UN WATER

# Means of Implementation: A focus on Sustainable Development Goals 6 and 17

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# Contents

## Executive summary

The means of implementation (MoI), as defined in the Sustainable Development Goals (SDGs), are fundamental to the post-2015 development agenda. In addition to providing a general overview of the proposed MoI, SDG 17 also defines specific aspects which must be taken into account. This summary presents key messages from SDG 17 sections as they relate to water and sanitation. For additional detail, refer to "Means of Implementation: A focus on Sustainable Development Goals 6 and 17", a comprehensive report released by UN-Water to coincide with discussions during the Third Conference on Financing for Development (July 2015)[1].

For SDG 6 on water and sanitation and its related targets, a solid base of experience in monitoring and implementation already exists in many countries but needs to be scaled up with support required from the international community. This will be essential to fully realize the human right to safe drinking water and sanitation, which the United Nations (UN) General Assembly recognized in 2010. Furthermore, there is considerable evidence that achieving SDG 6 will bring significant economic benefits that exceed the investment needed. For water and sanitation alone, research shows that benefits exceed the cost of an intervention by **3 to 6 times**. The World Health Organization (WHO) and the World Bank have found that the global economic return on sanitation spending is US $5.50 per US dollar invested[2].

**FINANCE:** Financial estimates suggest that achieving universal access to basic water, sanitation and hygiene (targets 6.1 and 6.2) could cost roughly USD $50 billion per year – yet in 77% of countries public finance is still insufficient to meet these targets.

WHO estimates losses due to inadequate water and sanitation services in developing countries at a total of **US $260 billion a year** – or up to 10% of GDP for some very poor countries[3]. And a recent evidence-based report published by the University of Oxford indicates that **water insecurity** is a drag on economic development in the order of **US $500 billion** annually – excluding environmental and other non-monetized impacts[4]. In rural China, for example, water pollution is estimated to cost 0.3% to 1.9% of annual GDP. All sectors of society are affected by water challenges and can benefit from implementing SDG 6, leading to advances in water efficiency and resources management, pollution reduction, and ecosystem protection.

Apart from this sound economic case, the social and environmental benefits and their importance to the poorest and most vulnerable groups are also well documented. Moreover, implementing Goal 6 is essential for the achievement of many, if not all, of the other Goals, especially those related to poverty, food, energy, gender, ecosystems and climate. Yet according to the 2014 UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS) Report, public finance in 77% of countries is still insufficient to meet targets 6.1

1 The full report is available at http://www.unwater.org/publications/publications-detail/en/c/284949/.
2 Tackling the Challenges of SDG Monitoring: A Roadmap Outlining the Costs and Value of a Water Sector Monitoring System (2015).
3 World Health Organization (2004), "Costs and benefits of water and sanitation at the global level". Available at http://www.who.int/water_sanitation_health/wsh0404summary/en/.
4 Sadoff C. *et al* (2015), "Securing Water, Sustaining Growth". Task Force for Global Water Partnership and the Organisation for Economic Co-operation and Development, 13 April 2015. Available at: http://www.ox.ac.uk/news/2015-04-13-water-insecurity-drag-global-economy-0.

and 6.2 on universal drinking water and sanitation access.[5] Official Development Assistance (ODA), vertical funds, blended finance and partnerships with the private sector can all leverage domestic financing and play a valuable role if designed and used smartly. **There is also scope for innovative financing from *new* sources, including sovereign wealth funds, philanthropy and micro-finance.** Addressing a critical issue, the draft Financing for Development Outcome Document[6] called for a platform to bridge the 'infrastructure gap', pledging to **double annual investments for sustainable infrastructure** including a priority on water and sanitation meet the '1 to 1.5 trillion-dollar annual infrastructure shortage in developing countries'[7].

**TECHNOLOGY**: Using smart monitoring for better decision-making together with sustainable and locally adapted technologies are critical steps towards achieving the SDGs.

There have been significant advances in water and sanitation technologies, related to both infrastructure and to monitoring, since the launch of the MDGs. These new water- and energy-efficient technologies must be used when designing and building new infrastructure. Encouragingly, many options are readily available for use at the county level. However, in many developing countries innovation and technology adaptation is still needed for cost-effective implementation, such as in the area of wastewater treatment. The challenge is to bring these technologies to scale and create an enabling environment.

The SDGs present a promising opportunity to leverage new technologies and approaches to increase the quality, frequency, scale, and accessibility of traditional data collection. Some illustrative examples of new data streams include Earth observations, mobile networks, smart meters, and citizen science campaigns supported by an ever-improving capacity to store and process large amounts of data. The applications of this 'data revolution' include robust weather monitoring systems that decrease the vulnerability of farmers as they plan ahead, early warning systems to help prepare for and adapt to water-related natural disasters, river monitoring advancements that improve decisions on water release to ensure endangered fish can move upstream to spawning areas, and smart metering of agricultural irrigation that improve water allocation across large watershed systems, especially in times of extreme events like droughts[8].

Implementing SDG 6 requires strong ownership and leadership at the state level to create a pro-active enabling environment. This requires transparent and effective governance systems, clear roles and responsibilities, supportive policies and planning, and improved institutional and human capacity from national to local levels.

**CAPACITY-BUILDING**: In the water and sanitation sectors, capacity-building is closely linked to investments that support the use, adaptation, and transfer of new technologies, in addition to public awareness and the dissemination of best practices.

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[5] UN-Water GLAAS Report (2014), "Investing in Water and Sanitation: Increasing Access, Reducing Inequalities". Available at http://www.who.int/water_sanitation_health/glaas/2014/en

[6] Updated document from 7 May 2015, available at http://www.un.org/pga/wp-content/uploads/sites/3/2015/05/070515_financing-for-development-Inf-Consultations.pdf

[7] *Ibid*.

[8] Tackling the Challenges of SDG Monitoring: A Roadmap Outlining the Costs and Value of a Water Sector Monitoring System (2015). Produced by a group of technical experts for the 3rd International Conference on Financing for Development.

C**apacity development** is integral to the success of the post-2015 development agenda, and a central component of Integrated Water Resources Management (IWRM). Enhanced and targeted international support to develop capacities in areas including water and sanitation is a top priority. Capacity development platforms such as UNDP Cap-Net (Capacity Development in Sustainable Water Management Network) can play a crucial role. Such networks build on established partnerships of international, regional, and national institutions committed to capacity development in the water sector. To meet the Goals, capacity building will need to focus more on the development of in-country practical skills and less on academic theory.

**DATA, MONITORING AND ACCOUNTABILITY FRAMEWORKS**: The expansion of the water-related development agenda contained in the SDGs requires coordinated, fit-for-purpose monitoring systems that serve multiple actors, scales, and applications.

Data, monitoring, and accountability frameworks are important for ensuring that MoI are realized and that the targets are met. SDG 6 monitoring can build upon the extensive mechanisms put in place over the past 15 years for the MDGs, such as the WHO/UNICEF Joint Monitoring Programme on Water Supply and Sanitation (JMP) for targets 6.1 and 6.2, and GLAAS. GLAAS reports on the enabling environment for drinking water, sanitation and hygiene, together with the UN-Water IWRM status survey and report, can monitor progress towards SDG targets 6.a and 6.b on MoI. To cover the 'expanded' SDG agenda of wastewater management and water quality, water use and efficiency, water resources management and the status of water-related ecosystems (targets 6.3 to 6.6), several initiatives, mechanisms, and programmes exist. These are now being integrated into a new monitoring framework, GEMI – Integrated Monitoring of Water and Sanitation Related SDG Targets, a partnership of UNEP, UN-Habitat, UNICEF, FAO, UNESCO, WMO, and WHO that resides under the UN-Water umbrella.

**PARTNERSHIPS:** Instead of initiating a new partnership platform in the water and sanitation sector, efforts should be made to recognize existing alliances and build upon them to revitalize the Global Partnership for Sustainable Development.

As the final MoI section, **strengthened and extended partnerships** are important pieces of the new global, regional and national architecture that will be required to capitalize on state-of-the-art knowledge, leverage funding and ensure accountability. For targets 6.1 and 6.2, the Sanitation and Water for All (SWA) partnership is an example of a platform for coordinated action and global high-level political dialogue. Similarly, for targets 6.3 to 6.6, the Global Water Partnership (GWP) brings together a broad set of stakeholders to balance the many, often competing, demands for limited resources formulated in SDG 6. There are many other key water and sanitation partnerships that can be brought together and expanded upon: this bodes well for a rapid start to implementing SDG 6. Governments can leverage these partnerships to engage with the private sector, academia and civil society to help implement SDG 6.

# 1 Introduction

In July 2014, the Open Working Group on the Sustainable Development Goals (SDGs) proposed a set of 17 Goals and 169 targets to guide global development from 2015-2030, to be adopted at the Summit on the Post-2015 Development Agenda at the end of September 2015 in New York. They include two that this paper will address: SDG 6, *"Ensure availability and sustainable management of water and sanitation for all"*, and SDG 17, *"Strengthen the means of implementation and revitalize the global partnership for sustainable development"*, in the context of water and sanitation. Goal 17 represents a significant shift and an underpinning of the rest of the agenda by moving from "what we must do" to "how we can do it" – the *means* of implementing the new sustainable development agenda across its three dimensions (environmental, social and economic).

The post-2015 development roadmap includes several processes: the intergovernmental negotiations which will result in the final set of SDGs and targets in September; plus parallel intergovernmental processes such as the Third International Financing for Development Conference (Addis Ababa, Ethiopia, July 2015) and the 21st Conference of the Parties (COP 21) to the international climate change negotiations (Paris, France, December 2015). All of these processes are directly linked to the implementation of all of the SDGs, including SDG 6, the water and sanitation goal.

The sentiment conveyed in the outcome document of Rio+20, "The Future We Want", that "water is at the core of sustainable development"[9] is embedded in the SDG framework prepared by the Open Working Group. SDG 6, as a universal goal on water and sanitation, represents a considerable increase in scope and ambition over the Millennium Development Goals (MDGs) they will be replacing in 2015, albeit one that builds upon years of experience and on-going initiatives. It includes achieving universal access to drinking water, sanitation and hygiene, addressing inequalities as well as addressing global challenges on wastewater, water quality, efficiency, water resources management and ecosystem services. This expansion is significant, underpinning the connections to other areas such as health, food, energy, poverty, economic productivity, equity, and access to education.

Adequate policies, resources, capacities and strategies as well as developing technologies and infrastructure will be essential if countries are to meet the development agenda set out by Member States in the emerging SDGs. While building on the mechanisms and lessons learned from the MDGs, the new set of global Goals demand renewed commitment and strong partnerships at the national and international level. Rapid response is needed to mobilize policy coherence, finance, technology, science and innovations, capacity-building and robust frameworks for data collection, and monitoring to report on progress towards reaching the Goals. These "means of implementation" have already been addressed in different UN reports, intergovernmental meetings and by various expert and stakeholder groups such as the Sustainable Development Solutions Network (SDSN). A set of proposals about the actions, measures and policies that would need to be taken to mobilize required resources was also a key outcome of the 'High-level Thematic Debate on Means of Implementation for a Transformative Post-2015 Development Agenda', which took place from 9-10 February 2015 at the UN headquarters in New York. That debate provided information critical to meeting the water and sanitation Goal, among other SDGs.

[9] "The Future We Want", UN GA Resolution A/RES/66/288 11 September 2012. Available at http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/66/288&Lang=E.

