



Water and Sustainable Development

From vision to action

Means and tools for Implementation and the role of different actors



Report of the 2015 UN-Water Zaragoza Conference

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1. Setting the Scene: the challenge of implementing the Post 2015 Water Related Sustainable Development Goals

1.1 Introduction: Sustainable Development Goals for water

The process towards defining and agreeing on a set of Sustainable Development Goals was formally launched at the Rio+20 United Nations Conference on Sustainable Development, when member states asked for a set of Sustainable Development Goals that are concise, action oriented, easy to communicate, aspirational, global in nature, universally applicable and adaptable to national and local realities (UN, 2012). These goals are part of the United Nations Development Agenda beyond 2015.

The development goals provide people, business, civil society, governments and international organizations with a set of common targets to coordinate private and public actions towards fulfilling common aspirations. They also foster coordination, taking advantage of existing opportunities to build up a sustainable future, while contributing to mobilizing the financial resources, promoting the technology development, improving governance and building up the individual and collective capacities required to effectively face the multiple implementation challenges that come together with the ambitious but feasible sustainable development goals (High Level Forum on Sustainable Development, 2014).

In Rio+20 it was recognised that water is at the core of sustainable development. Water is a key determinant in all aspects of social, economic and environmental development and should therefore be a central focus of any post-2015 framework for poverty eradication and global sustainable development (UN General Assembly – OWG on SDGs, 2014).

The National Stakeholder Consultations on Water, implemented by GWP in 2013, also concluded that water is one of the key drivers of sustainable economic growth. Water is essential for human life, poverty reduction, dignity, gender fairness and other basic human development objectives. It is also important for the production of food and energy, and intervenes in the production of almost all the goods and services in any economy. It is essential to the preservation of the water ecosystems on which human life and the economy critically depends on for preserving biodiversity, regulating the climate, providing amenities and sustaining the continuous provision of water for maintaining life and sustaining economic progress (Millennium Ecosystems Assessment, 2005). It should therefore be managed in a manner that is sensitive to and supportive of the many competing demands that is placed on it. Further, the management activities should not compromise the requirements of the future as well as ecological requirements. Based on these elements, water should be central to the integrated planning and development processes (GWP, 2013).

In particular water plays a key role in the following three essential aspirations of building together a sustainable future for all:

- **Meeting the needs and rights of the world's poorest people:** access to water, sanitation and hygiene is in its self a driver for poverty alleviation, dignity and equality (UNDP, 2004). It gives people an opportunity to stand up against poverty and build up a participative and inclusive society with institutions capable of engaging citizens, business and other stakeholders in the construction of sustainable development pathway.
- **Supporting sustained prosperity for all:** while providing access to water (as well as to energy and food) to the world's poorest people should be possible without significant environmental consequences, meeting the aspirations of a growing global middle class as well as the increasing demands for water from the rapid growth of transition economies will require innovative approaches to both production and consumption to avoid aggravating water scarcity and the increase of water related risks (FAO, 2012). The progressive building of water sustainability must be considered from the onset as a mean to open opportunities towards sustainable development. Innovative approaches to enhance water efficiency, develop new water sources, design and implement financial and economic instruments as well as improving water governance are all means to match water demand and supply with the existing resources available in the long term, and then to pave the road to a sustainable development pathway.

- **Defending progress into the future:** protecting water resources, and particularly the water that sustains ecosystems, upon which life, economic activity and their supporting ecosystems are dependent, is a critical precondition to protect human development (MEA, 2005). Besides access to water sanitation and hygiene, serving to growth and fulfilling current human aspirations, SDGs recognize the critical importance of water resources as common public goods that must be protected and restored.

In order to achieve a sustainable water future as well as to secure the key contribution of water to sustainable development, the following have been proposed¹:

- There needs to be a concerted effort of all stakeholders to ensure that we implement the new post 2015 water agenda.
- While the design and implementation of sustainable development policies will be at the national level, achieving sustainable development will require international support and cooperation.
- The challenge for policymakers is to channel and incentivize more of the diverse sources of financing into desired investments in sustainable development.
- Transparency and accountability must underpin all financing to enhance legitimacy and effectiveness.

The Open Working Group of the United Nations General Assembly (OWG), established by UN Member States with the purpose of leading a consultative process for the design of a SDG framework, delivered its recommendations for goals and targets, which included a new entire goal (Goal 6) dedicated to water. This Goal, focused on freshwater and sanitation, includes six targets. The first two targets (6.1-6.2) are based on the MDG access to water and sanitation target, enhancing their scope and definitions. The rest of the targets (6.3-6.6) go beyond basic water and sanitation services to address the wider water framework as recommended at the Rio-plus-20 Conference: water quality, protection of ecosystems, and different aspects of water resources management. In the OWG proposal, water is also a key component in many other Goals, and considered as crucial to the attainment of most, if not all, development objectives.

2015 is the cornerstone for water and sustainable development. The final decision on the new water related Sustainable Development Goals for 2015-2030 will take place in the United Nations Summit in September 2015. UN-Water has been bound to a year-long campaign on water and sustainable development with a number of milestones that include the kick off at the Zaragoza Conference in January, World Water Day celebrations in March in India and New York, the World Water Forum in April in Daegu (Korea) and the World Water Week in August in Stockholm.

The UN-Water working group on SDGs made a recommendation to the Open Working Group on a Water Goal and associated targets in 2014. Now, UN-Water, supported by a group of UN agencies and partners, is working on developing indicators and monitoring mechanisms for the OWG proposed targets 6.3-6.6. This initiative is called the Global Expanded

GOAL 6. ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL

- 6.1 by 2030, achieve universal and equitable access to safe and affordable drinking water for all.
- 6.2 by 2030, achieve access to adequate and equitable sanitation and hygiene for all, and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
- 6.3 by 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and increasing recycling and safe reuse by x% globally.
- 6.4 by 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity, and substantially reduce the number of people suffering from water scarcity.
- 6.5 by 2030 implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
- 6.6 by 2020 protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes
- 6.a by 2030, expand international cooperation and capacity-building support to developing countries in water and sanitation related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies
- 6.b support and strengthen the participation of local communities for improving water and sanitation management.

Source: United Nations Open Working Group (2013)

1. <http://sustainabledevelopment.un.org/index.php?menu=1558>

Water Monitoring Initiative (GEMI). Synergetic efforts can also be contemplated with parallel initiatives in this field (e.g. OECD's ongoing development of water governance indicators² or UNEP³).

The work of UN-Water has provided the third piece of the puzzle: i.e. implementation that commenced at the Zaragoza Conference. It has been a collective endeavor with the participation of representatives of 18 UN entities and 8 UN-Water Partners and more than 50 collaborating organizations. It has served UN-Water to identify implementation challenges and collect information on existing tools under different categories (technology and approaches; financial and economic instruments; capacity development and social instruments; and governance and monitoring), and analyzed the performance of the tools in specific cases. This has been included in a UN-Water toolbox⁴, which includes a section on lessons learnt and a discussion forum. The Zaragoza Conference has represented an opportunity for UN-Water members and partners to listen to different stakeholders. The conference facilitated a space for dialogue, to discuss the different stakeholders' views on their contributions to the implementation of the post 2015 agenda; which needs to be provided continuity. On Methods of Implementation we use UN Water's approach as stated at the General Assembly in April 2015.

1.2 A first look to implementation

Goal 17 of the post 2015 Sustainable Development agenda identifies the need to work on: technology; science and innovation; finance; policy and institutional coherence; multi-stakeholder partnerships; and capacity-building.

