an essential resource in the production of most types of goods and services including food, energy and manufacturing. Water supply (quantity and quality) at the place where the user needs it must be reliable and predictable to support financially sustainable investments in economic activities. Wise investment in both hard and soft infrastructure that is adequately financed, operated and maintained facilitates the structural changes necessary to foster advances in many productive areas of the economy. This often means more income opportunities to enhance expenditure in health and education, reinforcing a self-sustained dynamic of economic development.

*Pollution from untreated residential and industrial wastewater and agricultural run-off also weakens the capacity of ecosystems to provide water-related services*



Lake Sentarum in West Kalimantan (Indonesia) is one of the world's most diverse wetlands ecosystems. Photo: Ramadian Bachtiar/CIFOR

Many benefits may be gained by promoting and facilitating use of the best available technologies and management systems in water provision, productivity and efficiency, and by improving water allocation mechanisms. These types of interventions and investments reconcile the continuous increase in water use with the need to preserve the critical environmental assets on which the provision of water and the economy depends.

#### **Environmental protection and ecosystem services**

Most economic models do not value the essential services provided by freshwater ecosystems, often leading to unsustainable use of water resources and ecosystem degradation. Pollution from untreated residential and industrial wastewater and agricultural run-off also weakens the capacity of ecosystem to provide water-related services.

Ecosystems across the world, particularly wetlands, are in decline. Ecosystem services remain under-valued, under-recognized and under-utilized within most current economic and resource management approaches. A more holistic focus on ecosystems for water and development that maintains a beneficial mix between built and natural infrastructure can ensure that benefits are maximized.

Economic arguments can make the preservation of ecosystems relevant to decision-makers and planners. Ecosystem valuation demonstrates that benefits far exceed costs of water-related investments in ecosystem conservation. Valuation is also important in assessing trade-offs in ecosystem conservation, and can be used to better inform development plans. Adoption of 'ecosystem-based management' is key to ensuring water long-term sustainability.

#### **Water's role in addressing critical developmental challenges**

Interlinkages between water and sustainable development reach far beyond its social, economic and environmental dimensions. Human health, food and energy security, urbanization and industrial growth, as well as climate change are critical challenge areas where policies and actions at the core of sustainable development can be strengthened (or weakened) through water.

Lack of **water supply, sanitation and hygiene** (WASH) takes a huge toll on health and well-being and comes at a large financial cost, including a sizable loss of economic activity. In order to achieve universal access, there is a need for accelerated progress in disadvantaged groups and to ensure non-discrimination in WASH service provision. Investments in water and sanitation services result in substantial economic gains; in developing regions the return on investment has been estimated at US\$5 to US\$28 per dollar. An estimated US\$53 billion a year over a five-year period would be needed to achieve universal coverage – a small sum given this represented less than 0.1% of the 2010 global GDP.

The increase in the number of people without access to water and sanitation in **urban areas** is directly related to the rapid growth of slum populations in the developing world and the inability (or unwillingness) of local



Freshly picked olives (Italy)  
Photo: Richard Allaway



Geothermal borehole house (Iceland)  
Photo: Lydur Skulason



New construction in Astana (Kazakhstan)  
Photo: Shynar Jetpissova/World Bank

and national governments to provide adequate water and sanitation facilities in these communities. The world's slum population, which is expected to reach nearly 900 million by 2020, are also more vulnerable to the impacts of extreme weather events. It is however possible to improve performance of urban water supply systems while continuing to expand the system and addressing the needs of the poor.

By 2050, **agriculture** will need to produce 60% more food globally, and 100% more in developing countries. As the current growth rates of global agricultural water demand are unsustainable, the sector will need to increase its water use efficiency by reducing water losses and, most importantly, increase crop productivity with respect to water. Agricultural water pollution, which may worsen with increased intensive agriculture, can be reduced through a combination of instruments, including more stringent regulation, enforcement and well-targeted subsidies.

**Energy** production is generally water-intensive. Meeting ever-growing demands for energy will generate increasing stress on freshwater resources with repercussions on other users, such as agriculture and industry. Since these sectors also require energy, there is room to create synergies as they develop together. Maximizing the water efficiency of power plant cooling systems and increasing the capacity of wind, solar PV and geothermal energy will be a key determinant in achieving a sustainable water future.

Global water demand for the **manufacturing industry** is expected to increase by 400% from 2000 to 2050, leading all other sectors, with the bulk of this increase occurring in emerging economies and developing countries. Many large corporations have made considerable progress in evaluating and reducing their water use and that of their supply chains. Small and medium-sized enterprises are faced with similar water challenges on a smaller scale, but have fewer means and less ability to meet them.

The negative impacts of **climate change** on freshwater systems will most likely outweigh its benefits. Current projections show that crucial changes in the temporal and spatial distributing of water resources and the frequency and intensity of water-related disasters rise significantly with increasing greenhouse gas emissions. Exploitation of new data sources, better models and more powerful data analysis methods, as well as the design of adaptive management strategies can help respond effectively to changing and uncertain conditions.

## Regional perspectives

The challenges at the interface of water and sustainable development vary from one region to another.

Increasing resource use efficiency, reducing waste and pollution, influencing consumption patterns and choosing appropriate technologies are the main challenges facing **Europe and North America**. Reconciling different water uses at the basin level and improving policy coherence nationally and across borders will be priorities for many years to come.



Walking through the Potato Park in Písaq, Cusco (Peru)  
Photo: Manon Koningstein (CIAT)

Sustainability in the **Asia and the Pacific** region is intimately linked with progress in access to safe water and sanitation; meeting water demands across multiple uses and mitigating the concurrent pollution loads; improving groundwater management; and increasing resilience to water-related disasters.