**The aim of this paper is to provide an overview of the current available sources, actions and conditions needed to implement SDG 6 and water-related disasters as included in target 11.5. It is not meant to be a comprehensive set of actions, as that would vary from country to country and from target to target and thus go beyond the scope of this paper.** It instead brings together the different threads highlighted in SDG 17 with a focus on how they relate to implementing SDG 6. These are grouped in seven sections following the structure of SDG 17. The actions covered in targets 6.a and 6.b are covered throughout the document under the seven sections based on SDG 17 and thus are not treated separately.

The paper first sets out the case for SDG 6, providing information on the costs and benefits of investments needed to achieve it. This clearly shows that the cost of inaction on water and sanitation is greater than the cost of meeting the Goal – in terms of social, environmental and economic benefits and opportunities for future generations.

## 2 Making the economic case for SDG 6

**While an increase in investment is needed to meet SDG 6, the cost-to-benefit ratios are high.** Achieving universal coverage in safe drinking water and sanitation has been estimated to require investing the equivalent of around 0.1% of Global Domestic Product (GDP) in 2010 terms[10], or US $53 billion over five years, though this estimate is expected to rise as future scenarios should consider hygiene and the use of private sanitation as opposed to shared facilities. World Health Organization (WHO) estimates costs of US $390 billion to achieve universal 'improved' access of water and sanitation services, or US $26 billion per year over 15 years. However, as the sanitation MDG was not achieved, the remaining costs would be in the order of USD 500 billion for universal access over 15 years, or approximately USD 33 billion per year. However, this does not include 1.25 billion additional people forecasted in low and middle income countries from 2015 to 2030 (UN growth estimates, medium variant), nor does it include costs of achieving universal practice of handwashing with soap at critical moments. Hence the likely costs of achieving universal access to basic water, sanitation and hygiene (WASH) would be closer to US $50 billion per year[11]. WaterAid has suggested that African countries should spend 4.5 per cent of GDP on water and sanitation, in line with the Africa Infrastructure Country Diagnostic (AICD) assessments[12].

**In the water and sanitation sector, the benefits exceed costs by between 3 to 6 times** depending on the type of intervention, from achieving universal access to basic sanitation at home to eliminating open defecation[13]. Drinking water supply and sanitation investments generate high economic returns to society and a large range of economic and social benefits[14]. At the same time, inadequate sanitation causes a loss of several percentage points of GDP in many countries around the world – in India it is estimated that 6.4 per cent of its GDP, or US $53.8 billion, is lost due to the adverse economic impacts and costs of inadequate sanitation,

[10] UNESCO World Water Assessment Programme (2015), UN World Water Development Report, "Water for a Sustainable World". Available at http://www.unesco.org/new/en/loginarea/natural-sciences/environment/water/wwap/wwdr/2015-water-for-a-sustainable-world/.
[11] WHO (2012), "Global costs and benefits of drinking-water supply and sanitation interventions to reach the MDG target and universal coverage". Available at http://www.who.int/water_sanitation_health/publications/2012/globalcosts.pdf .
[12] Greenhill, R, and Ali, A (2013), "Paying for Progress: How will emerging post-2015 goals be financed in the new aid landscape?" ODI Working Paper 366. Available at http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8319.pdf.
[13] Ibid.
[14] G. Hutton (2015), "Benefits and Costs of Meeting the Water, Sanitation and Hygiene Targets in the Post-2015 Development Agenda". Available from http://www.copenhagenconsensus.com/sites/default/files/water_sanitation_assessment_-_hutton.pdf.

including death and disease, accessing and treating water, and losses in education, productivity, time and tourism.[15] The WHO places estimates for total losses due to inadequate water and sanitation services in developing countries at a total of US $260 billion a year– or up to 10% of GDP for some very poor countries[16].

Moreover, **water-related disasters**, addressed in SDG 11.5 and which can involve either an extreme surplus of water, such as tropical cyclones and storm surges, or its opposite – a deficit of water in the form of drought, make up more than 80% of all climatic disasters, more than 60% of all damages resulting from disasters, and are the direct cause of 95% of all people affected by disasters worldwide. Between 2003 and 2013, natural hazards and disasters in developing countries affected more than 1.9 billion people, and cost more than US $494 billion in damages[17]. The 2011 flood in Thailand wiped out 5% of the country's GDP. In Least Developed Countries (LDCs) and Small Island Developing States (SIDS), this adverse impact is potentially much larger: Floods in Mozambique in 2000 reduced annual GDP by 6%[18]. Cyclone Evan in 2012 caused damage worth 30% of Samoa's GDP, and Cyclone Pam is expected to cause Vanuatu's economy to shrink in 2015, whereas a 4% expected rise in GDP was previously forecasted[19].

The need for action on **water quality and treatment**, water resources management, floods, droughts and eco-systems is highlighted in a recent report published by the University of Oxford. It indicates that water insecurity is a drag on economic development in the order of US $500 billion annually - excluding environmental and other non-monetized impacts[20]. Africa, for example, loses 2% of GDP to power outages, between 5 - 25% to droughts and floods in affected countries, and perhaps a further 5% to the probable future impacts of climate change[21]. Additionally, these partial values can only capture a proportion of the total costs of inaction. For example, water pollution costs in China may also represent between 0.3% and 1.9% of rural GDP (depending on the "value of a statistical life" that is applied), without including projected costs on other complimentary sectors like ecosystem services and effects on biodiversity.[22]

Any consideration of the quality and quantity of available water supplies in the region must examine **groundwater**, which is critical to several economic sectors. The depletion rate of underground water resources is unsustainable, resulting in higher pumping costs and often higher salinity of the water even in areas distant from the sea. Experts estimate that groundwater irrigation contributes US$10 to 12 billion per year to the Asian economy. When also including earnings from groundwater sales for irrigation, that estimate increases to US

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[15] World Bank Water and Sanitation Program (2015), "The Economic Impacts of Inadequate Sanitation in India". Available at https://www.wsp.org/featuresevents/features/inadequate-sanitation-costs-india-equivalent-64-cent-gdp.
[16] World Health Organization (2004), "Costs and benefits of water and sanitation at the global level". Available at http://www.who.int/water_sanitation_health/wsh0404summary/en/.
[17] Food and Agriculture Organization of the United Nations (2015), "The Impact of Natural Hazards and Disaster son Agriculture and Food Security and Nutrition. Available at http://www.fao.org/3/a-i4434e.pdf.
[18] U.S. Agency for International Development (2002), "Mozambique 1999-2000 Floods Impact Evaluation". USAID, Washington, D.C.
[19] Asian Development Bank (2015), "2015 Economic Outlook for Vanuatu." Available at http://www.adb.org/countries/vanuatu/economy.
[20] Sadoff C. *et al* (2015), "Securing Water, Sustaining Growth". Task force of the Global Water Partnership and the Organisation for Economic Co-operation and Development, 13 April 2015. Available at: http://www.ox.ac.uk/news/2015-04-13-water-insecurity-drag-global-economy-0.
[21] Africa Regional Position Paper, 5th World Water Forum, Istanbul
[22] OECD (2008). "Costs of Inaction on Environmental Policy Challenges: Summary Report". Available at http://www.oecd.org/environment/ministerial/40501169.pdf.

$25 to 30 billion[23]. Bangladesh, China, India, Nepal and Pakistan together account for nearly half the world's total groundwater use[24].

Examples of the positive impact of water on economic growth include irrigation in India (rapid decline in rural poverty) and China[25], hydropower in China (doubling of local GDP)[26] and flood management in USA (benefits of 3.5 times costs)[27]. The value of wetlands for human security has been estimated at US $15 trillion[28] – and maintaining or restoring water-related ecosystems underpins not only other ecosystems, but also generates economic activity in or nearby them. Generally speaking, improved management of water resources helps the many countries that are highly vulnerable to rainfall variability and will be increasingly critical with climate change.

# 3 The means of implementation for SDG 6

All sectors of society will benefit from improved water security resulting from advances in water efficiency, pollution reduction, and adequate infrastructure, as well as the provision of water and sanitation services. All sectors therefore have a role to play in addressing these challenges, relying on robust and inclusive water governance structures to respond to short-term priorities and plan for long-term risks. Governments can leverage this emerging water stewardship paradigm and all the elements it entails to engage with the private sector, academia and civil society to help implement SDG 6. Also, implementing SDG 6 must be done in parallel with other SDGs, such as those relating to poverty, health, food, energy, climate change and ecosystems.

Systematic effort will be required in order to generate the means (economic, social, human and environmental resources) needed to support the implementation of SDG 6. The enabling environment clearly needs to include not only the mobilization of adequate and targeted investments but other crucial enabling factors, such as policies, capacity-building and other requirements. Goal 17, as proposed by the Open Working Group, sets out 19 targets to address implementation. These are grouped into the seven building blocks in Figure 1 below.

These seven categories are mutually reinforcing and interdependent. Experience shows, for example, that timely investment in technology and infrastructure is essential and needs to be prompted by institutional arrangements, and that many financing mechanisms are only possible when accompanied by effective governance, enhanced capacities, and properly adapted technologies, as well as appropriate tariff systems and legal and regulatory frameworks.

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[23] Shah, T., DebRoy, A., Qureshi, A.S. and Wang, J. (2003), "Sustaining Asia's groundwater boom: an overview of issues and evidence". *Natural Resources Forum* 27, 130–140.
[24] UNESCO World Water Assessment Programme (2015), UN World Water Development Report, "Water for a Sustainable World". Available at http://www.unesco.org/new/en/loginarea/natural-sciences/environment/water/wwap/wwdr/2015-water-for-a-sustainable-world/.
[25] World Water Development Report (2015): A six-year study of winter wheat production on the North China Plain showed water savings of 25% or more through the application of deficit irrigation at various growth stages. In normal years, two irrigations (instead of the usual four) of 60 mm were enough to achieve acceptably high yields and maximize net profits.
[26] Stockholm International Water Institute (2005): *Making Water a Part of Economic Development: The Economic Benefits of Improved Water Management and Services*, SIWI/WHO, Stockholm.
[27] Grey and Sadoff (2007): *Sink or Swim? Water security for growth and development*, Water Policy 9: 545–571.
[28] Millennium Ecosystem Assessment (2005)*: "*Ecosystems and Human-Being: A Framework for Assessment". Island Press, Washington D.C.

The key aspects of each building block will be discussed below in the context of meeting SDG 6. Each country has to determine which of these means is most critical within its own specific context. The objective of this paper is to provide initial ideas that will require further in-depth consideration by national experts and international support mechanisms.


*Figure 1 The seven building blocks for means of implementation laid out in Goal 17, as expressed in the Open Working Group (OWG) proposal from July 2014.*

## 3.1 Finance

Financing SDG 6 will require concerted and combined efforts in order to ensure the mobilization of adequate funding for its implementation from all sources: public and private, domestic and international. As stated by the Financing Sustainable Development Report:

> *"Without financing there can be no credible agreement on the SDGs or climate change. Without the SDGs, there can be no guidance on how to design a financing framework for sustainable development. Without a successful climate summit, the hope to end poverty will be lost."* [29]

The forthcoming Third Financing for Development Conference in Addis Ababa will consider in detail the financing needs to achieve the SDGs, and it is essential that water be considered within this process. Below are some examples of financing for water, which will hopefully be reinforced and expanded by the outcome of this conference.