Technology, science and innovation

The Post 2015 Agenda recognizes the critical importance of knowledge as a driver of human development and sustainability (GWP, 2013). Technology is commonly understood as the "collection of techniques, methods or processes used in the production of goods or services or in the accomplishment of objectives", such as the SDGs. It includes knowledge of techniques and processes, often embedded in machines, software than can be many times sophisticated, computers, devices or infrastructures that can be used and operated by individuals without extended knowledge on their fundamentals.

TECHNOLOGY

"Technology refers not only to physical equipment – including infrastructures and installations (so called 'artefacts'), but also to the knowledge, techniques and skills that surround its deployment and use. These in turn form part of a broader technological 'regime' or infrastructure that supports innovation and the ability for one technology to build on or link to another". <http://bit.ly/1IM8QZz>

Finance

Financial and economic issues are at the heart of sustainability. Widening the ambition of the development agenda from the MDGs to the SDGs implies dealing with more ambitious financial and economic challenges. The implementation of the new agenda will need to begin by gathering the financial resources, and will benefit from the experience gained in the past to bridge the existing gaps, but will also come with more and more sophisticated financial and economic instruments.

The Millennium Development Goals provided a lever to mobilize and increase the financial resources available to provide access to water and sanitation for the poor. All types of finance – public, private, domestic and international – have increased since 2002 (IMF, 2014). Domestic finance has grown rapidly in recent years, representing by far the greatest share of financing sources for most countries (DOHA, 2014; ICESDF, 2014). But financing needs for poverty eradication and water development still are significant.

Besides funding the WASH agenda all financial and economic instruments must contribute to advance a sustainable development path and then to improve water quality, manage water resources integrally and deal with current and future risks. Financial needs differ across countries and regions.

Policy, institutional coherence and multi-stakeholder partnerships

The importance of policy and institutional coherence for the implementation of the water related SDGs can hardly be minimized. Coordination, conflict prevention, cooperation building are three important elements of water development that can only be performed by governments. Beyond naturally created problems, water crises are water governance crises.

2. <http://www.oecd.org/env/watergovernanceprogramme.htm>

3. <http://www.scpclearinghouse.org/d/the-clearinghouse/94-scp-indicators-for-the-future-sdgs-discussion-paper.html>

4. <http://watersdgttoolbox.org>

Policy and institutional coherence tools are then instrumental to water and sanitation access and hygiene, protecting water quality, tackling water scarcity challenges in an integrated manner and responding to current and future risks.

Curbing water scarcity would only be possible if policies are consistent and coherent, effective regulatory frameworks are set, corruption is avoided, transparency is enhanced and all stakeholders are engaged in all the phases of policy making at the different levels of government. Data monitoring and accountability are key, together with the promotion of a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the World Trade Organization.

Capacity-building

The Rio+20 outcome document emphasizes the need for enhanced capacity-building for sustainable development and, in this regard, for the strengthening of technical and scientific cooperation, including North-South, South-South and triangular cooperation. It reiterates the importance of human resource development, including training, the exchange of experiences and expertise, knowledge transfer and technical assistance for capacity-building, which involves strengthening institutional capacity, including planning, management and monitoring capacities.

Target 17.9 of the post 2015 Sustainable Development Agenda promotes capacity-building. The concept of capacity-building entails much more than building schools and training people. It comprises the establishment of a solid knowledge base and awareness at all levels, including those of individuals, organizations, partnerships, communities and the enabling environment as well as the untapped ability of volunteerism to engage and benefit all segments of society.

Achieving the WASH targets require changes in behaviour and there is a need to 'create the demand' for basic services in communities used to open defecation, for instance. UNICEF, the World Bank and WHO have mobilized and developed different actions in this regard.

Capacity building to bring this change implies curbing existing practices when they are detrimental to people and the environment. This may include bringing the actual or potential losers to a demonstration project that was able to improve their welfare and reduce uncertainty about adopting innovative solutions. This will help with briefing the more reluctant and risk averse and to take advantage of the first easy steps to promote further advances, supported by the formation of leaders.

In the water and sanitation sector, as in other sectors, capacity-building and capacity development are critical for the successful implementation and scale-up of development programmes. Development experience demonstrates that the concept encapsulates a "diverse array of functional capacities – from planning, oversight, and monitoring to situational analysis, facilitation of stakeholder dialogue, training, implementation capacities and management support, and provision of policy advice – must be developed and put in place" (UNDP and AEPC, 2010).

1.3 The Actors

Having stakeholders involved in the implementation of the SDGs will be critical to advance in their execution, since all of them have fundamental roles to play from both an individual and a collective perspective. These include **Academia, Business, Civil Society and Governments** In order to put this into practice, it is essential for the stakeholders to be aware of their roles, their potential contributions and their challenges, and undertake the required internal changes, reforms or measures that will allow them get the optimal conditions to start the journey. These optimal conditions, which start with the adoption of an open-minded, collaborative, objective focused and prone to listening approach, will contribute to maximize the individual and collective gains and contributions and promote win-win solutions that speed the achievement of the SDGs.

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2. The challenges

2.1 The water challenges

Water, Sanitation and Hygiene (WASH)

The post 2015 water related SDGs build on the lessons learnt from implementing the existing MDG Target 7C (halve the proportion of the population without sustainable access to safe drinking water and basic sanitation by 2015) and address many of its shortcomings. The scope is expanded beyond water and sanitation to include hygiene, and beyond the household to cover non-domestic settings. It also addresses priority concerns relating to safety, equality and sustainability.

There is still an important gap to be bridged to move towards a universal access to safe drinking-water and sanitation. Advances have been unequal and while evident in medium income countries, compared with those in the poorest regions in Sub-Saharan Africa, which have experienced limited improvements. Besides reasonably good aggregate outcomes, a detailed analysis of progress towards the achievement of MDGs shows that often improvements in access do not always reach those groups who need them most. WASH coverage still mirrors the pervasive inequalities both between and within countries (GLAAS, 2014). Differences are between urban and rural areas, slums and formal urban settlements, men and women; and disadvantaged groups and the general population are pervasive. In many regions, women and girls bear the burden of fetching water (UN Water, UNDESA and UNICEF, 2013).

Since 1990, 2.1 billion people gained access to improved sanitation facilities (JMP Report, 2015). In absolute terms, latecomers that started with the lowest coverage rates experienced the fastest growth but substantial efforts are still required to halve the proportion of the population without access. On the other side the MDG sanitation target is far from being reached. Laggards in providing sanitation services, such as South Asia and Sub-Saharan Africa, still present low coverage rates and disparities between rural and urban sanitation are even more pronounced than those in drinking-water.

Taking everything into account according to WHO/UNICEF the post 2015 objectives relating WASH will require actions covering the following elements:

- No Open Defecation.
- Basic Access to drinking water, sanitation and hygiene for households, schools and health facilities.
- Safely Managed Services in order to halve the proportion of population without home access to safely managed drinking water and sanitation services.
- Regressive elimination of inequalities in access to services by population groups (e.g. rich/poor; urban/rural; slums/formal settlements).

Water quality and protecting ecosystem services

The water challenges go beyond WASH for all and encompass preserving and protecting water quality as an integral pre-condition of sustainable water development. The Post 2015 development framework recognizes the need to widen the ambition of the water agenda and include wastewater management, water quality and protecting ecosystems.

Development is not yet decoupled from water use and pollution. The use of water is still growing at twice the rate of population growth and the effective strategies to manage wastewater, its treatment and reuse, are urgently required. The scale of population growth and its concentration in cities makes the dilution, the natural regeneration and the dispersion

WASH QUICK FACTS

- 2.4 billion people lack access to improved sanitation.
- 663 million people lack access to an improved source of drinking water – the first time the figure has fallen below 700 million.
- 946 million people still practise open defecation. Nine out of 10 people who practise open defecation live in rural areas, but the number in urban areas is gradually increasing.
- Half the countries did not report on access to adequate sanitation in schools or health-care facilities, suggesting a lack of monitoring systems and capacity. In many parts of the developing world, up to 4 out of 10 schools and healthcare facilities lack basic water, sanitation and hygiene facilities.

