Water and sustainable development

Information brief

What does water have to do with sustainable development?

Water is a finite resource that is fundamental to human well-being and only renewable if well managed. Smart water management is a pre-condition of sustainable development. Managed efficiently, water plays a vital role in strengthening the resilience of social, economic and environmental systems in the face of rapid and unpredictable changes.

Did you know?

- **Over 1.7 billion people live in river basins where water use exceeds recharge**, leading to the desiccation of rivers, depletion of groundwater and the degradation of ecosystems.
- **Two-thirds of the world's population will live in water-stressed countries by 2025** if current consumption patterns continue.
- **Demand for water will increase by 55% by 2050**.
- **Economic losses from inadequate delivery of water and sanitation** amounts to **1.5% of gross domestic product** of the countries included in a WHO study on meeting the MDGs.
- Some estimates suggest **over 80% of wastewater is discharged without treatment**.
- About **40% of the world's population lives in basins that overlap two or more countries**, which account for about 60% of global freshwater flow. About 2 billion people worldwide depend on groundwater for basic water needs.
- Water **shortages** have been identified by industry, government, academia and civil society as **one of the top three global risks** of highest concern to them.
- Water-related disasters are the most economically and socially destructive of all natural disasters. **Since the original Rio Earth Summit in 1992 floods, droughts and storms have affected 4.2 billion people** (95% of all people affected by disasters) and **caused US$ 1.3 trillion of damage** (63% of all damage).

The role of water in achieving sustainable development

Water is fundamental to the three dimensions of sustainable development, including social needs, economic development and environmental limits, and a cross-cutting driver. Moving from a sectoral approach towards a holistic one, which captures interconnections between food, energy, health, trade, the environment and water is necessary.

Water and agriculture

The goal of the Food and Agriculture Organization of the United Nations (FAO) is "a world free from hunger and malnutrition, where food and agriculture contribute to improving the living standards of all, especially the poorest, in an economically, socially and environmentally sustainable manner".

- Agriculture accounts for **70% of water withdrawals** worldwide, although this figure varies considerably across countries. Agriculture is by far the largest consumer of water globally.
- Agriculture uses **11%** of the **world's land surface** and **30%** of total global **energy consumption**, when considering food production and supply chain.
- **Rain-fed agriculture** is the predominant agricultural production system around the world. This method is little more than half as effective as optimal agricultural management.
- By 2050, world agriculture will need to produce **60% more food** globally, and 100% more in developing countries.

To achieve sustainable agriculture, FAO proposes five interconnected principles:

- **Improving efficiency** in the use of resources;
- Direct action to **conserve, protect and enhance** natural resources;
- Protect and improve **rural livelihoods and social well-being**;
- Enhance the **resilience** of people, communities and ecosystems, especially to withstand climate change and market volatility;
- **Good governance** is essential for the sustainability of both natural and human systems.

Water and industry

Industry is a broad sector, comprising manufacturing, extractive industry, power generation and agriculture. Industry accounts for **20%** of water demand.

Water and Industry Solutions

Actions in confronting water sustainability in industry come from two opposing directions. Top-down approaches are essentially from government at various levels. They include command-and-control methods of policy, regulation, enforcement and incentives. Manufacturing as a point source of pollution is a good target. In the past, these methods have focused on technology and performance ignoring preventive approaches and resource efficiency (UNEP, 2011).

Source: WWDR 2015 - Interim internal UN-Water working draft, August 2014 (WWAP, 2015)

Water and energy

90% of all power production is water intensive. The International Energy Agency (IEA) estimates global water withdrawals for energy production in 2010 accounted for roughly 15% of world totals. Electricity accounts for approximately 5% to 30% of the total operating cost of water and wastewater utilities, but in some developing countries such as India and Bangladesh, it can be as high as 40%.

Energy demand is projected to increase by one-third by 2035. Meeting growing demands for energy will put increasing stress on freshwater resources. Since these sectors also require energy, there is room to create synergies as they develop together, such as increasing water and energy efficiency from the life cycle viewpoint.

Water and Energy Solutions

The most common solutions are related to improving the efficiency and sustainability with which water and energy are used and finding win–win options that create savings of both, which can become mutually reinforcing (creating synergy). But not every situation offers such opportunities. There are situations in which competition for resources can arise or there is genuine conflict between water and energy aims, meaning some degree of trade-off will be necessary. Where competition between different resource domains is likely to increase, the requirement to make deliberate trade-offs arises and these trade-offs will need to be managed and contained, preferably through collaboration and in a coordinated manner. To do this, better (and sometimes new) data are required. A coherent policy – that is, an adequate public response to the interconnectedness of the water, energy and related domains – is needed.