**Finance is a key part of the means of implementation.** It is particularly needed for disadvantaged groups and to ensure non-discrimination under human rights legal requirements, keeping in mind that targeting the poorest 40% of the population yields the biggest gains[30]. Yet in 77% of countries public finance is still insufficient to meet targets 6.1 and 6.2 related to universal drinking water and sanitation access[31]. In addition to finance for domestic water supply and sanitation, new evidence demonstrates that more investment is

[29] SDSN (2014), "Financing Sustainable Development: Implementing the SDGs through Effective Investment Strategies and Partnerships". Preliminary, unedited draft. Authors: Schmidt-Traub, G. & Sachs, J.D.
[30] *Ibid.*
[31] UN-Water GLAAS Report (2014), "Investing in Water and Sanitation: Increasing Access, Reducing Inequalities". Available at http://www.who.int/water_sanitation_health/glaas/2014/en.

needed to improve water resources management if we are to achieve sustainable economic and social development[32].

The total amount of these funding requirements as a whole is difficult to estimate and may vary widely depending on the methodology used and assumptions made. Any financing studies need to consider costs of operation, maintenance and replacement of existing as well as new water and sanitation infrastructure and facilities in order to be sustainable and as accurate as possible in a particular country's context[33].

### *Utilizing existing financing and improving targeting*

To meet SDG 6, besides gathering new financial resources, which will no doubt be needed, it is equally important to **use existing finance more effectively**. This is a key element of target 6.5 and requires better governance and accountability to ensure financial resources are used for the purposes intended and not wasted. The 2014 UN-Water GLAAS Report, for example, highlights the case that current funding may not be going to those with the greatest needs[34]. Making sure that the resources that have already been mobilized go to those most in need would make the best use of funds from both international and domestic sources.

Similarly, using finance effectively means ensuring resources are used to strengthen country capabilities, maximizing impact by building the systems need to deliver and sustain services in the long term. Ensuring financing is delivered according to internationally recognized principles of aid and development effectiveness will help catalyse the improvements in performance needed to meet SDG 6.

In particular, as with the MDGs, **national commitments and local efforts** will be a key part of achieving the SDGs, not only in terms of mobilizing domestic resources but also for strengthening public finance, broadening tax bases and creating transparent and accountable institutions, and for limiting tax evasion and curbing corruption and illicit flows. These form part of the means of implementation covered under target 6.5.

**The effective use of domestic resources** is a central piece of any sustainable development strategy. Domestic public funds are critical in order to provide public goods, increase access to the poor, streamline the economic cycle and support macroeconomic stability. These policy choices effectively reduce long-term risks for water investments while enhancing the fiscal base for the future. As important as it is to progress towards efficient and transparent procurement, it ultimately is the removal of environmentally harmful subsidies and the progress towards pricing systems in line with the sustainable use of water, land and energy that will ensure long-term solutions. Domestic resource mobilization (DRM) is a key part of the spectrum of financing needed for Sustainable Development. It is essential for eradicating poverty and delivering the public services and infrastructure needed for all SDGs but has particular significance to SDG 6. By allowing developing countries to take ownership of their development strategies, meet the needs of their citizens then they have to adopt a pathway out of aid dependence.[35] Effective DRM requires optimum use of the three 'T's' – tariffs, taxes

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[32] Sadoff C. et al (2015), "Securing Water Sustaining Growth: *Report of the GWP/OECD Task Force on Water Security and Sustainable Growth".* Available at: http://www.gwp.org/en/gwp-in-action/News-and-Activities/New-Report-Water-Insecurity-a-Drag-on-Global-Growth/.

[33] G. Hutton and J. Bertram (2008), "Global costs of attaining the Millennium Development Goal for water supply and sanitation", available from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2647341/.

[34] UN-Water GLAAS Report (2014), "Investing in Water and Sanitation: Increasing Access, Reducing Inequalities". Available at http://www.who.int/water_sanitation_health/glaas/2014/en

[35] Postel, EG (2014), "Financing the future, why domestic resource mobilization belongs on the post- 2015 development agenda." USAID.

and transfers.[36] Here, effectiveness of planning will take into account how resources are channelled, coordinated and aligned in order to build country capabilities. Without addressing these questions (captured well by the development effectiveness principles of Paris, Busan etc.) it will not be possible to maximize the long-term impact of resources.

While domestic finance is a *sine quo non* for meeting SDG 6 it will not be sufficient on its own. A mix of public and private from multiple sources will be needed. Financial planning is necessary for making political investment decisions for water infrastructures that have long-term benefits. This has to be supported with viable and financeable sustainable management models to attract financing from many sources and cover operation, maintenance and capital costs. Defining the objective and designing more sophisticated financing packages that select the most appropriate and suitable instruments for each particular problem, e.g. blending grants, loans and public funds, are essential to attract financing institutions and secure best value for money.

In order to attract more finance – both public and private – basic building blocks need to be put in in place so that the finance is used to achieve the greatest impact and to ensure that the poorest and most vulnerable benefit[37]. These building blocks are discussed later as part of a package of means on implementation. They include regulatory frameworks that enable the setting of affordable tariffs and ensure the poorest and the most vulnerable are included; policies that create an enabling environment for investment; adequate human resource capacity at all levels; and, robust systems to monitor progress and the impact of policies and resources.

For SDG 6, the majority of public finance will come through taxes and tariffs supported by targeted transfers. For water resources management targets in SDG 6, financing will essentially be for public goods through government[38]. The levels of finance may be high for measures such as flood/drought risks, but modest for institutional reforms or regulatory systems. Domestic resources, with support from bilateral donors, will therefore be critical to achieve the non-service oriented targets. Financing for ecosystems is a good example. Protecting and restoring ecosystems as needed to meet target 6.6, has a proven track record of providing cost-savings and improving sustainability in water management. For example, watershed restoration to reduce water-treatment costs or protecting key ecosystem services that have unknown replacement costs are now relevant in policy planning. There is increasing experience in relevant financing tools such as through payments for ecosystem services (PES) schemes and approaches that invest in the value or importance they provide. Ecosystems, represented by natural or green water infrastructure and natural capital, must be integrated into overall financing and investment approaches along with other infrastructure. The benefits of investment can be assessed on a case-by-case basis. Incentives are critical for conservation and the manner in which systems are valued do not respond to current market pricing methods[39].

It is also important to factor in co-benefits (beyond water) of ecosystem-related investments, since these can be substantial (for example, fisheries or tourism and recreation benefits from

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[36] UN-Water GLAAS Report (2012), p.26. Available at http://www.unwater.org/fileadmin/user_upload/unwater_new/docs/UN-Water_GLAAS_2012_Report.pdf.

[37] These suggestions draw from the contributions of stakeholders at the 2015 UN-Water annual international Zaragoza conference, outcomes of which are available at http://www.u.org/waterforlifedecade/waterandsustainabledevelopment2015/.

[38] *Ibid*.

[39] Liu, S., Costanza, R., Farber, S. and Troy, A. (2010), "Valuing ecosystem services". Annals of the New York Academy of Sciences, 1185: 54–78. doi: 10.1111/j.1749-6632.2009.05167.x

more natural areas)[40]. In a low-income context PES schemes can provide jobs and income through ecosystem conservation and restoration; so-called pro-poor PES. This can also provide business experience and increased knowledge of sustainable resource management and, in the long term, improved ecosystem resilience[41].

**Businesses stand to benefit substantially** from the wide range of positive public health and economic development outcomes that will accompany the achievement of all SDG 6 targets. Private sector funding can supplement public investments in financing the means of implementation. This ranges from philanthropic and civil society financing to private finance investment for major infrastructure. It can contribute to the development of social enterprise models and other innovative financial instruments to finance the development or modernization of new or existing infrastructure, as well as sustainable business models for the maintenance and delivery of water and sanitation services. Leading companies are already finding opportunities to co-invest with the public sector in localities (such as South Africa) to improve local water infrastructure for the benefit of not only the company but for the local government and community more broadly. The private sector looks for investment opportunities that can supplement and/or provide a multiplier effect on other sources of funding to make a significant long term impact which individual company action cannot achieve. A financial model that demonstrates how access to water and sanitation improves a company's performance and enhances future business opportunities would help to stimulate this type of investment. Businesses are increasingly aware of the need to invest in new technologies to make their own operations more efficient, to reduce stress on water resources and protect eco-systems.

### *Pricing practices to match willingness to charge with capacity to pay*

Peoples' willingness and ability to pay for water and sanitation services should not be underestimated. Prior experience shows that water and sanitation targets can be reached even when financial opportunities are small and people's willingness to pay is hampered by poverty and deprivation. When financial, environmental and social objectives in water pricing are balanced, putting the right price on water should encourage people to waste less, pollute less, and invest more in water infrastructure[42]. Pricing water services is thus a means to implement targets 6.3 to 6.6. It should also be noted that the alternative for drinking water access via water services is, in many cases, bottled water, which carries a much higher cost per cubic meter.

Water prices must be adaptable and must progress in line with local incomes and economic development. Research shows, for example, that many poor people can afford using water from the network but not the cost of connecting to the network – thus calling for "pro-poor" initiatives that support free connection to water services for the poor. However, the political nature of water tariffs makes them resistant to increases, resulting in existing tariffs often lagging behind both people's willingness to pay and the true costs of providing the service. There is in fact potential to increase resources from tariffs by setting realistic prices at up to 3% of disposable income while using pro-poor tariffs to maintain access for the disadvantaged[43]. With a water meter system in place, a two-tiered tariff model is also viable, where the volume necessary to cover basic needs comes to a low or zero cost, whereas

[40] See for example a recent study on how lakes with greater water quality receive more visits at http://discover.umn.edu/news/environment/online-photos-provide-evidence-value-clean-water .
[41] UNEP (2008), "Payments for Ecosystem Services: Getting Started – A Primer". Available at http://www.unep.org/pdf/PaymentsForEcosystemServices_en.pdf .
[42] OECD (2015), "Water – the right price can encourage efficiency and investment", available at http://www.oecd.org/env/resources/water-therightpricecanencourageefficiencyandinvestment.htm
[43] *Ibid.*

volumes beyond the basic needs are charged a higher price. Experience shows that people are more willing to pay for a reliable service and the convenience of having a service closer to home.

Improving water resources management to meet target 6.4 will require considerable change to the way water is used for **agriculture**, the largest consumer in many countries. This is a complex topic that depends on local conditions. A main constraint to more efficient use of water for food appears to lay in the system management rather in the price. Where the legal and regulatory environments allow, using tradable rights to use water (quotas) is worth considering as a management tool. In many countries, large irrigation infrastructures have been, and still are, heavily subsidized and prices set accordingly, resulting in low to very low capital cost recovery.

To adequately address the food-energy nexus, agricultural and water policies must be harmonized. For example, the European Union Common Agricultural Policy for many years favoured subsidies to crops with high water requirements, which contradicted the Water Framework Directive for better water management. Many countries try to internalize the social and environmental impacts of irrigation water consumption. A balance has to be found between water-social and environmental demands when fixing the price of water. In a study from Navarra, Spain, it was found that an additional 0.06 EUR/$m^3$ would internalize the environmental costs generated by irrigation. Such an increase would, however, risk job losses and have negative impacts on regional GDP; therefore an optimal social price was reached by taking two thirds of the environmental costs into account.[44, 45]

To ensure sustainable use and management of water resources, measures are needed that incentivize water saving in industry and energy sectors. The price of water is often too low to justify a business case based on price alone. However, as water scarcity and associated risks are increasingly understood and acknowledged[46], some companies are already preparing for the future, not only as part of their operational risk management but also as part of their corporate social responsibility strategy. Examples including using shadow water prices, where the price of water, for internal accounting purposes, is set according to local water availability rather than the actual price charged by the local water provider[47,48]. In this manner, internal incentives for water saving investments increase. Such schemes take environmental and societal externalities into account and are useful in countries that lack the institutional capacity or political will to impose adequate regulatory measure. The UN Global Compact Water Action Hub, the UN's main corporate sustainability initiative, is providing leadership in this field and partnering with more than 125 companies committed to advancing corporate water stewardship and better sanitation practices. From the side of corporate responsibility, tackling risk and enhancing their reputation as "good citizens" is an important means of implementing the SDG 6 targets on water resources management[49].