More information: http://www.who.int/water_sanitation_health/monitoring/jmp-2015-key-facts/en/

of wastewater insufficient. The preservation of water resources would only be possible if wastewater is collected, treated and recycled to some extent.

Water quality degradation presents a global threat to human health and wellbeing, with both immediate and long-term consequences for efforts to reduce poverty whilst sustaining the integrity of some of our most productive ecosystems. Water discharges and pollution from runoff carry water-borne disease, degrade natural systems, and have material economic impacts.

To address impacts and build capacity requires political will. Alas, politicians rarely act to provide wastewater infrastructure because often benefits are felt after their 'political time' and are most visible downstream.

Water pollution and poverty often go together. Over half of the world's hospital beds are occupied by people suffering from water related diseases. Diarrhoeal diseases make up over four percent of the global disease burden, 90 percent of which is linked to environmental pollution, a lack of access to safe drinking water and sanitation. But these gloomy prospects can be converted into opportunities for sustainable development. Wastewater management in combination with sanitation and hygiene offers the best cost effective alternative to reap multiple benefits in terms of health improvements, food security, increased production and income and new job opportunities.

Besides its importance for life and for human progress water resources are also critical for maintaining healthy ecosystems. Managing water then implies not only dealing with the tradeoffs and opportunity costs of allocating water amongst the different water using economic activities but is also about finding the balance between the use of these multiple water provisioning services for humans and their activities and the maintenance of water in nature so as to leave it perform the self-regulation and support systems that are essential to underpin the long term provision of water and the multiple ecosystems services that water perform. In fact, in many parts of the world the livelihoods of the poorest are directly linked to water resources, such as for fishing, farming, household supply, navigation, small scale industry and livestock care. Rather than maximizing the flows of water for some particular purposes, such as water for drinking, irrigation or energy, water resources management aims at optimizing the combination of uses provided in the short and the long term and including surface water groundwater, and eventually desalinated and recycled water, so as to satisfy competing needs between both users and uses here and there, and in the present as well as in the future, in light of achieving growth, poverty reduction and equity.

Water resources management

Managing water resources is a collective endeavor to make the ambition of human progress fit within the critical thresholds of the amount of available water resources and the pressures that natural resources can support. Higher rates of urbanization will mean a growing demand for drinking water and economic use with consequent higher waste disposal and treatment.

Feeding a world of eight billion people will require more water for food. The demands for energy will more than double, with hydropower called upon to make a far greater contribution than today. And to add to these challenges, the impact of climate change will threaten economies and put further strain on the environmental flows required to maintain aquatic ecosystems.

WATER QUALITY QUICK FACTS

- Over **80%** of wastewater generated in developing countries is discharged without treatment into surface water bodies.
- Globally, **2 million** tons of sewage, industrial and agricultural waste is discharged into the world's waterways.
- Currently **245,000 km²** of marine ecosystems are affected with impacts on fisheries, livelihoods and the food chain.

For more information: UNEP and UN-Habitat (2010), WHO (2014)

ON THE RIGHT TRACK AND GAINING MOMENTUM

The UN-Water Status Report on the Application of Integrated Approaches to Water Resources Management for the Rio+20 conference, based on feedback from more than 130 countries, shows that efforts over the past 20 years to improve governance of water resources have been significant, but this clearly remains an on-going process for most countries. Institutional reforms have been undertaken in many countries.

Improvements have been done to the institutional framework, together with improved policies, laws and systems has led to better water resources management practices bringing important socioeconomic benefits. In depth country reports indicate however that institutional reform is slow, for example the majority of countries reported changes in their water policy, but translating policy and legal changes into implementation is often a slow process. Countries that have adopted integrated approaches report more advanced infrastructure development (such as dams, canals, reservoirs, treatment plants and delivery pipes), but further efforts are needed to ensure appropriate levels of coordination between actors and actions.

WATER FOR ENERGY AND ENERGY FOR WATER

Energy production requires water and water requires energy. Worldwide, energy uses 8% of all freshwater withdrawals, but rich countries divert up to 44% to energy production. Both water and energy challenges must be managed together in order to avoid mutually defeating alternatives.

In this sense, population growth and human development can only be sustained in the long term if decoupled from increased water use. Traditional approaches to water management have been designed to serve only a single goal (such as provisioning water for citizens to accommodate a higher and more affluent population, provide water for energy generation and increase access to energy, or enhance crop productivity through irrigation in order to tackle with food security concerns. Managing water integrally requires coordinating all water uses so as to make the water demand and the water supply in any moment of time match with the overall resources available.

WATER SCARCITY: THE BASIC FACTS

- Over 1.7 billion people live in river basins where water use exceeds recharge, leading to reduced rivers flows, depletion of groundwater and the degradation of ecosystems.
- Two-thirds of the world's population will live in water-stressed countries by 2025 if current trends continue.
- Demand for water will increase by 55% by 2050.
- Economic losses from inadequate delivery of water and sanitation amounts to 1.5% of gross domestic product of the countries included in a WHO study on meeting the MDGs.
- About 40% of the world's population lives in basins that overlap two or more countries, which account for about 60% of global freshwater flow.
- About 2 billion people worldwide depend on groundwater for basic water needs.
- Water shortages have been identified by industry, government, academia and civil society as one of the top three global risks of highest concern to them.

<http://bit.ly/1IMa9HL>

Water risks

Even without accounting for climate change, the world as a whole is heading towards an increasingly water insecure world. Water scarcity is already high, particularly in some developing countries. Climate change and its various consequences add up a new uncertainty layer and require urgent measures to reduce risks and adapt to a more uncertain water future.

Water is the primary link through which climate change affects people's welfare and ecosystems. Climate change is likely to impact all the hydrological cycle and then the distribution and availability of water across time and space. Our records over the hydrological past will become of relative value to forecast our water future and then to plan and manage water infrastructures for the long term. Water is linked to almost any climate related risks, such as longer and severe drought, more frequent floods, losses in snow and glaciers to regulate runoff, rising sea levels, reduced river flows, storms, etc.

Climate change affects the quantity and quality of water resources available to meet the needs of societies and ecosystems. It can result in an increased intensity in precipitation but may also lead to an increase rain variability and temperatures resulting in reduced water infiltration, aquifer recharge and minimum flows that can increase erosion and change the structural conditions of many ecosystems with negative effects on biodiversity and other ecosystems services.

Developing countries, still in the transition to a water decoupled development path, may be the most vulnerable as climate change may impair their opportunities to harness the potential of water resources for economic growth or for reducing poverty and thus to unlock positive development dynamics. Countries may need to find ways to create and enhance their capacity to adapt to whatever may happen and, at the same time, to make their infrastructures and their economic activities less vulnerable and more resilient to extreme weather events.

Climate change is an additional argument for integrated water resources management and for the need of planned, anticipated and coordinated responses to water and climate challenges (instead of reactive, spontaneous and uncoordinated ones), considering different areas of the economy, the resources base, and providing consistent responses in the short and the long term. Furthermore, water resources and the way they are managed will play a pivotal role in building social capacities to adapt to climate change and enhance resilience.

RISKY WATER

1. Since 1992 floods, droughts and storms have affected 4.2 billion people (95% of all people affected by disasters) and caused USD 1.3 trillion of damage (63% of all damage in cost terms). US\$2.5 trillion economic losses from disasters so far this century – 70% relate to floods and droughts.
2. Floods, droughts and windstorms are the most frequently occurring natural disaster events and account for almost 90% of the 1,000 most disastrous events since 1990.
3. The number of people affected and estimated damages from water-related disasters continue to increase.
4. The negative impacts of disasters may further exacerbate inequalities and are disproportionately borne by poor and vulnerable communities.
5. Developing robust solutions to manage these escalating disaster risks due to rapid global changes will call for new strategies and a stronger capacity to absorb expected changes.