Water scarcity stands at the forefront when considering water-related challenges that impede progress towards sustainable development in the **Arab** region, where unsustainable consumption and over-abstraction of surface and groundwater resources contribute to water shortages and threaten long-term sustainable development. Options being adopted to enhance water supplies include water harvesting, wastewater reuse and solar energy desalination.

A major priority for the **Latin America and the Caribbean** region is to build the formal institutional capacity to manage water resources and bring sustainable integration of water resources management and use into socio-economic development and poverty reduction. Another priority is to ensure the full realization of the human right to water and sanitation in the context of the post-2015 development agenda.

The fundamental aim for **Africa** is to achieve durable and vibrant participation in the global economy while developing its natural and human resources without repeating the negatives experienced on the development paths of some other regions. Currently only 5% of the Africa's potential water resources are developed and average per capita storage is 200 m<sup>3</sup> (compared to 6,000 m<sup>3</sup> in North America). Only 5% of Africa's cultivated land is irrigated and less than 10% of hydropower potential is utilized for electricity generation.

## Responses and means of implementation

### The post-2015 development agenda

The Millennium Development Goals (MDGs) were successful in rallying public, private and political support for global poverty reduction. With regard to water, the MDGs helped to foster greater efforts towards improving access to drinking water supply and sanitation. However, the experience of the MDGs shows that a thematically broader, more detailed and context-specific framework for water, beyond the issues of water supply and sanitation, is called for in the post-2015 development agenda.

In 2014, UN-Water recommended a dedicated Sustainable Development Goal for water comprised of five target areas: (i) WASH; (ii) water resources; (iii) water governance; (iv) water quality and wastewater management; and (v) water-related disasters. Such a focused water goal would create social, economic, financial and other benefits that greatly outweigh its costs. Benefits would extend to the development of health, education, agriculture and food production, energy, industry and other social and economic activities.



*Progress in water-related governance calls for engaging a broad range of societal actors, through inclusive governance structures that recognize the dispersion of decision-making across various levels and entities*

Consolation Prize "Clean India Photo Contest" 2008  
Photo: Dinesh Chandra

### **Achieving 'The Future We Want'**

The outcome document of the 2012 UN Conference on Sustainable Development (Rio+20), The Future We Want, recognized that 'water is at the core of sustainable development', but at the same time development and economic growth creates pressure on the resource and challenges water security for humans and nature. There also remain major uncertainties about the amount of water required to meet the demand for food, energy and other human uses, and to sustain ecosystems. These uncertainties are exacerbated by the impact of climate change.

Water management is the responsibility of many different decision-makers in public and private sectors. The issue is how such shared responsibility can be turned into something constructive and elevated to a rallying point around which different stakeholders can gather and participate collectively to make informed decisions.

### **Governance**

Progress in water-related governance calls for engaging a broad range of societal actors, through inclusive governance structures that recognize the dispersion of decision-making across various levels and entities. It is, for example, imperative to acknowledge women's contributions to local water management and role in decision-making related to water.

While many countries face stalled water reform, others have made great strides in implementing various aspects of integrated water resources management (IWRM), including decentralized management and the creation of river basin organizations. As IWRM implementation has too often been geared towards economic efficiency, there is a need to put more emphasis on issues of equity and environmental sustainability and adopt measures to strengthen social, administrative and political accountability.

### **Minimizing risks and maximizing benefits**

Investing in all aspects of water resources management, services provision and infrastructure (development, operation and maintenance) can generate significant social and economic benefits. Spending on drinking water supply and sanitation is highly cost-effective on health grounds alone. Investments in disaster preparedness, improved water quality and wastewater management are also highly cost-effective. Distribution of costs and benefits among stakeholders is crucial for financial feasibility.

Water-related disasters, the most economically and socially destructive of all natural hazards, are likely to increase with climate change. Planning, preparedness and coordinated responses – including floodplain management, early warning systems and increased public awareness of risk – greatly improve the resilience of communities. Blending structural and non-structural flood management approaches is particularly cost-effective.

*In order to achieve universal access, there is a need for accelerated progress in disadvantaged groups and to ensure non-discrimination in WASH service provision*



Children learning the importance of proper hand washing and drinking safe water, Had Ane Primary School, Oudomxay Province (Laos). Photo: Bart Verweij/World Bank

Risks and various water-related security issues can also be reduced by technical and social approaches. There are a growing number of examples of reclaimed wastewater being used in agriculture, for irrigating municipal parks and fields, in industrial cooling systems, and in some cases safely mixed in with drinking water.

Existing assessments of water resources are often inadequate for addressing modern water demands. Assessments are necessary to make informed investment and management decisions, facilitate cross-sector decision-making, and address compromises and trade-offs between stakeholder groups.

## Equity

Social equity is one of the dimensions of sustainable development that has been insufficiently addressed in development and water policies. Sustainable development and human rights perspectives both call for reductions in inequities and tackling disparities in access to WASH services.

This calls for a reorientation of investment priorities and operational procedures to provide services and allocate water more equitably in society. A pro-poor pricing policy keeps costs as low as possible, while ensuring that water is paid for at a level that supports maintenance and potential expansion of the system.

Water pricing also provides signals for how to allocate scarce water resources to the highest-value uses – in financial terms or other types of benefits. Equitable pricing and water permits need to adequately assure that abstraction as well as releases of used water support efficient operations and environmental sustainability in ways that are adapted to the abilities and needs of industry and larger-scale irrigation as well as small-scale and subsistence farming activities.

The principle of equity, perhaps more than any technical recommendation, carries with it the promise of a more water-secure world for all.

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Photo credits: Cover: Local fisher using a traditional net, Situ Gunung, Sukabumi, West Java (Indonesia).  
Photo : Ricky Martin/CIFOR

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