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[44] FAO (2004), "Water charging in irrigated agriculture - An analysis of international experience". Available at ftp://ftp.fao.org/agl/aglw/docs/wr28e.pdf.
[45] OECD (2010), "Agricultural Water Pricing - EU and Mexico." Available at http://www.oecd.org/eu/45015101.pdf
[46] The water crisis is listed by World Economic Forum as one of the main global risks for the future; see http://reports.weforum.org/global-risks-2015/#read
[47] WBCSD (2012), "Water Valuation: Building the business case". Available at http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=15099&NoSearchContextKey=true, see
[48] See example from Nestlé: https://www.water-challenge.com/posts/water-management-%E2%80%93-part-three-pricing-and-other-cost-effective-solutions-to-address-overdraft
[49] UN Global Compact Water Action Hub (2012). "The CEO Water Mandate: A guide to Water-related Collective Action." Available at http://pacinst.org/wp-content/uploads/sites/21/2013/02/wrca_full_report3.pdf

Israel provides an example of the successful use of water pricing to manage water demand in a severely water scarce country. The country has pioneered water efficient technologies and practically all water consumption is metered. In recent years, the financial burden has been shifted to consumers that pay higher water tariffs[50]. These tariffs reflect cost recovery, the scarcity of resources and the cost of rehabilitating natural assets that have been depleted or have deteriorated. Increases in water prices have both reduced water use and encouraged the use of recycled and desalinated water sources for irrigation.

Encouraging water users contribute to financing water services is an integral part of a sustainable water development strategy. However, revenue from water tariffs must not be diverted to other uses, captured by any social group or lost to corruption. People must perceive that they are paying a fair price and that, by paying for water, they are getting better services and contributing to a collective endeavour. All these conditions will ease the financial challenge of water development.

### *Future financial resources*

In addition to strengthened domestic fiscal systems and better water pricing, new and expanding opportunities to tap into financial resources may come from areas such as climate change, energy and food. Climate change is expected to be felt most clearly in the area of water, and more effort is needed in the United Nations Framework Convention on Climate Change (UNFCCC) Committee of the Parties (COP) 21 negotiations to put water at the centre of climate change adaptation and mitigation strategies. The new Green Climate Fund[51] to support country actions coping with the adaptation and mitigation of climate change in this regard may represent as much as US $100 billion per year. To access funding for the implementation of SDG 6, a coherent framework for the distribution of funds will have to be developed that optimizes investments across the range of users vying for these new funds.

Another area where water is also critical is in the promotion of sustainable agricultural development and water projects. These may be eligible for financing by the Fund for Smart Agriculture in Latin America and the Caribbean (LAC), or other funds such as the Canadian Climate Fund for the private sector. Acknowledging the role that water plays in enhancing and protecting the environment, water has also been funded by the Global Environmental Facility. The creation of blue water bonds, similar to climate bonds, may be another future option to attract funds to water management and environmental protection. Finally, the incorporation of new donors from emerging economies like China, India, the Middle East and Brazil into the market can provide new financial streams.

**Private sector philanthropic investment** is playing an increasingly important role for water and sanitation. Foundations such as the Bill & Melinda Gates Foundation have committed more than US $265 million to the WASH sector over a five-year period to 2011[52]. Many others, such as the Rotary Foundation, invest and mobilize millions of dollars for the provision of drinking water and sanitation access around the world. Yet enabling domestic environments and sound policies for accountability between partners will remain important conditions for private sector funding in order to balance business needs with affordable pricing policies.

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[50] UN-Water (2011). "A Water toolbox or best practice guide of actions." Available at http://www.un.org/waterforlifedecade/green_economy_2011/pdf/water_toolbox_for_rio+20.pdf

[51] Available at: http://unfccc.int/cooperation_and_support/financial_mechanism/green_climate_fund/items/5869.php

[52] Gates Foundation Water, Sanitation and Hygiene Portfolio. Available at http://www.gatesfoundation.org/What-We-Do/Global-Development/Water-Sanitation-and-Hygiene.

**Public-private partnerships** (PPPs) can for example help smallholder farmers invest in irrigated agriculture projects, and also improve access to safe water and sanitation services by building new infrastructure, improving technology or using clean technology to better meet the needs of the community. Increasingly, the professionalization of technical skill-sets may pave the way for new private sector investments and access to other financial instruments in water and sanitation services and in productive water uses via commercial loans, results-based finance and credit guarantees[53].

**Official Development Assistance** (ODA) continues to play an important role for water and sanitation in the world's poorest countries. ODA is an essential component of the financing "toolbox" and donor countries are obligated by their previous commitments to act. Governments need to use ODA much more effectively, including the means to leverage funds from other sources. ODA has to be targeted at poor and vulnerable countries and people, including water insecure countries, which still lack the governance systems and capacity to mobilize financial resources domestically or raise adequate funds from payment for water services. Assessing the contribution of ODA through indicators such as the "Total Official Support to Sustainable Development" may become a powerful means to ally international support with national priorities.[54] This is particularly important to scale up emerging South-South and triangular cooperation and to guarantee that all new sources are additional, predictable and applicable to the priorities of developing countries.

In times of economic difficulties, ODA, like investments from the private sector, can suffer. Yet one promising example is the Monterrey Agreement, which has served both to maintain and increase ODA in spite of the economic downturn of many donors, as well as to help countries progress towards integrated sustainable development strategies better focused on those more in need.[55] Other new mechanisms such as "**blended finance**" (a combination of concessional and non-concessional public finance paired with private investments) can become an important means to structure investments in water development that do not replace or impose heavy debt burdens on public responsibilities.

In this way, funding mechanisms can gradually be eased or transitioned from foreign aid and public funding to shared funding (by the public and private sector) and cost recovery strategies, which can ensure long-term sustainability to affordable and self-sustainable water services and water resources management. These must be underpinned by changes in behaviour and education in areas such as charging and paying for services.

**Vertical funds** present another promising example. Good experiences from the MDG era include vertical funds such as the Global Alliance for Vaccines and Immunization (GAVI). A similar global pooled fund linked to the implementation of SDG 6 for the poorest and most vulnerable people would provide an opportunity to reach the targets.

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[53] World Water Council and OECD, (2015). "Water, Fit for Finance? Catalysing national growth through investment in water security". Full article forthcoming, information available at http://www.oecdobserver.org/news/fullstory.php/aid/4825/Water:_Unclogging_the_finance.html.

[54] OECD (2014), "Background paper: Towards more inclusive measurement and monitoring of development finance – Total Official support for Sustainable Development". Available at: http://bit.ly/1Q5MBk3

[55] The Monterrey Consensus of Financing for Development (2002). Available at: http://www.un.org/esa/ffd/monterrey/MonterreyConsensus.pdf

Recent input suggestions that such a fund would need to fulfil some important agreed criteria based on experiences from other funds to add value and be efficient in its implementation in countries, for example[56]:

- focus on **the poorest and most vulnerable** and seek to reduce the significant disparities that exist in countries as an essential part of achieving the water Goal;
- **support and reinforce government systems** rather than creating parallel coordination and monitoring mechanisms;
- establish **governance structures led by Member States,** as they are ultimately accountable for the achievement of the SDG targets;
- work alongside structured support in-country to governments to access funding by developing credible policies and plans and systems to monitor and account for the use of the funds and the results achieved; and
- foster **collaboration and integration** between Goal 6 and other aspects of the SDG framework, rather than reinforcing sector 'silos'. The SDGs will not be met if individual Goals are tackled in isolation.

### *Pro-poor and inclusive financing strategies*

As is relevant for all SDG targets and for all of the options listed in this section, financing strategies need to follow "pro-poor principles" that involve water users in decision-making and implementation. Making people part of their own water development solutions is critical to meeting the SDGs. As experience shows that governments alone cannot implement all water projects, ensuring that capacity and financial support to local communities are in place may increase community ownership and the ability to respond to eventual difficulties.

Within this context, trust funds, micro-finance, philanthropy and sovereign wealth funds and choosing low-cost grassroots solutions can be powerful options. Community engagement from the very planning process is fundamental to enable choosing cost-effective solutions, ownership, empowerment and sustainability in operation and maintenance.

The World Bank identifies three main instruments for viable financing for lower income communities:[57]

- **Lower water tariffs linked with low-cost technologies**. In poor communities where households cannot contribute significantly, the selection of affordable but efficient technologies may contribute to provide essential services.

- **Better targeted public support**. It is important to shift public finance to those more in need of support, such as the urban and rural poor and those living in distant rural areas. This may include targeted transfers from international donors.[58]

[56] These suggestions draw from the outcomes of discussions among various stakeholders at the 2015 UN-Water annual international Zaragoza conference, outcomes of which are available at http://www.u.org/waterforlifedecade/waterandsustainabledevelopment2015/.

[57] The World Bank Group (2013). "Financing for Development Post-2015". Available at: https://www.worldbank.org/content/dam/Worldbank/document/Poverty%20documents/WB-PREM%20financing-for-development-pub-10-11-13web.pdf.

[58] WASH does not take a relevant share of the USD 15 billion spent by external support agencies in 2012 but, even if this was possible, 60% of countries do not have the capacity to generate and implement projects to absorb a high percentage of donor capital commitments for sanitation.

- **Improving use of donor and public financing through results-based contracts and output-based aid**. Performance-based contracts can increase effectiveness and reduce future financial burdens.

Existing aid can also be used to provide collateral and warranties designed to attract private capital to locally risky projects – including local community projects and for supporting the establishment of local credit systems that can create revolving financing sources.

## 3.2 Technology (including science and innovation)

Targets 17.6 to 17.8 address technology, science and innovation aspects, putting special focus on three particular points. First, there needs to be an enhancement of North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation. Second, the promotion of the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms. Third, and arguably most difficult, is the full and rapid operationalization of the technology, banking, science, and innovation capacity-building mechanisms for the least developed countries (LDCs) while enhancing the use of enabling technology, in particular information and communications. This is a vast and technical topic and a few examples are given below to illustrate the huge potential this offers for achieving the SDG.

**Cost-effective technological solutions for water supply, sanitation and hygiene are readily available and implementable**. For targets 6.3 and 6.4 new technologies and infrastructure must be provided to treat wastewater and increase reuse, as well as improve water use efficiency by the industry, energy and agriculture sectors. To meet targets 6.1 and 6.2 sound practices and services must be delivered and sustained within an enabling environment. Accompanied by adequate human, institutional and financial arrangements for long-term operation and maintenance, this requires adopting behavioural change approaches, scaling-up services that are appropriate within the local context and broadening the scope of funding for water projects. Projects must also look at the entire water cycle and consider sanitation, from which more people suffer from a lack of access: drinking water continues to attract the majority of water, sanitation and hygiene (WASH) funding, even in countries with relatively high drinking water supply coverage and relatively low sanitation coverage.