Source: UN (2015)

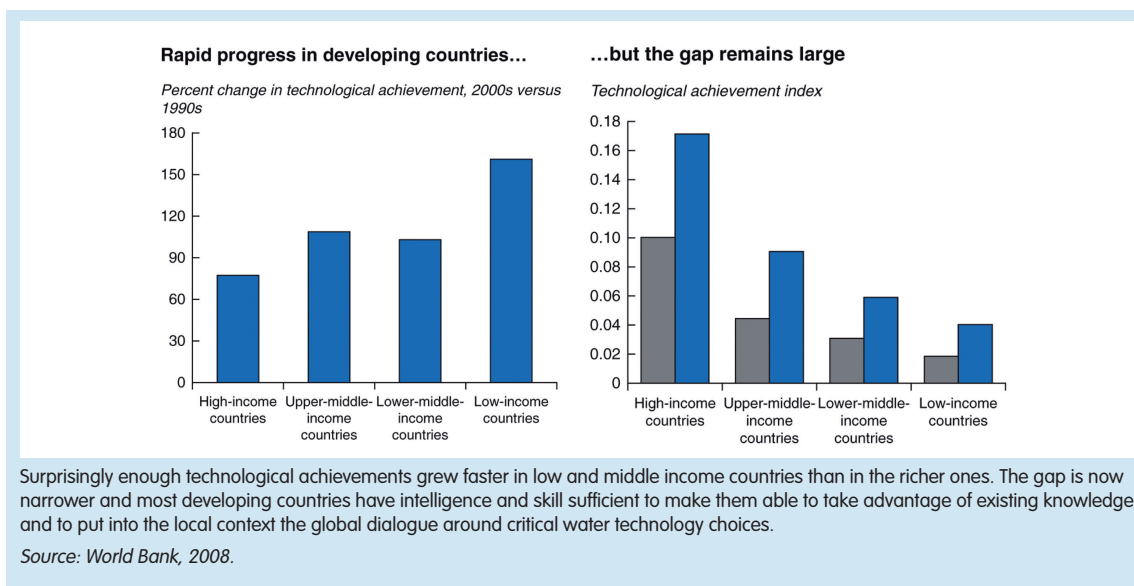
2.2 The Implementation Challenges

The implementation challenges for achieving universal access to water and the other water related SDGs are immense. Forty-six countries still have more than 50% of their population without improved sanitation and there are at least 800 million people still drinking water contaminated with feces. Disparities in the provision of water and sanitation services are at the base of inequalities in many countries in Africa and in poor countries. Costs of further advances are mounting, as they imply both improving coverage in massive slums in urban areas and providing for scattered populations in rural ones (GLAAS, 2014).

But it is also clear that achieving the Sustainable Development Goal for Water is in the range of the resources, the human and social capacities and the technologies available. They can be achieved by better water governance, the development of individual and social capacities, the diffusion and adaptation of existing and new technologies and by properly designed and implemented economic and financial instruments. Achieving the water SDG does not, however, merely depend on the water community or water policies alone.

- Regarding means of implementation, we need to: Take advantage of **existing technologies** to advance towards the attainment of the water related SDGs as well as **reshaping technology research development and innovation** towards providing more effective responses to water challenges and reinforcing the contribution of water to sustainable development⁵.

TECHNOLOGY AND DEVELOPMENT: GROWING TO THE TASK, BUT NOT YET THERE



5. http://www.un.org/waterforlifedecade/waterandsustainabledevelopment2015/pdf/sesiones/Themes_Session.pdf

- Develop **individual and collective capacities** to mobilize existing resources, take advantage of existing opportunities and find innovative and more effective responses to water challenges. This should include reinforcing capacities to build up, maintain and reinforce partnerships and cooperation agreements to exploit synergies and manage the multiple trade-offs that are characteristic of water challenges. Capacity building is essential to strengthen the ‘learning by doing’ and promote self-reinforcing institutional development and better water governance.

SDGS: MORE THAN WISHFUL THINKING

Insufficient capacity is a problem for many countries (e.g. Albania, Armenia, Costa Rica, Guatemala, Bangladesh, Ghana, Namibia, and Rwanda (UNEP 2012)). Typical problems relate to lack of human capacity both in numbers and knowledge to plan and manage. 35% of countries have an advanced level of action across most of the capacity building areas however the need for capacity to implement an integrated approach is felt across all of the HDI groups.

- **Mobilize the financial resources** required to implement the ambitious water development agenda. This includes the development of **financial and economic incentives** to improve water efficiency and promote the creation and adoption of cost effective innovations as well as to make improvements in water efficiency worthwhile. It also implies reshaping existing incentives, as well as finding innovative economic and financial instruments able to promote cooperation and water conservation.

WASH FOR ALL: THE ECONOMIC SIZE OF THE CHALLENGE

The World Bank has estimated that just extending the access to basic safe water services to those still uncovered would cost around USD 200 billion and reaching universal access to basic sanitation will imply an additional financial effort of little over USD 100 billion. Globally, 50% of these financial resources need to be spent on the poorest 40% of the population. According to the 2014 GLAAS report in 77% of the countries public finance is insufficient to meet the targets for WASH.

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, or USD53 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. Recent estimates reviewed and confirmed by various publications suggest that an incremental USD27 billion will be required to ensure universal access to drinking water and sanitation, with sanitation accounting for the majority of incremental resource needs. WaterAid has suggested that African countries should spend 4.5% of GDP on water and sanitation, in line with the Africa Infrastructure Country Diagnostic (AICD) assessments.

Sources: WWAP (2015), GLAAS (2014); WaterAid (2011), WHO and UN-Water (2012), Greenhill et al. (2013)

- **New and better adapted institutions, policies and improved partnerships.** The implementation challenge of the new SDGs and the distinctive nature of water requires reshaping our abilities to act collectively through innovative water institutions. Harnessing the potential of water for human development, as well as securing sustainable water future requires cooperation and collective action so as to coordinate individual decisions, manage potential conflicts, take advantage of synergies, solve trade-offs and balance all water uses. At the end of the day, technology development, capacity building, economic and financial instruments are all means that can only be mobilised, shaped and adapted to local circumstances by governments in close cooperation with people, business and the civil society in general. The quest for a water-secure world is a joint responsibility and can only be achieved through water cooperation at local, national, regional and global level and through partnerships with a multitude of stakeholders ranging from citizens to policy makers and the private sector (UNDP, 2013). People must be able to participate in decisions on water and sanitation that affect their lives. institutions. Harnessing the potential of water for human development, as well as securing sustainable water future requires cooperation and collective action so as to coordinate individual decisions, manage potential conflicts, take advantage of synergies, solve trade-offs and balance all water uses. At the end of the day, technology development, capacity building, economic and financial instruments are all means that can only be mobilised, shaped and adapted to local circumstances by governments in close cooperation with people, business and the civil society in general. The quest for a water-secure world is a joint responsibility and can only be achieved through water cooperation at local, national, regional and global level and through partnerships with a multitude of stakeholders ranging from citizens to policy makers and the private sector (UNDP, 2013). People must be able to participate in decisions on water and sanitation that affect their lives.

KNOWLEDGE MOBILIZATION

Building on the recommendations emerging from structured dialogue the UN Secretary General proposes to “establish an online, global platform building on and complementing existing initiatives, and with the participation of all relevant stakeholders, in order to:

- Map existing technology facilitation initiatives, needs and gaps, including in areas vital for sustainable development, including agriculture, cities and health;
- Enhance international cooperation and coordination in this field, addressing fragmentation and facilitating synergies, including within the UN system; and promote networking, information sharing, knowledge transfer, and technical assistance, to advance the scaling up of clean technology initiatives.”