Source: WWAP (2014)

Water, sanitation and hygiene (WASH)

The domestic sector accounts for **10%** of total water use. Yet worldwide, an estimated 768 million people were without access to an improved source of water in 2011 and 2.5 billion remain without access to improved sanitation.

The number of people without access to safe water and sanitation in urban areas is increasing. Targets for universal access to WASH and to reduce inequalities in access (proximity, gender, financial clout) are putting pressure on policy makers to address the needs of the urban poor.

WASH Solutions

WASH solutions include the need to focus on service delivery not solely capital costs; to ensure that services are financially viable; to enhance accountability and transparency in financing; to strengthen independent regulatory agencies; and to build capacity to monitor progress and assess inequalities in service. Creation of new infrastructure, whilst essential, will not suffice to increase sanitation and hygiene coverage. A renewed focus on shifting social norms is paramount.

Source: WWDR 2015 - Interim internal UN-Water working draft, August 2014 (WWAP, 2015)

Water and ecosystems

Global environmental degradation is at critical level with major ecosystems such as oceans approaching thresholds that could trigger massive collapse.

Mainstreaming the sustainability of ecosystem management is key:

- Integration, collaboration, coordination among sectors and natural resources managers;
- Implementation as well as policy setting (regulation, enforcement and compliance);
- Economic rationale incorporated into solutions (e.g. natural infrastructure);
- Valuing ecosystem services (including oceans), making them more relevant to people on the street;
- Investment in and implementation of watershed management plans.

Water and urbanization

More than half the world already lives in urban areas and by 2050, it is expected that more than two-thirds of the world's 9 billion people will be living in cities. The development of water resources for economic growth, social equity and environmental sustainability will be bound to the sustainable development of cities.

Urban dwellers generally consume more water daily than their rural counterparts and urban and peri-urban areas also have thirsty industries. As much of the water consumed by cities comes from outside city limits, and the pollution generated flows downstream and away, the impact of cities on water resources goes beyond city boundaries.

Cities are centres for innovation and the concentration of people in compact settlements can reduce the cost of providing water and sanitation.

It pays to invest in watersheds: The city of New York saved US$4–6 billion on the cost of water treatment plants by protecting forests and compensating farmers in the Catskills for reducing pollution in lakes and streams.

Water and Cities Solutions

Solutions in urban areas include Pro-Poor Policies for safe water and sanitation; integrated urban water management (IUWM) systems, bringing together water supply, sanitation, and stormwater and wastewater management and integrates these with land use planning and economic development; improved urban water governance and strong leadership; Sustainable sanitation which may include separate collection of wastewater from households and industry to promote reuse, treatment of wastewater. As much of the cost of wastewater management is actually transportation of wastewater, decentralized systems where the wastewater is treated close to the source using simple technologies that maximize recycling of water and nutrients can be useful, particularly in poor and peri-urban settlements; Adaptation to climate change and water-induced disasters.

Source: WWDR 2015 - Interim internal UN-Water working draft, August 2014 (WWAP, 2015)

Water and climate change

Sustainable freshwater resources management means balancing freshwater supplies with demands in a way that ensures water availability (quantity and quality) for the future.

Population growth and increasing living standards mean increasing demand for water. **Adaptation decisions need to be taken now**. The Integrated Water Resources Management (IWRM), a more holistic approach to water management, has now been accepted internationally as the next step towards efficient, equitable and sustainable development and management of the world's limited water resources and for coping with conflicting demands.

Water and Climate Solutions

Adaptation decisions need to be taken now. An adaptive approach focusing on robust strategies and low regret or no-regret solutions may be a way to deal with the current uncertainties in climate impact projections (Heltberg et al., 2009). Knowledge generation and policy translation priorities include the collection of data and improving the understanding of interactions and feedbacks between the water cycle and other natural and human processes, such as the carbon cycle, population growth, food production, energy consumption and ecosystem services. Data analysis and simulation methods still have a long way to go to enable the formulation and evaluation of adaptation practices. Capacity-building of technicians, water managers, and policy makers is another priority to optimize the creation of actionable knowledge. Communication of available environmental and socio-economic observations, insights and predictions, with their uncertainties, is critical to the implementation of successful policies. New technologies for visualization and communication of data and simulations are emerging (infographics; Spiegelhalter et al., 2011), which allow for two-way interaction and interactive scenario analysis. Climate information and services, including data, diagnostics, assessments, monitoring, predictions and projections that users need for a broad range of climate-sensitive decisions at different levels are required at national and local scales. Lastly, institutional development holds promise for improving climate change adaptation.

Source: WWDR 2015 - Interim internal UN-Water working draft, August 2014 (WWAP, 2015)

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