Advances in water and sanitation are contributing to an increasingly wide array of new technologies and approaches that are adaptable to scale, capacities and local conditions. There is an increasing range of innovative and low cost technologies and behaviour change approaches for sanitation and water supply and management, as well as technical alternatives to increase efficiency in water provision and water use in industry, agriculture and energy production. There are also many alternatives for adapting to climate change and reducing the risks derived from water extremes, such as floods and droughts. What is clear is that an integrated management approach is essential to reach sustainability in the sector: the solution to one problem must be the solution to all.

In terms of water production, improved treatment technologies are making it increasingly feasible to convert lesser quality raw water to better quality drinking water. In Namibian capital Windhoek, one of the most arid regions in the world, wastewater has been directly used to produce drinking water since 1968, without any waterborne disease outbreaks or

attributed health effects[59]. Singapore is another example, with a third of the country's water consumption being covered by reclaimed wastewater[60]. The main obstacle is not technical feasibility, but public acceptance. Seawater desalination is another option for water scarce regions, and although the technology is relatively expensive due to its energy requirements (10 to 100 times higher than conventional water treatment[61]), with more than 17,000 desalination plants in 150 countries serving more than 300 million people it is clear that many see no other option than to pay that price[62]. To abate the energy requirements, research is looking into a variety of innovative solutions that will need to be rapidly brought to scale if the SDGs are to be met.

Another infrastructure component with great savings potential is the water distribution network: about 30 % of global drinking water production never reaches the final consumer due to leakages on the distribution network[63]. The work of detecting and repairing leakages is labour-intensive, but new monitoring instruments such as pressure and acoustic sensors, coupled to cloud-based monitoring systems, enables fast and precise detection. For water used in agriculture, it is estimated that 50 % of total production is lost[64]. This leakage does not necessarily affect the overall level of water scarcity, as water often is returned to nearby aquifers or rivers; however, returned water is often polluted and may be returned too far downstream to be of use. It is thus important to invest in efficient water delivery systems for agriculture to meet targets 6.4 and 6.6 for both economic efficiency and for eco-system protection.

The safe transport of excreta and wastewater to a treatment facility is needed for both environmental and human health benefits. In regions of high precipitation, raising sea level and frequent floods, infrastructure is needed for storm water management. To avoid overflowing sewers and subsequent consequences on the built infrastructure as well as the environment and human health, green areas can be set aside to retain the storm water, such as wetlands, rain gardens and green roofs, instead of sending it down the pipe. Such solutions, along with aquifer recharge, also have the added benefit of storing water for later use, for example in agriculture. The use of green areas can provide important open spaces for people within urban areas. Due to the high cost of building and maintaining modern water and sewer systems, urban planners in smaller or secondary urban centres in developing countries can consider decentralized systems, with wastewater treatment close to its point of origin[65]. One example is the ecological toilet, designed to use no or very little water, and to separate urine and faeces for easier treatment and reuse in agriculture.

Meeting target 6.3 and 6.4 for wastewater treatment, improved water quality and better water resources management is also linked to other Goals such as energy. Wastewater is a resource and technology is moving towards solutions that use waste for energy production. In water scarce areas, wastewater can be reused in agriculture after treatment, with its nutrient load as an added benefit. In less water-scarce areas, the effluent is discharged into a nearby water course and the dewatered sludge can be used as a fertilizer, a process step commonly coupled with biogas production. Depending on the choice of tertiary treatment process, nutrients can to a higher extent be removed from the effluent and made more easily available

[59] http://www.waterscarcitysolutions.org/assets/2030WRG_case_study_windhoek_namibia.pdf.
[60] http://www.dw.de/singapores-toilet-to-tap-concept/a-16904636.
[61] Gude (2015), "Energy and water autarky of wastewater treatment and power generation systems".
[62] http://idadesal.org/desalination-101/desalination-by-the-numbers/
[63] https://openknowledge.worldbank.org/bitstream/handle/10986/19811/9781464802768.pdf?sequence=5.
[64] FAO (2004), "Water charging in irrigated agriculture - An analysis of international experience." Available at ftp://ftp.fao.org/agl/aglw/docs/wr28e.pdf.
[65] http://www.unep.org/pdf/SickWater_screen.pdf.

in the sludge. Phosphorus can also be extracted from the wastewater's urea component as an effective fertilizer that can be easily stored and transported[66]. For industrial wastewater, onsite treatment is gaining importance due to the use of many new process chemicals that need to be managed from a liability point of view. Further, the fewer constituents in the wastewater, the easier it is to treat it and potentially recover individual constituents of value.[67]

In agriculture, soil moisture conservation practices, rainwater harvesting and application of water at key growth stages are examples of techniques that have shown to increase yields significantly - a win-win for the water and food SDGs. On the larger scale a sustainable intensification of existing land and water resources along with a revitalization of irrigation systems and bioremediation, can reduce losses and salinity, which wastes water and reduces food production[68].

Investment in hydropower, particularly in Africa will be needed to meet energy requirements and keep $CO_2$ emissions low. Efficient technologies and carefully designed operating systems are required to minimise water use and pollution. Application of good practices and following international guidelines helps to meet energy needs for development without compromising long-term sustainability of water resources, significant impacts on other water uses and the health of dependent ecosystems.

One example of the interconnectedness of water and agriculture comes from India, which made a legal commitment in 2013 to provide minimal essential calories to over 75% of the population. It includes "rainwater harvesting, aquifer recharge and conjunctive use of ground water, surface water, treated wastewater and seawater (...) farming systems involving halophytes and aquaculture"[69]. As fresh water constitutes only 3 % of all global water resources, and 70% of freshwater resources are used for agriculture, methods to utilize seawater for agriculture could represent a major technological breakthrough that would reduce the freshwater burden.

An example of important water scarcity management measures under consideration by Jordan and Palestine[70] is the Red Sea - Dead Sea Water Conveyance project. At an estimated USD 4 billion, this project touches on the nexus of geo-engineering, preparedness and supply management interventions and can forge strong, lasting partnerships between all parties involved. It also demonstrates the way forward for the implementation of various SDG targets. It will provide potable water to the two countries, bring seawater to stabilize the Dead Sea water level and generate electricity to support the energy needs of the project. This case study provides member states with a roadmap for the future of transnational cooperative projects for resilience to meet the Sustainable Development Goals.

### *Smart monitoring technologies: low cost and locally adapted*

Information is key to sound decision-making, and local, up-to-date and high-quality data is essential for the provision of sustainable water and sanitation solutions. New technologies are rapidly improving our capacity to collect, store, analyse, report and share data, a remarkable

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[66] Etter et al. (2011). "Low-cost struvite production using source-separated urine in Nepal".
[67] http://www.aquatech.com/news/industrial-water-treatment-technology-trends/.
[68] Bird, J. (2014), "Game changers for irrigated agriculture—do the right incentives exist?" In *Irrigation and Drainage* 63: pp. 146–153.
[69] UNDP (2014), "Human Development Report", p. 49. Available at http://hdr.undp.org/sites/default/files/hdr14-report-en-1.pdf
[70] The World Bank (2012), "Red Sea-Dead Sea Water Conveyance Study." Available at http://web.worldbank.org.

data revolution[71] in which the sector already is taking part. Effectively measuring progress toward the expanded targets under SDG 6 will require new approaches to monitoring; innovations that integrate all relevant data sources and fill missing data gaps in unique ways.
The expanded SDG 6 water targets—water quality, wastewater treatment, water-use efficiency, integrated water resources management, and protection of water-related ecosystems—require coordinated, fit-for-purpose monitoring systems that serve multiple actors, scales and applications. These are being incorporated into an expanded Integrated Monitoring of Water and Sanitation Related SDG targets, or "GEMI" initiative, which aims to provide a consolidated monitoring framework for the entirety of SDG 6.[72]

Rapid advancements in the field of mobile phone-based and geospatial data collection tools, for example, have been proposed as a means to create national inventories of critical facilities and infrastructure relevant to achieving and monitoring the SDGs. With these technologies it will be possible for local people to collect information on the type, location and functionality of water and sanitation infrastructure, such as water points; WASH facilities in schools and health clinics; water treatment, storage and distribution systems; wastewater transportation and treatment systems; irrigation systems; and solid waste collection and treatment facilities[73]. Through mobile-to-web solutions the collected data will be available in real time for various uses on the local, regional and country level.

This kind of data collection could help remedy knowledge gaps in developing countries regarding their national physical assets and provide a platform for improving future on-going administrative data and reporting. The information can also provide valuable insights as a basis for informed decision-making, program planning, and strengthen transparency and accountability. The full potential of mobile to web solutions is still to be discovered and have potentials for governments to track progress on targets in real time.

Geospatial data encompasses and enables a wide-range of environmental monitoring, but there are a few environmental dimensions that will require additional and more targeted measurements, using ground technologies or surveys. There is huge potential for technological innovation. Data collection is often paired with geospatial tools such as remote sensing. Measures considered include biodiversity, air quality, hydrological monitoring, and forest and land use change[74].

Climate variability impacts directly on food security and in 2009 the Kyrgyz Republic established a Weather Information for Farmers (WIF) system and strengthened the Kyrgyz Agency on Hydrometeorology by upgrading its outdated equipment and improving staff skills, resulting in better reporting and data collection. Among others this provides an SMS based weather forecast dissemination system for farmers and a few small-scale meteorological stations for data collection on agricultural microclimates. Such initiatives, include installing technologies, training staff to use the systems and data help vulnerable farmers take the

[71] United Nations Secretary-General's Independent Expert Advisory Group on a Data Revolution for Sustainable Development (2014), "A world that counts". Available at http://www.undatarevolution.org/wp-content/uploads/2014/12/A-World-That-Counts2.pdf.
[72] UN-Water GEMI (Integrated Monitoring of Water and Sanitation Related SDG targets) (2015), "Monitoring Waste Water, Water Quality and Water Resources Management: Options for Indicators and Monitoring Mechanisms for the Post-2015 Period". Available at http://www.unwater.org/fileadmin/user_upload/unwater_new/docs.
[73] UN Sustainable Development Solutions Network (2015), "Data for Development: A Needs Assessment for SDG Monitoring and Statistical Capacity Development. Available at http://unsdsn.org/resources/publications/a-needs-assessment-for-sdg-monitoring-and-statistical-capacity-development/.
[74] UN Sustainable Development Solutions Network (2015), "Data for Development: A Needs Assessment for SDG Monitoring and Statistical Capacity Development. Available at http://unsdsn.org/resources/publications/a-needs-assessment-for-sdg-monitoring-and-statistical-capacity-development/.

measures needed to protect animals and crops, thereby improving food security for the entire country.

There are many institutions which have developed guidelines for different aspects of SDG 6 implementation. These need to be much better disseminated and used in capacity-building programmes linked to actual development projects. An example is the Water Partnership Programme of the World Bank and its partners from successful utilities that focuses on *'How to Turn Utilities Around and Provide Services for All'.* A toolkit (now in preparation) will provide access to information on what works and what does not in urban water reform and how to get infrastructure to the urban poor.

Transferring technology requires both local knowledge and local capacities to make well tried practices meet with local conditions. The effective adaptation and use of technologies, (which have been piloted already in Nigeria and other countries[75]), critically depend on the knowledge, the human and social capacities in place and the strengthening of existing institutions and policies.

### *Making better technology choices*

Smart technology choices require comparison between conventional technologies and new ones, balancing traditional infrastructures with green alternatives, mixing local and global knowledge, adapting alternatives from abroad to local conditions, dealing with environmental and social impacts of the alternative technologies, etc. All of these decisions require technology evaluation and assessment tools and good water governance so as to ensure transparency and inclusiveness.