Source: UN General Assembly, 2014

2.3 Specific implementation challenges for different themes

Towards WASH for all

The MDGs have demonstrated that setting international goals and targets can be a powerful driver of change. The improvements in access to drinking-water and sanitation have been achieved through sustained commitment, mobilization of additional resources and effective design and implementation of projects and measures. “Since 2001, financial aid to the water sector has risen significantly, governments, donors, civil society organizations and development partners have together formed the Sanitation and Water for All Partnership, which provides a transparent, accountable and results-oriented framework for action to address the obstacles for global progress in the drinking-water and sanitation sector” (UN and OWG on SDGs, 2014).

Reaching the extended WASH objectives is within the reach of existing technologies and the water resources available. WASH does not lack the technologies to quickly build a pit latrine, drill a borehole, provide soap bottles, etc. Rather, the challenge is to ensure these solutions work in practice and in context. Cost-effective technological solutions for drinking water, sanitation and hygiene are readily available. The challenge is rather to ensure that services are sustained. Systems are not always adapted to local circumstances nor to be managed by empowered local communities or build to last decades with reliable daily operation, maintenance and use. Although financial resources may be judged as insufficient in the overall, a big proportion goes still into building new wells and hardly any money is devoted to making what exists work better (Hutton and Bertram, 2008). Building institutional and human resource capacity for both increasing WASH services to the unserved and maintaining existing services by directing more resources to operations and maintenance is key.

In the same direction water investments are biased in favour of harvesting the low hanging fruits and the cost of going the extra mile and reach the poorest of the poor in rural areas or slums implies paying a higher marginal cost. Short-term success may vanish without a long-term financial strategy. Although the poor are actually little able to pay for the provision of basic water and sanitation services governance and financial arrangements can be designed and implemented to make water development last and self-sustainable in the longer term (The World Bank Group, 2013).

WASH implementation challenges are now short term and long term. The former refer to providing water and sanitation services where they are lacking, to guaranteeing the maintenance of existing infrastructure and to making the arrangements required to make the provision of services financially sustainable as well as to expand and improve their quality (Doczi et al., 2013). The long-term challenges refer to making development compatible with reducing water scarcity and the increase in water security. WASH sustainability is an integral part of water resources management and requires strategies to manage risks and uncertainties in the longer term.

CONTAMINATED WATER AND POVERTY TRAPS: FACTS AND FIGURES WASH: THE COST OF DOING NOTHING

Almost 900 million people still do not have access to safe water and some 2.6 billion, almost half the population of the developing world do not have access to adequate sanitation. At least 1.8 million children under five years old die every year due to water related disease, accounting for around 17 percent of deaths in this age group. Worldwide some 2.2 million people die each year from diarrhoeal disease. Poor hygiene and unsafe water is responsible for around 88 percent of all diarrhoeal incidents. Under-dimensioned and aged wastewater infrastructure is already overwhelmed, and with predicted population increases and changes in the climate the situation is only going to get worse. Without better infrastructure and management, many millions of people will continue to die each year and there will be further losses in biodiversity and ecosystem resilience, undermining prosperity and efforts towards a more sustainable future. A healthier future needs urgent global action for smart, sustained investment to improve wastewater management. UN WATER "The economic impact of not investing in water and sanitation costs an enormous 4.3% of Sub Saharan African GDP. While under-five (U5) child mortality rates have been falling globally, diarrhoea remains the second leading cause of death; 88% of which are WASH-related. Nearly half of the 800,000 annual U5 diarrhoeal deaths occur in Africa. Early childhood diarrhoea and worm infection compromise both physical and cognitive development – further undermining the value of human capital to economic growth and development. Epidemiological studies show that 25% of all stunting in 24-month-old children is attributable to having five or more episodes of diarrhoea in the first 2 years of life; in turn significant deficits in cognitive performance are linked to stunting. More than half of school-age children in Africa suffer from worm infection, the root cause of which is poor sanitation and hygiene". The most recent estimates suggest that, globally, the benefits of achieving universal access to sanitation outweigh the costs by a factor of 5.5 to 1, whereas for universal access to drinking-water the ratio is estimated at 2 to 1.8.

Source: UNICEF (2014)

Improving water quality and ecosystems

Despite strong evidence about the important co-benefits and the high social and economic returns of investing in wastewater treatment and the preservation of water quality, this is still a neglected political issue. This neglect is more likely when those more affected by bad wastewater management are poor, do not pay much taxes and lack political influence. In addition to that, in many cities and rural communities, spending in wastewater collection and treatment is perceived as a burden that only increases the welfare of those downstream.

These negative dynamics can be broken if the opportunities of wastewater and water quality are brought to the frontline of the political agenda. Wastewater management has the capacity to transform 'pollution' into assets that smart leaders embrace, voluntarily, from the bottom up. **Benefits go beyond public health or natural resilience and include boosting economic growth, create jobs, provide business certainty, increase revenues, attract investors and improve lifestyles and wellbeing.** Addressing water and sanitation also requires vertical integration of policies (from national to subnational and municipal levels), as well as data sharing, capacity building and decentralized cooperation.

Feasible and rewarding technologies and approaches to improve water quality exist and can easily be adapted to local circumstances. These include smart preventive practices to reduce the volume and extent of water pollution; waste water collection; a wide array of adaptable technologies to remove pollution from wastewater; water recirculation, regeneration and recycling when appropriate, water reuse, reutilization of nutrients and many other alternatives.

But having opportunities is not sufficient. A change in policy priorities as well as in adapting current institutions is required. Governments can do a lot in making wastewater management a central in their strategies.

Some governance related institutional barriers for improving water quality and protecting ecosystems include the following:

- Ensuring good quality level for water requires collective and co-ordinated actions across actors and sectors. It is as such particularly sensitive to **sectoral fragmentation**, which can hinder collective efforts to reducing pollution, eliminating dumping, minimizing release of hazardous chemicals and materials, reducing the proportion of untreated wastewater, and increasing recycling and safe reuse.
- Meeting water quality targets can also be hampered by **limited enforcement** of standards.
- **Lack of accountability and transparency** in complying with existing standards for quality and wastewater treatment, in particular when governments do not have the capacity to monitor their performance and civil society is not fully engaged to hold them accountable.

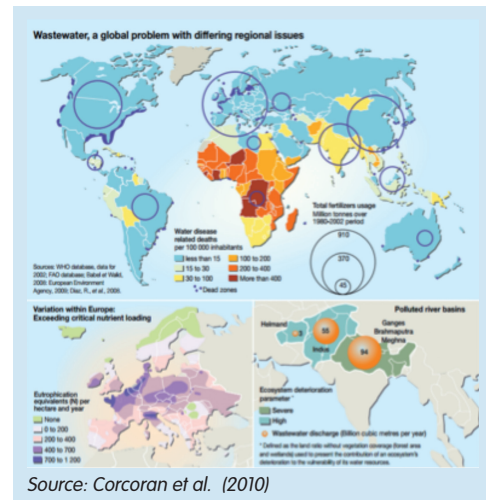
Improving water resources management – dealing with water scarcity

Water management at all levels faces increasing challenges to satisfy increasing, often conflicting, water demands between stakeholders, with mounting uncertainties of how much water will be available in different countries in the future. The ability of countries to address the mounting challenges of matching water available with mounting demand for domestic, agricultural, industrial and environmental needs depends upon better management of water resources and then upon the more efficient use of water for productive purposes.