Poor countries managing water integrally have a lot to gain from choosing the best technologies by using sustainability criteria. Countries at an early stage of development have the opportunity to advance rapidly by harnessing new technologies and avoiding following unsustainable development pathways. Technological leapfrogging can allow these countries to make better choices between traditional and new technologies, especially when going further than mechanical technology transfers by disaggregating data among gender issues, local knowledge and intellectual property rights in making the right social choice. In addition, green technologies, which increase the amount of water available, boost resource efficiency and contribute to achieving development goals, may be converted into opportunities to create new business opportunities, markets and jobs. Technology, science and innovation development, when combined with public awareness, can make a real contribution to efficiency and sustainable growth in most water using sectors.

### *Knowledge-sharing and transfer of technology*

**Knowledge-sharing**, such as through Global Technology Platforms is another important means to improve water decisions. This includes not only the dissemination of techniques but also to the enabling conditions that may favour their transfer and adaptation and of the capacities to make them viable.

Technology transfer may also be facilitated by **peer-to-peer transfers**, business networks and alliances. In the policy making arena, this interplay can be facilitated by Ambassadors able to

[75] This tool has been piloted in Nigeria by the Nigerian MDG Office and the Earth Institute and designed but not fully implemented for the Government of Haiti. Many countries already have partial inventories so this tool is meant to support and enhance existing sources. The objective of this tool is to ensure national coverage.

connect business sectors in the water, energy, food and climate change sectors, and third parties able to connect social sectors, such as academia, civil society and governments.

The private sector has an important role to play in developing and disseminating technologies, and it participates both in entrepreneurial activities to develop and introduce new models for delivering water and sanitation services and increasing water use efficiency and productivity, as well as in efforts to accelerate adoption of successful innovations across global supply chains and markets.

### *Overcoming barriers for technology adoption*

This includes initiatives to ease or remove barriers that inhibit the adoption of water technologies – such as policy disincentives, weak market demand, uncertain return on investment, and technological lock-in to current infrastructure - as well as other barriers that are more specific to some developing countries, such as lack of technical skills and capacity. Competition policies may be examined for its potential to foster or inhibit the adoption and dissemination of new technologies.

In implementing SDG 6 lessons can be learned from other sectors. For example, to meet the MDG targets on malaria, the Global Malaria Action Plan and detailed national strategies for controlling and treating malaria was established in priority countries. This initiative aimed for a "2015 Roll-Back Malaria" with a 75 per cent reduction in malaria morbidity and mortality relative to 2005[76]. Through this project, Long Lasting Insecticidal Nets (LLINs) were established as a proven and effective tool in controlling malaria in endemic areas, and over time WHO also recommended the free distribution of LLINs (WHO 2007), largely because social marketing campaigns had proven ineffective at reaching the required scale. What the Malaria Roll-backs initiative demonstrated was that more often small-scale capacity projects that informed and inspired the scaling-up of proven health-care interventions had better success.

The Millennium Villages Project demonstrated the feasibility of rapid malaria control through an integrated strategy which reshaped the donor discourse in order to provide effective forums for rapid learning and knowledge transfer across countries. In this case, capacity building and training was effective, because it was tied to the mobilization of resources to implement programs at scale. For example, after implementing the programme practically all malaria endemic countries have an effective national malaria programme, because of the emphasis placed on learning and knowledge transfer made possible through its large-scale and targeted funding.

### *Providing incentives to foster research and innovation for sustainable water management*

The SDGs can be a driver of innovation. Besides supporting basic research, governments can play a key role to incentivize and foster innovation by creating the conditions to transform knowledge and sustainable technologies into viable opportunities. Pilot projects or demonstration projects, can help reduce innovation risk and minimize costs when scaling up. Global business solutions like certification schemes are also efficient means to motivate business to act in the right direction of technology, science and innovation development. Further investments in science, and particularly in applied science, will help speed the innovation curve and the translation of new tested solutions into the ground.

[76] SDSN (2015). "Financing for Sustainable Development Report". Available at http://unsdsn.org/wp-content/uploads/2015/04/150505-SDSN-Financing-Sustainable-Development-Paper.pdf.

Science, technology and innovation strategies are integral parts of sustainable development strategies. Government financing and policies for innovation, supported by public-private partnerships, can be purposely designed and implemented to reduce risks and promote research and development and diffusion and transfer of technologies. Additionally, most research on infrastructure costs and needs has focused on drinking water supply and sanitation[77], leaving behind other important aspects that highly influence the other water targets as well as target 11.5 (water-related disasters) and building resilience to climate change. Particularly, further research is needed for country-specific investment for water resources management and the control of water and wastewater quality, as well as for operation and maintenance necessary for the sustainability of services from both existing and new infrastructure, not forgetting funding of related governance functions. Apart from the development of new infrastructure, important investments will be required to upgrade and maintain existing infrastructure to avoid it becoming obsolete. Countries will have to allocate research focused on identifying strategies to attract financing and human resources capacity that will address the water targets.

## 3.3 Building and developing capacity

Target 17.9 highlights the importance of developing capacities to implement the SDGs. This comprises the establishment of a solid knowledge base and practical skills at all levels, including those of individuals, organizations, partnerships, communities and the enabling environment as well as the untapped ability of volunteers to engage and benefit all segments of society (Figure 2). The key for implementing SDG 6 will be to ensure that building capacity is focused and targeted on the people and institutions that are critical to achieving all water targets, as well as other targets linked to water.

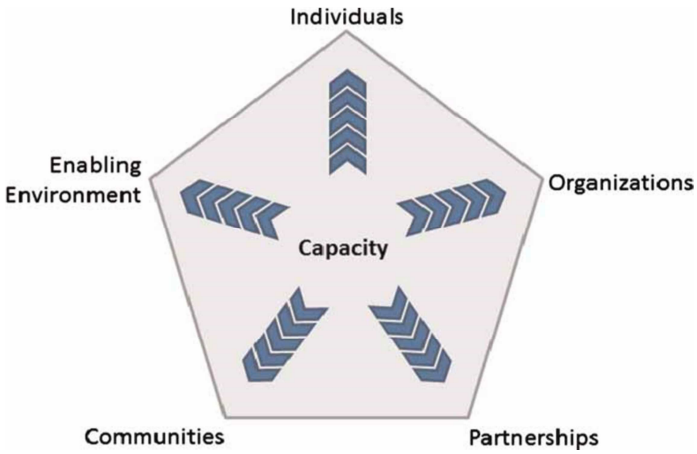


*Figure 2 Five key dimensions of capacity. Adapted from Wouter T. Lincklaen Arriëns and Uta Wehn de Montalvo, "Exploring Water Leadership".* In *Water Policy 15 (2013) 15–41.*

Capacity-building and capacity development is a critical element for the successful implementation and scale-up of development programs. It encapsulates a diverse array of functional capacities – from planning, oversight and monitoring to situational analysis,

[77] Doczi, J, Dorr, T., Mason, N. and Scott, A. (2013), "The Post-2015 Delivery of Universal and Sustainable Access to Infrastructure Services." Overseas Development Institute, London.

facilitation of stakeholder involvement, skills training, management support, and provision of policy advice[78].

### *The role of capacity-building for target 6.5*

The obligation to implement national Integrated Water Resources Management (IWRM) plans has been accepted and embedded in international development agendas since Agenda 21 in 1992 and is included in the SDG 6 under target 6.5. See **section 3.5** for further information on IWRM policies and their implementation at the national level. Building capacities for target 6.5 will also support all the other water targets and target 11.5 as well as facilitate links between water and other SDGs. By its very nature, IWRM requires a special focus on capacity building at each stage in order to be successful (Figure 3).

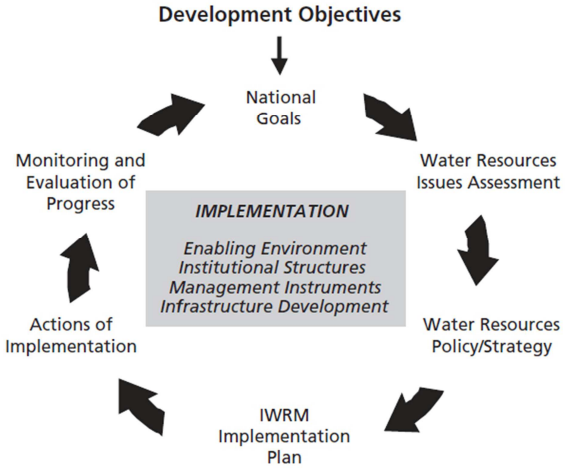


*Figure 3 Stages in IWRM planning and implementation. Adapted from http://www.un.org/waterforlifedecade/iwrm.shtml.*

Access to information on IWRM is presently limited. Obtaining new skills requires improved access to information, sharing capacity (e.g. as when trainees become trainers) and its application. Information materials, training materials, and knowledgeable experts are all critical inputs to a successful capacity-building programme. Online platforms of open content education and training materials can help facilitate these processes.[79] This is particularly the case with IWRM, which requires a cycle of responsiveness to capacity development needs coming from different target groups around the world, along with adaptive knowledge management systems. The process of managing, transferring and developing knowledge for IWRM is shown in Figure 4 below. Capacity building programmes are best if they form an integral part of a larger development process so that skills learned can be immediately applied.

### *Investing in capacity*

Investment in capacity-building has been a major challenge facing many countries and has to be addressed if the Goals are to be met. For example, all institutional reform or infrastructure projects need to include a capacity building component. Costs can be significant at the initial

[78] UNDP and AEPC (2010), "Capacity Development for Scaling Up Decentralized Energy Access Programmes: Lessons from Nepal on its role, costs, and financing". Available at http://www.undp.ro/download/capacity_dev_energy_access%20full%202010.pdf

[79] See, for example, the UNDP Cap-Net virtual campus, launched in September 2014 and building upon programmes on how to use integrated water resources management tools and instruments for adapting to climate change, and in managing floods and droughts, including the use of earth observation tools: http://campus.cap-net.org/.

stages of a project, and must be fully taken into account in planning program budgets. There is strong evidence that investing in capacity-building not only makes sound economic sense in terms of return on investment, but it can also help leverage additional sources of funding. In a recent UNDP project, initial funding from public sources played a dominant role in the beginning (well over 90 %), much of which was dedicated to capacity development. Yet the share of public financing gradually declined to about 50 % at a later stage, suggesting that the pivotal role of public investments in developing national and local capacities subsequently attracted private financing. Following the publicly financed capacity building, communities and households made significant contributions to implement them[80].

The private sector can contribute to capacity-building, for example through initiatives such as technical training, project planning and management support, and creating capacity for self-sufficiency. A wide range of tools and guidance is available. This knowledge can be utilized and integrated into broader frameworks being pursued by the public and civil society sectors to help meet SDG 6.