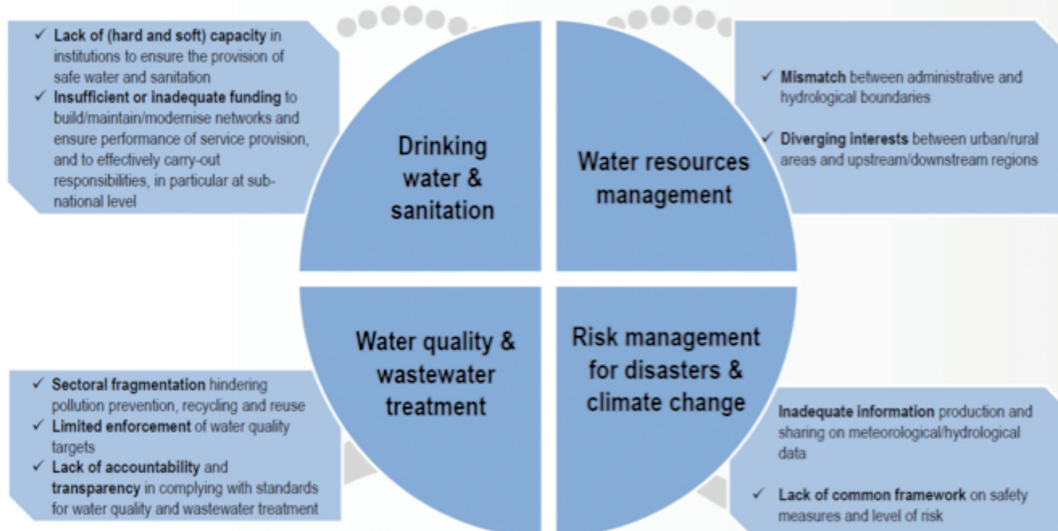
Improved governance of water resources remains at the heart of the struggle for sustainable human development, growth and poverty reduction. –Most implementation challenges are linked to the need to adapt existing policies of water institutions which must grow to the challenge of managing water resources integrally. Despite recent advances institutions tend to be affected by inertia, focus in compliance of existing regulations and decision protocols rather than on the pursuit of forward looking actions. Tasks are distributed among institutional silos with little communication among them and each department tends to lock in well established practices and values rather than in adapting to new challenges. Some institutional barriers for sustainable water resources management include the following:

- The management of water resources is an issue particularly sensitive to the question of **scale**. The mismatch between administrative limits and hydrological boundaries can lead to local actors (e.g. municipalities) placing their own interests ahead when designing and implementing water resources management policies and strategies, rather than integrating the needs of the river basin and aquifers.
- Managing water resources efficiently can also be hindered by **diverging interests** between urban and rural areas for example, or between up-stream and downstream regions. This can hinder the water-use efficiency across sectors and prevent the adoption of convergent objectives for sustainable withdrawals and supply of freshwater to address water scarcity.

WASTEWATER: A GLOBAL PROBLEM WITH MANY LOCAL FACES



Governance obstacles by water management function



Source: OECD (2014)

The effective and integrated planning and management across competing uses and users must be the outcome of an inclusive transparent and collaborative decision making process. Rather than the other way around, changes in water management must focus on improving processes of collective decision making.

The application of human rights based approaches (HRBA) and measures of improved transparency, accountability, participation and integrity are critical to progress towards the good governance practices required to manage water resources integrally. On the contrary, weak social control, lax law enforcement, the combination of large-scale infrastructure development projects and market power create a favorable environment for rent seeking practices from businesses and civil servants and then lead to severe risk of corruption and power abuse. →

Water remains at all levels a catalyst for coordinated policy, shared management, and peaceful cooperation between countries. Enhanced cooperation over water issues could contribute to more efficient management, with positive impacts on water quantity and quality, as well as reducing potential for conflicts.

Mechanisms must hold political leaders and Governments accountable for fulfilling WASH-related promises. Legislation should strengthen consumer's rights, and empower communities to demand better services from governing officials. We also need to scrutinize where development funds actually end up.

Dealing with water related disasters and climate change

Responding to the challenges of climate change impacts on water resources requires adaptation strategies, adaptive institutions and solid legal frameworks at the local, regional, national and global levels, including across political borders in the case of shared rivers basins, lake basins and transboundary aquifers.

When mainstreaming water into the climate change policy agenda at a country level priority is given to the improvement of water resources management systems by implementing strategies that contribute to water development objectives are also resilient to climate change. In particular, climate change proofed strategies have made visible the higher adaptive capacity of well-preserved ecosystems such as floodplains instead dams to control flood events or the role of healthy rivers and aquifers as buffers stocks to respond to droughts.

Water is also critical for climate change mitigation, as many efforts to reduce carbon emissions and to sustain carbon storage in plants and soil rely on water availability. While some politicians still do not understand or appreciate the need to adapt, water managers can work with the right mix of adaptation and mitigation efforts, share knowledge, and build long-term resilience by investing in appropriate infrastructure.

Water security, instead of high capacity water infrastructures, have gradually become the relevant criterion for long term water management objectives. Accordingly, around the world, governments are increasingly adopting water management and allocation frameworks that prioritise securing sustainable flow regimes towards ensuring the long-term availability of water for all.

Adaptation planning and practices need to be comprehensive and flexible. When developing cross-sectoral national climate change adaptation plans, proper attention should be given to water management. At the same time, adaptation requirements have to be considered in the climate risk management framework to ensure sustainable interventions. Some important institutional barriers for water risk management are the following:

- **Inadequate information** production and sharing for what concerns meteorological and hydrological data is an important obstacle to managing the risks related to extreme events and global warming. Often, countries deal with data scattered across various sources (scientific, institutional, etc.) which hamper a common understanding of the risks and exposure to natural disasters such as droughts and floods.
- It results in the **absence of common frame of reference** regarding safety measures and levels of risks and different levels of knowledge and awareness across actors.

WATER MEASURES TO ADAPT TO CLIMATE CHANGE

Adaptation measures can be categorized in the following five ways,

- Planning and applying new investments (for example, reservoirs, irrigation systems, capacity expansions, levees, water supply, wastewater treatments, and ecosystems restoration).
- Adjusting operation, monitoring and regulation practices of existing systems to accommodate new uses or conditions (for example, ecology, pollution control, climate change, population growth).
- Working on maintenance, major rehabilitation and re-engineering of existing systems (for example, dams, barrages, irrigation systems, canals, pumps, rivers, wetlands).
- Making modifications to processes and demands for existing systems and water users (for example, rainwater harvesting, water conservation, pricing, regulation, legislation, basin planning, funding for ecosystem services, stakeholder participation, consumer education and awareness).
- Introducing new efficient technologies (for example, desalination, biotechnology, drip irrigation, wastewater reuse, recycling, and solar panels).

Source: UN Water (2010)

Effective adaptation for water requires different approaches within an integrated water management framework. This fact calls for cooperative solutions that help prevent the negative effects of unilaterally taken adaptation measures and identify more comprehensive solutions. Adaptive water governance will call for more inter-sectoral planning and links between institutions responsible for agriculture, land tenure and use, forestry, energy, environment and water. Lessons can be learned from drought and flood experiences of the past to reduce vulnerability of newly affected areas in the future.

Meeting the challenge of climate change adaptation becomes more daunting for decision makers because information is often limited on the status of availability and use of water, and on the potential impact of climate change. Hydrological information is often incomplete, unreliable, inaccessible or simply lacking at the global, regional, national and local levels. Even existing data are not used efficiently. There is little sharing of hydrologic data, owing mainly to limited physical access, policy and security concerns, lack of accepted protocols and often commercial considerations. Embedding resilience thinking to water management means working on alternatives that respond effectively to current risks and disasters while building new strong capabilities to deal with unpredictable events in the future, and in particular dealing with those risks affecting the more vulnerable poor. These objectives must serve to reshape water management options and to screen for more robust solutions.

Adaptive management requires institutional and human capacity-building at various levels. Planning and designing of new hydraulic infrastructure, with adaptable pathways instead of 'once for all' hard works, and the development of new hydrologic tools, able to include risks into decision making, and new cost benefits tools able to include the value of reduced risks and increased adaptation capabilities.

WISE WATER RISK MANAGEMENT

UN Lessons learnt from water management and disaster risk reduction:

1. Focusing on preparedness, mitigation and adaptation is less costly in social and economic terms than relying on emergency responses.
2. A post-2015 disaster risk reduction framework represents an opportunity to adopt new implementation pathways, including greater stakeholder participation, particularly of the poor, indigenous peoples, youth and women.
3. Institutions will need to be strengthened to deliver results across the broad spectrum of water, sanitation and related areas.
4. There is a need to manage water-related risks by putting in place operational plans and actions to mitigate the impacts of extreme events and climate change.
5. Improving individual and institutional capacity will be key to achieving a post-2015 development agenda and in reducing water-related disaster risks and adapt to climate change impacts.
6. Institutional coordination remains a challenge, especially in circumstances where there is an underlying capacity deficit.
7. There is a clear call for new water infrastructure, and the protection, rehabilitation, operation and maintenance of existing infrastructure.
8. The scale of investment required to securing sustainable water for all will be substantial.
9. An innovative and comprehensive monitoring and evaluation system will be needed to measure progress.

Source: UN (2015)

2.4 Some regional perspectives on implementation

Asia

The Asia Pacific Region is developing multiple efforts and strategies relevant to meet the water SDG targets through the application of water security frameworks at national scale. However, there is acknowledgment about the transboundary nature of water issues and the need to address them jointly, recognizing the need for and the potential benefits of the development of upper scale initiatives and agreements under a frame of cooperation.

There are several challenges regarding access to water in general. One is the lack of a water law in some countries, causing water allocation problems and upstream/downstream conflicts. A second big challenge is the insufficient availability of freshwater to meet the demands of a rapid urbanization and extension of the agricultural area. A third main challenge is climate change and the related exacerbation of droughts and water scarcity.

The tools that have been implemented in the region to address them include improvements in institutional frameworks and capacity development tools. Particularly in Thailand a IWRM approach has been implemented with the creation of a National Committee and a River Basin Committee for the 25 major rivers, although allocation competences have not yet been included within their mandate thus remaining a pending aspect. Capacity building and stakeholder integration have been encouraged through a bottom up approach and are expected to be increasingly present in current and future projects.

Asian states are adopting integrated and coordinated approaches for natural resources management to address the water-energy-food nexus and related challenges. Several examples of participative social governance at local level are providing effective and win-win results, highlighting the potential of building and strengthening local capacities and creating awareness on their own problems to achieve successful horizontal governance formulas.

Identifying the connection between infrastructure and economic development is the first critical step. In Korea the public water infrastructure macro-project was only possible thanks to the aid of foreign donors in the first stages of the economic development. In the industrial areas, improvements in the water system required activity and economic investment, which were contributed directly or indirectly by the technological development and job creation. Knowledge on careful investment and efficient operation management of the system, as well as consideration of the scale of the projects, are critical points to come up with sustainable projects in the long term.

Knowledge transfer on examples of cooperation in other regions such as Europe could be very useful to bring awareness on the importance of transboundary cooperation among the Asian states, as well as to provide guidance on how to replicate these initiatives in the region. Meanwhile, the support of United Nations and other regions with further experience in dealing with water and energy security issues can be very valuable to guide on the elaboration and implementation of water integrated resources management frameworks.

Bringing water access to remote rural areas remains an important challenge. Important investments in water infrastructures projects will be required to achieve universal access to water and sanitation in the region. The contribution of external funds and international donors to face the initial upfront investments until the project dynamics drives new own financial sources (increased economic activity, technological innovation, job creation and cost recovery), may be a condition to make these projects possible.

There is need to first define the concept of rural communities and small communities. There are certain rural areas that are not covered by the water district, and there is need to enhance the coverage of water services to those rural districts. Second, there is need to inventory and map the areas lacking access to water and analyse their situation (proximity of water sources, geographical barriers, etc.), in order to design a complete National Plan for Water for All. This could be lumped into a project where both the government and private sector should contribute. Finally, capacity building is essential and should be localized so tools can be understood and implemented, and monitored to ensure its sustainability.

The main challenge associated to finding contractors relies on the lack of willingness or demand of higher prices to undertake projects in rural and isolated areas, which are usually located at far distances. There a potential for local governments to tap the skilled resources and capacities they are working with, which are usually government controlled corporations, to help nearby rural communities through encouragement and incentives.

Latin America and the Caribbean

The most recent data from the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP) indicate that the overwhelming majority of the countries in Latin America and the Caribbean (LAC) has already achieved or is likely to achieve the Millennium Development Goal for drinking water, despite a great variety among countries. Access to sanitation on the contrary has only been achieved by 46% of the countries. Despite the remarkable advances in the expansion of access to improved services between 1990 and 2011 (going from 85% to 94% for drinking water and 68% to 82% for sanitation), Latin America remains the most urbanized and unequal region in the world, with still almost 36 million people without access to improved sources of drinking water and over 110 million people without access to improved sanitation facilities. In the majority of cases, it is not a problem of water scarcity – as the region has abundant water resources in general terms - but of insufficient investment.

Inequalities are still one of the main challenges in the region. Gaps in service mainly affect low-income groups, which means that between 70% and 85% of the people lacking access to water services are in the two lowest income quintiles. In rural areas, coverage is consistently lower: 15% in the case of drinking water and 24% in the case of sanitation services. Future challenges in the region include the reduction of such inequalities between rural and urban areas and service improvement, particularly in regards to uninterrupted services. It is also important to take into account that water sources are threatened by climate change.

According to a study performed by the Latin American Development Bank (CAF), the Latin American Bank for Development, to calculate the costs of reaching the water related SDG targets, the investment required would amount USD 12.500MM annually, the equivalent to 0,31% of the Region's GDP in 2010.

To overcome this situation, the region will need to improve and consolidate its water governance with a paradigm shift towards the sustainable integration of water resources management. A special effort from governments will be required to consolidate operational water management institutions to develop water management strategies valuing the local knowledge and practices; to develop and implement water management and economic instruments (water use rights and discharge permits, efficient costs, markets and social evaluation, etc.); to create decentralized and independent water authorities; and to design water allocation (and especially reallocation) systems that promote investment in the water sector.

The UNECE region

The UNECE region is comprised by Europe, including the European Union and all the ex-soviet states, the US, Canada and Israel. The European region is not homogeneous in terms of economic development, nor free of geopolitical conflicts and tensions and water related problems. Half of the population lives in water stressed areas and faces problems of conflicting uses, disparities on access to WASH services, deficient capacities of data collection and monitoring and vulnerability to disaster risks. Important tools that can potentially help overcome these challenges include institutional and legal cooperation frameworks, the Nexus approach to water, food, energy and ecosystems, the application of integrated water resources management, the promotion of the human right to water and sanitation and harmonized systems for reporting and monitoring, among others.

The UNECE Water Convention has led to strengthened transboundary water cooperation, peace and security through intersectoral and transboundary coordination and cooperation. The Water Convention and the UN Watercourses Convention are based on the same principles and they complement each other. The UNECE Water Convention was signed in 1992 and amended in 2003, and is focused on the prevention, reduction and controlling of adverse transboundary impacts and imposes the obligation to cooperate through agreements and joint institutions. The UN Water Courses Convention entered in force in 2014 and has its focus on the fair and reasonable use of shared water resources by setting basic standards and rules for cooperation between watercourse states on the use, management, and protection of international watercourses. The globalization of these Conventions brings new opportunities for experience sharing.