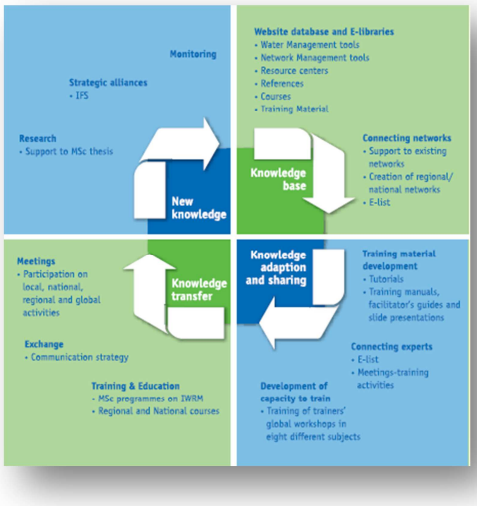


*Figure 4: Addressing IWRM Knowledge Management: Conceptualising the flow and management of knowledge in the context of capacity-building and the strategy of the Cap-Net programme. Adapted from UNDP/Cap-Net.*

**For water and sanitation, capacity-building is closely linked to investments that support the use, adaptation and transfer of new technologies.** Capacity-building needs, however, also include researching and promoting the understanding the impact of global changes (not just climate change), and implementing best management practices in places such as water utilities, where they are often of poor quality. Target 6.a highlights the need to expand international cooperation and capacity-building support to developing countries in water and sanitation-related **technological** activities and programs, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.

Funding agencies (including government agencies for public finance) often express concern that water and sanitation projects are poorly prepared and thus do not attract finance. To be successful, capacity-building to meet SDG 6 thus requires education of water specialists in financial instruments and in the preparation of projects suitable for investment.

[80] *Ibid* .

### *Building upon and involving local knowledge*

Policy and technology choices must take existing capacities into account and their implementation must consider processes that enable people to implement policies and make use of innovative technologies in due time. This also requires identifying local knowledge and mobilizing it from the start. A virtuous cycle of capacity building, policy formulation and adopting innovative technologies has to be implemented to ensure all the means of implementation are mutually reinforcing.

Capacity-building is an accumulative *learning by doing* exercise. It is not just a process of absorbing information and skills brought by experts, whether local or external, but one of assuming responsibilities and being able to adapt existing knowledge and to assume new knowledge in order to respond better to local circumstances. Capacities are also needed to implement, monitor and report on development plans and strategies.

Capacity-building works better and delivers better outcomes in terms of human development when social-cultural aspects are taken into account and when locals and their institutions understand the value of building capacities. This may require undertaking intensive communication to bridge the gap between decision makers, experts and local communities. Advocacy, scaling up, social mobilization/building networks are also necessary means with a focus on implementation.

### *People-centred approaches*

The SDGs call for people-centred approaches to development, yet human resources are perhaps the most underused resources that must be unleashed in order for communities to achieve SDG 6. In particular, in the water and sanitation sectors it is important to recognize the central role of women and to give value to inter-generational responsibility for transformation. Successful examples exist whereby women have become effective and reliable water managers and where young people were trained at community-level to build and maintain low-cost toilets or hand pumps in rural areas.

**The role of volunteerism** is another factor which is often overlooked but can be essential to achieving development goals. Volunteerism fundamentally represents a *people-centred* and *rights-based approach* acknowledged by the OWG. The power of volunteerism has been recognized as a cross-cutting means of implementation but is presently under-utilized. Recently, the International Forum for Volunteering in Development produced the 2014 Lima Declaration, which provides a strong argument, including financially, that sustainable development is not possible without volunteers[81]. Specifically, in the context of SDG 6, the organizations at this forum have called attention and committed to volunteer programmes which "cooperate with local authorities in the improvement of local capacity for self-sufficiency" and are "designed to empower grassroots-level water resources management and to provide capacity development to ensure access to adequate and equitable sanitation and hygiene for all."[82] In practice, according to a UNV in action report, in **Ecuador**, UN Volunteers set up eight Ecological Youth Clubs in regions of the country with challenges in drinking water supply and sanitation. The benefits of volunteerism were enormous due to the local influence of volunteer partners. Through community-based adaptation about 400 youth learned how to take measures to protect water sources and the environment, and around 30,000 people were

[81] The Lima Declaration (2014*). International Forum for Volunteering in Development.* Available at http://forum-ids.org/conferences/ivco/ivco-2014/lima-declaration/.
[82] *Ibid.*

reached through awareness-raising workshops and campaigns[83]. Volunteerism is essential and continues to implement long-term change at the community level as outlined in target 6.a.

## 3.4 Trade

SDG 17 includes targets on trade that are not directly related to water. However, it would be a mistake to assume water and trade are not linked: water scarcity is impacted by its use in the production of goods and services. Trade in high water consumptive goods from water scarce regions is not viable long term and is a threat to meeting SDG 6 and other Goals[84]. Countries will need to revise policies to avoid incentivizing high water use for low value purposes and unsustainable export promotion. This is a very complex issue and requires much more research to evaluate water-trade links and to find possible policy and regulatory solutions if trade is causing unsustainable water practices and reducing local availability of adequate water resources. The water footprint concept is an example of a tool that companies, governments and individuals can use to understand their water dependency and how much water that is traded together with a specific goods.

Water experts need to be involved is trade negotiations and trade policies, and practices need to be aligned with the goal of sustainable water at global, regional and national levels. To meet target 6.4 overall gains in water-use efficiency is needed as well as incentives to countries to produce and trade goods in-line with their specific water circumstances, while fully participating in fair, equitable and sustainable trade. As a central producer and disperser of goods and services, the private sector has a key role to play in discussions around trade policies and governments must regulate to protect societies from over-exploitation and degradation of water resources by business.

## 3.5 Policy and institutional coherence

Policy and institutional coherence are covered by Targets 17.13 to 17.15. Integrated responses are called for in many sectors, based upon sustainable development strategies at the national and sub-national level and a global partnership for sustainable development at the international level[85]. Yet the nature of the water cycle calls for a particular need for integrated responses, in addition to a sector-specific focus on the enhancement of global macroeconomic stability, policy coordination and policy coherence across the different ministries and agencies involved with water. Given that water affects and is affected by many constituencies, particular effort is needed to promote multi-stakeholder partnerships (public-public, public-private and civil society partnerships). These can help mobilize and share knowledge, expertise, technology and financial resources to support the achievement of the SDGs in all countries. For water and sanitation management in particular, supporting and strengthening the participation of local communities is fundamental for the implementation of SDG 6.[86]

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[83] http://www.unv.org/fileadmin/docdb/pdf/2013/resources/UNV_Water_Overview.pdf.
[84] See research done on virtual water trade by, for example, www.waterfootprint.org and FAO.
[85] High-level Forum on Sustainable Development Issues Brief (2014). Available at http://sustainabledevelopment.un.org/content/documents/1322HLPF_Brief_5.pdf.
[86] Many of the recommendations in this section were gathered from high-level input provided by stakeholders at the 2015 the UN-Water annual international Zaragoza conference, Outcomes available at http://www.u.org/waterforlifedecade/waterandsustainabledevelopment2015/.

### *Integrated water resources management planning and integration in national strategies*

As noted in the section on capacity-building, integrated water resources management (IWRM) plans have so far been developed by 64% of countries[87], 34% at an advanced stage. These need to be implemented to achieve SDG 6, as stated in target 6.5. Some IWRM plans may require updating from the MDG agenda in order to take account of new demands, reduce path dependency and encourage the formulation of innovative and forward-looking water strategies across policy fields and territorial and institutional levels, for example, by helping countries move from reactive to proactive policies which anticipate the effects and reduce the considerable impacts of water-related disasters[88].

To meet target 6.5 integrated planning is a key instrument for building policy coherence and coordination so as to connect water policy, land use planning and to take advantage of the multiple synergies between water and food security, energy development, industrial progress, etc. Many countries have developed IWRM and water efficiency plans following the target set in Johannesburg 2002. However, few plans have been implemented and that now has to be a priority. In countries without IWRM plans they should be developed as a first step to meeting SDG 6. Such plans, once implemented, will also help to address targets 6.3, 6.4 and 6.6, for example by reducing pollutants from agriculture, energy and manufacturing and more efficient use of water by these sectors. Coordinated policy approaches are needed to overcome the institutional silos in which water, land planning, agriculture and industrial policies are defined and implemented. The integrated responses required must be based upon sustainable development strategies at the national and sub-national level and a global partnership for sustainable development at the international level[89].

Integrated water resource management plans must therefore be part of national development strategies and the key issue is now to implement those plans. Partnerships will be important in implementing the plans: external support agencies, the UN and pressure groups such as the private sector, academia and civil society all have a part to play to help governments implement their plans and avoid a constant cycle of plan formulation that never leads to implementation.

### *Institutional reforms*

As noted by the high number of countries which have created IWRM plans, institutional reform is a concern for many countries, yet implementing the plans has proceeded at a slow pace; almost one-third of countries consulted about IWRM planning noted inadequate participation and awareness of decision makers, users and other key stakeholders[90]. Legal and policy reforms may be needed to facilitate implementation, increase joint decision-making at national level, facilitate management of water resources at basin level and legitimize stakeholder structures at community level. When water-related concerns are taken on at an early stage of decision-making, encompassing areas such as water resources (environment), exposure to water-related risks or planning affecting water infrastructure, institutions can provide valuable support to the management of shared river basins and aquifers.

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[87] UNEP (2012). "The UN-Water Status Report on the Application of Integrated Approaches to Water Resources Management". Available at http://www.un.org/waterforlifedecade/pdf/un_water_status_report_2012.pdf

[88] UN-Water (2009), "Global Trends in Water-Related Disasters". Available at http://www.unwater.org/downloads/181793E.pdf.

[89] High-level Forum on Sustainable Development Issues Brief (2014). Available at http://sustainabledevelopment.un.org/content/documents/1322HLPF_Brief_5.pdf.

[90] *Ibid*.

When reshaping legal frameworks and institutions, policy-makers need to consider the ability to cope with risks. Governments must develop institutional systems for coordinated and coherent responses on disaster risk managements and risk reduction across different sectors and between central and local governments.

### *Regulations and regulatory bodies*

Improving regulation and enforcement can help to curb environmental degradation and reduce health risks particularly in developing economies. While the WHO produces international norms on water quality in the forms of guidelines which can serve as a basis worldwide[91], many countries will need to develop or adapt their own national guidelines for "acceptable" water quality for household consumption, standards for industry effluents or for the minimum water quality requirements for irrigation water for food, forage or industrial crops.

A well-designed institutional framework of water use rights, regulations and water allocation has to be established and combined with more conventional engineering works. Strengthening safety regulation dealing with water-related risks would contribute to better planning, development and monitoring mitigation measures and ensure resilience of societies and the environment. This will encourage sound enforcement and compliance mechanisms, accurate and consistent data and better disclosure of information to the public. Effectiveness of regulation is improved by harmonization across borders, notably in the case of shared waters, where appropriate.

Guaranteeing the stability of the regulatory framework is fundamental to protect long-term water management objectives and principles from the threats of short-term political calendars. Once decisions on targets and the distribution of responsibilities are made in the political arena, decisions regarding their implementation, including benchmarking, needs to be based on technical criteria. Independent regulatory bodies must have the possibility of self-financing. This independence is critical in order to make the right decisions for the disadvantaged and underrepresented groups.

### *Private sector policy engagement*

Many companies are beginning to understand the need to manage water sustainably to reduce reputational risk. For some engaging in water policy is a key element of their corporate water stewardship strategies, recognizing their interdependency on water-related challenges such as scarcity, pollution, inadequate infrastructure, insufficient management capacity, and climate change. The stated objective of businesses' "beyond the fence line" strategies, often collectively referred to as "policy engagement" is to reduce business risk by supporting a stable operating environment and ensuring consistent access to water supplies. These efforts help to identify and reduce a company's adverse impacts on a region's water resources, ideally strengthening its license to operate and standing among relevant stakeholders.

### *Information and decision support systems*

The disclosure of timely, comprehensive, and forward-looking information in accessible formats as well as the gradual development of the capacity to stream information into the decision-making process is a means to allow people and institutions to access new insights and innovations as well as to build a better connected and empowered society which enables transparency and trust in the pursuit of collective goals. A necessary prerequisite for this is

[91] See WHO drinking water quality guidelines. Available at http://www.who.int/water_sanitation_health/dwq/guidelines/en/.

adequate, reliable monitoring of relevant parameters on the status of water resources and on pressures exerted on them. This access is important in terms of different levels and stakeholders across and between sectors and agencies, such as the scientific community, for example to allow for the development of information products that can eventually become operational, and to civil society, to ensure transparency.

Shared information might include general organizational plans and priorities, privately collected data or analyses, or specific monitoring, operational, or management practices. Collective action, by design, will typically have relatively low resource commitments, may not involve convening interested parties as a group, will maintain clear independence for decision-making and implementation among the interested parties, and can operate effectively with relatively low expectations of businesses beyond the agreed-upon information sharing.

Information sharing on the extent, condition and functioning of water services infrastructure is an example of public sector-private sector joint effort. The private sector has been engaged in a number of water-related disclosure initiatives over the past years, and a vast array of private sector water-related information is coming into public fora through water-risk analysis tools and through formal reporting (such as the Water Questionnaires conducted by the Carbon Disclosure Project or sustainability reports following CEO Water Mandate's Corporate Water Disclosure Guidelines). Remotely sensed information provides valuable support to water resources planning and decision-making, for example, in areas of flood management.

Water management and water risks are often interlinked and spill over to different sectors (drought in agriculture, flooding in land planning, modified freshwater systems for hydropower, etc.). Comprehensive policy support needs to include the tools for assessing risks and options for achieving win-win outcomes across various sectors. Opportunities are increasingly opening to apply analytical tools to inform decision-making to such cross-sectoral policy domains, revealing opportunities to improve, for example, water use efficiency in energy planning and agriculture.

## 3.6 Multi-stakeholder partnerships

Recognizing that the SDGs have many, often competing, demands for limited resources, multi-stakeholder partnerships are an important tool to bring together a broad set of governmental and supporting actors. Under the MDGs, partnerships have proven effective in a variety of means of implementation: from coordinating stakeholders at national and/or global levels to facilitating political dialogue, monitoring of progress, and building consensus.

For SDG 6, a broad partnership inclusive of all targets may be an appropriate umbrella to bring various stakeholders together at national level. Furthermore, specific multiple partnerships may also be needed for different targets. The direction provided in Goal 17 is more ambitious than in the past, and extensive efforts have already started to build strong multi-stakeholder partnerships. Rather than initiate a new partnership platform, existing alliances can be retooled or build upon. Partnerships need to be action-oriented and more focused than hitherto, with more care taken in setting out the purpose, structure and composition of partnerships so they are not unwieldy nor delay implementation.

The involvement of the private sector in multi-stakeholder partnerships must not be ignored and can help to address the lack of skills and organisational abilities as well as provide a conduit to access financial resources.

### *Existing partnership platforms*

There are many examples of partnerships for the implementation of SDG 6. One example focusing on targets 6.1 and 6.2 is the Sanitation and Water for All (SWA) partnership[92] – a multi-stakeholder partnership of developing country governments, bilateral donors, civil society organisations and other multilateral partners working together to catalyse political action, improve accountability and use scarce resources more effectively. Among other activities, SWA promotes country-led, coordinated multi-stakeholder efforts to strengthen national WASH sector planning, budgeting, investment and accountability frameworks.

For targets 6.3 to 6.6 the Global Water Partnership[93] brings together a broad set of stakeholders at country, regional and global levels to balance the many, often competing, demands for limited resources both within the SDG 6 targets and between SDG 6 and other Goals. Another example is the Water Operators Partnerships[94] (WOPs) that provides not-for-profit peer support between utilities to understand and address the issues and problems faced by utilities leading to better solutions and rapid implementation. Finally, the Women for Water Partnership[95] brings a gender focus to water management at all levels taking women's views to the policy level and developing women's capacity at community level. There are many other established partnerships that ***augur*** well for a rapid start to implementing SDG 6. Governments can leverage these partnerships to support their implementation strategies and to engage with the private sector, academia and civil society to help them implement SDG 6.

### *Public involvement, stakeholder engagement and effective partnerships*

Implementation requires Governments to act in partnership with civil society, the private sector and the broader range of stakeholders. Promoting partnerships as a governance model to implement the water related SDGs can serve the following purposes (see the OECD Programme on Water Governance)[96]:

- Clearly allocate roles and responsibilities for policymaking, service provision and regulation and ensuring sound coordination between stakeholders
- Manage water at the appropriate territorial scale(s) including coherent and integrated basin governance systems to accommodate needs and priorities across levels of governance.
- Go beyond institutional 'silos' and foster policy coherence between all areas essential to build a sustainable water future, such as climate change adaptation, food, urban development, energy, etc.
- Where access to services is most needed, ensure that increased decentralization and empowerment of local government and communities comes with increased financial resources and capacities at this level;
- Produce, update, and share meaningful, quality, timely, consistent and comparable data and information on water and water-related issues, and use it to guide, assess and improve policy formulation and water management.
- Foster integrity and transparency, to reduce corruption and rent-seeking to make public action serve its intended social goals;

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[92] www.sanitationandwaterforall.org.
[93] www.gwp.org.
[94] www.gwopa.org.
[95] www.womenforwater.org.
[96] Available at http://www.oecd.org/env/watergovernanceprogramme.htm.

- Engage with stakeholders in water management with sufficient attention to consumer behaviour to build acceptability, legitimacy and sustainability of decisions and policies, to build trust and strengthen transparency, but also to support capacity.
- Conduct regular and thorough monitoring and evaluation of water policy and water governance systems, and share the results with the public in order to identify areas of improvement and adjust when needed. This also requires robust, timely and comparable data and information at all levels of decision-making.

### *Trust-building and collective action*

Promoting effective social dialogues leading to legitimate decisions requires shared perceptions of the water management problems to be faced as well as trust and mutual recognition of the stakeholders' vested interests. This can be achieved through partnerships and consultation. Collective management such as National Water Resources Committees, adequate legislation and enforcement of the right to access to information are means to give civil society a role and a responsibility in collective decisions. At the same time efforts have to be made not to delay action by endless participatory processes that stop development.

A particular focus for collective action is strengthening partnerships for transboundary cooperation. Meeting target 6.5 will require building trust and agreeing on actions that benefit all riparian states sharing water resources. There are existing mechanisms at basin level that need to be strengthened, which may require legal processes to establish treaties or agreements. Such formal processes take time, however, and much can be done in parallel in terms of capacity-building, setting up/strengthening joint information systems, shared research, etc. International cooperation, highlighted in target 6.a, is a key to achieving transboundary cooperation and meeting other SDG 6 targets, especially in Africa.

## 3.7 Data, monitoring and accountability

Targets 17.18 and 17.19 focus on data and monitoring, which is supported through three pillars in the water and sanitation structure: the monitoring of outcomes (covering targets 6.1 - 6.6), the monitoring of the means of implementation (covering targets 6a, 6b and Goal 17), and the need for an accountability platform. Existing monitoring and reporting mechanisms, such as the Joint Monitoring Programme (WHO/UNICEF), UN-Water GLAAS and the UN-Water IWRM status survey and report, can all be used as the basis for monitoring progress on SDG 6 and the means of implementation. Such means of implementation monitoring could cover aspects of finance and human resources, and enabling environment factors such as policies and plans, institutional arrangements, capacity and technology and provide insights into topic such as the progressive realization to the human rights to water and sanitation.

Monitoring of progress against outcomes on drinking water and sanitation is already undertaken through the JMP, which has been consolidating data from Member States for more than 20 years. This work, together with the UN-Water GLAAS, has been essential in monitoring the MDG targets on water supply and sanitation, allowing for reliable, disaggregated data on progress in addition to detailed analysis on enablers and barriers to progress, indicating where additional support is needed to make progress. These monitoring frameworks are currently being adapted to cover monitoring for targets 6.1 and 6.2 as well as parts of 6.a and 6.b.

The "new" water targets (6.3 to 6.6), expands the development agenda to cover the whole water cycle, including water quality and wastewater management, water resources

management and water use efficiency, as well as water-related ecosystems. Several initiatives, mechanisms or programmes have been collecting information and monitoring data on these components for decades[97], but they still need to be integrated into one global monitoring mechanism. To respond to this need, a number of UN agencies and external partners are currently developing GEMI – Integrated monitoring of water and sanitation related SDG targets, operating under the UN-Water umbrella[98]. The monitoring of IWRM (target 6.5) includes aspects on enablers and barriers to progress, which can feed into the WRM part of targets 6.a and 6.b.

As demonstrated by JMP, credible monitoring focuses national and global policies and resource allocations. Together, JMP, GLAAS and GEMI will be able to monitor progress towards the entire SDG 6. All the targets are thus measurable and a framework for monitoring and reporting is in place but requires some refinement to cover the full range of SDG 6 targets.

# 4 Concluding Remarks

Over many years, there have been numerous evidence-based reports, academic studies and field case studies that show the importance of water and sanitation for economic growth, social equity and environmental protection. The importance of water for the sustainable development of other sectors and its critical value for the poorest and most vulnerable in society is also well documented. The inclusion of SDG 6 to ensure availability and sustainable management of water and sanitation for all in the post-2015 development agenda is a breakthrough that represents a culmination of such evidence and captures decades worth of international agreements concerning water. It is now time to shift the dialogue from advocacy for water towards implementation of the new agenda; this paper is a first attempt to do that. The SDG 6 can be achieved given the political will and timely application of the range of implementation measures highlighted in this report. It means building on the existing institutions and processes as well as adopting new practices and reforms to ensure that SDG 6 is achieved.

It is clear that strengthening the means of implementation for SDG 6 will help achieve many of the other SDGs. A key for the successful implementation of the entire set of Goals will be to make a rapid start once the Post-2015 Development Agenda is agreed upon in September 2015. Countries and supporting institutions, both local and international, need to gear up rapidly to apply the recommendations set out here and the many examples that are available. With Member States in the driving seat of this process, the main focus must be at the country level, where local systems will determine which means of implementation can be readily applied and which will require external support.

For the water-related targets a solid base of experience, technologies, and institutions and to some degree funding mechanisms already exists. These have to be scaled up and spread out to cover the full range of targets set out under SDG 6. Meeting the Goal and its associated targets will require a major effort by everyone to ensure that the specific actions proposed are implemented as appropriate based on local circumstances.

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[97] E.g., FAO-AQUASTAT, UNEP's GEMStat, National Accounts Main Aggregates (UNSD), "World Energy Outlook". International Energy Agency, WaterStat Database (Water Footprint Network), IBNET (the International Benchmarking Network for Water and Sanitation Utilities), Ramsar Convention's State of the World's Wetlands and their Services (SoWWS), System of Environmental-Economic Accounting (SEEA)

[98] www.unwater.org/gemi/en/.

The different means of implementation are interconnected and, in particular, securing adequate finance is essential for all. The cost associated with action to achieve SDG 6 is modest compared with the cost of inaction – in terms of loss of social, environmental and economic benefits, opportunities for future generations, and the considerable drag on national economies of not taking action. Moreover, given the risks and impact that water and sanitation have on sustainable development for the world as a whole, implementation of SDG 6 is an opportunity that must not be missed.