Finland has a long tradition in transboundary cooperation and in participating in the development of international water law and in promoting international water conventions. The agreement between Finland and Russia concerning frontier

watercourses is already 50 years old. It has a wide coverage, both geographically and in terms of the topics included. It meets the principles of transboundary cooperation: equitable and reasonable use of the water resource, no harm principles and common institutional body; and was developed based on the following pillars:

- A participatory approach during planning and implementation, involving stakeholders to identify their needs, problems and priorities
- The main aim to minimise adverse consequences in the river system as a whole, including flood and drought risk management in both countries, hydropower production and habitats of fish and endangered Saimaa seal.
- Common understanding of risks, benefits and costs in the broad sense.
- Joint rules for watershed regulation in extreme water events - important tool for joint climate change adaptation.

Looking at the future challenges for implementation of the SDGs, Water Conventions and their regional implementation are important instruments for water diplomacy and conflict prevention that can contribute to increase water security. Transboundary agreements can lower the threshold for initiating discussions leading to solving disputes, while creating win win opportunities that rise above the national level.

Reporting and monitoring are essential tools for the implementation of the 6th SDG on water. Within the European Union, the Water Framework Directive establishes the bases of a water quality reporting and monitoring system to assess the state and quality of water bodies and ensure their protection; and another reporting system is linked to the Drinking Water Directive. Upscaling to the UNECE region, an important monitoring and reporting tool is given by the Protocol on Water and Health, which constitutes the world's only legal treaty designed to reduce water-related deaths and diseases through improved water management. It is a practical instrument to achieve the water related MDGs and a framework to implement the human right to water and sanitation, focused on governance, integration of policies and on cooperation. Its key objectives are the access to drinking water and the provision of sanitation for everybody. It has currently been ratified by 26 of the 36 UNECE countries. Within its scope it includes coastal and estuarine waters, surface waters, wastewater collection, transport, treatment, discharge and reuse. Every three years the parties shall evaluate progress towards the targets set and submit a summary report in accordance with guidelines established by the Meeting of the Parties. Two reporting cycles have been conducted in 2010 and 2013 and the third cycle will take place in 2015. The reporting has the objectives of assessing progress (self assessment by Party and assessment by the Meeting of the Parties), exchanging experience and lessons learned, demonstrating the main challenges/obstacles in implementing the Protocol and having a basis of harmonized information throughout the region. This protocol could be revised as a result of the Post 2015 Agenda, adjusting the guidelines and targets; increasing the focus on sanitation, wastewater, safe and efficient water management, equitable access, health promotion, financing, human resources; and integrating the reporting with global monitoring frameworks.

The implementation of these frameworks into an independent regulatory framework in Portugal has led to an increase from 84% to 99% of waters complying with the drinking water standards in 10 years, with improved conditions in treated wastewaters, surface waters, coastal bathing waters and river bathing waters.

In the case of the Danube basin with a lot of socio-economic diversity and heterogeneity. There are differences because for EU member states, the EU legal framework, i.e. the Water Framework Directive (WFD) with its requirements and deadlines, prompt them to automatically also fulfil the requirements stemming from the Danube River Protection Convention. Non-EU countries politically agreed to work on the implementation of the WFD. Cooperation in the frame of the convention brings them closer to the EU, while the application of these principles also results in benefits for them.

Considering the cross-cutting and interdisciplinary nature of water and the inclusion of water issues among the SDGs, cooperation in international basins becomes particularly important. In this context and in view of the warnings raised by the most recent IPCC technical reports on predictable risks to water quality and availability, the International Commission for the Protection of the Danube River (ICPDR) was asked by the Ministers of the Danube countries in 2010 to prepare the first transboundary Climate Change Adaptation Strategy for the whole basin. The Strategy was finalized and adopted in December 2012, and is based on a scientific research study which summarizes all relevant information on climate change and expected impacts on water for the Danube River Basin.

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3. Advice on Means and Tools for Implementation⁶

Achieving the post 2015 water-related Sustainable Development Goals is possible. It's within range of available resources, human and social capacities and technologies available. It is feasible and can be achieved by improving water policy, institutions and partnerships, mobilizing and developing individual and social capacities, speeding the diffusion and adaptation of existing and new technologies and designing and implementing the required economic and financial instruments. None of these challenges, however, involve only the water community or can be dealt with in the water policy arena in isolation. A systematic effort is required in order to put in place the means required to make it happen.

3.1 Finance

“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.”⁷

Increasing finance

As with the MDGs, achieving water and sanitation targets in the SDGs will require increased funding – the total requirements as a whole are difficult to estimate and may vary widely depending on the methodology used and assumptions made.

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 terms⁸, or USD53 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. Recent estimates reviewed and confirmed by various publications suggest that an incremental USD27 billion will be required to ensure universal access to drinking water and sanitation, with sanitation accounting for the majority of incremental resource needs⁹. WaterAid has suggested that African countries should spend 4.5 percent of GDP on water and sanitation, in line with the Africa Infrastructure Country Diagnostic (AICD) assessments¹⁰.

Financial needs will differ across countries and regions. They may be disproportionately large relative to the size of their economies in many poor countries, where the main focus is still on basic access to water and sanitation. Challenges facing the increasing water needs of a growing economy are also a priority for many middle-income countries and, while differing in their details, all countries face the challenge of making human prosperity compatible with preserving the critical ecosystems and the services they provide for people, the economy and the environment.

It is possible to mobilize resources. The Millennium Development Goals provided a lever to mobilize and increase the financial resources available to provide access to basic water and sanitation for the poor. All types of finance – public, private, domestic and international – have increased since 2002 (IMF, 2014). Domestic finance has grown rapidly in recent years, representing by far the greatest share of financing sources for most countries. (DOHA, ICESDF, 2014).

Mobilize finance by bringing the benefits upfront

Gathering the financial resources for water development can be speed up and facilitated by bringing compelling evidence about the benefits of water development upfront.

The evidence of the benefits from improving access to basic services has shown that WASH benefits greatly exceed the size of the financial effort required (Hutton, 2015). Benefits are higher in those situations that affect the poorest and where

6. A draft of this section served to prepare the UN-Water (April 2014) Compilation of aspects on the means of implementation: water and sanitation. This section has incorporated inputs from the compilation document.

7. SDSN (2014) Financing Sustainable Development: Implementing the SDGs through Effective Investment Strategies and Partnerships. Preliminary, unedited draft. Authors: Schmidt-Traub, G. & Sachs, J.D.

8. 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/>.

9. WaterAid 2013, WHO and UN-Water 2012, World Bank 2011.

10. 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>.

financial resources are scarcer. For instance, benefits exceed costs in a proportion that goes from 3 to 6 times, from interventions designed to achieve universal access to basic sanitation at home to those focused on eliminating open defecation (Greenhill and Ali, 2013)¹¹. The WHO places estimates for losses due to inadequate water and sanitation services in developing countries at a total of USD260 billion a year, 1.5% of global GDP – or up to 10% of GDP for some very poor countries¹². A recent report published by the University of Oxford indicates that water insecurity is a drag on economic development in the order of USD500 billion annually - excluding environmental and other non-monetized impacts¹³.

Beyond WASH, investments in water play a defining role in economic development. Investments in infrastructures for energy, food, cities and many other areas where water is an essential production input is an important driver in particular for intermediate economies. Africa, for example, loses 5% of GDP due to poor coverage of water and sanitation, but also 2% 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 change¹⁴. 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 biodiversity¹⁵. Drinking water supply and sanitation investments generate high economic returns to society and a large range of economic and social benefits¹⁶.

Improving the use of the financial resources already available

Besides gathering new financial resources, it is also important to use those already in place better and more effectively. Efficiency must go beyond building new facilities to guarantee their effective use and replacement. Between 20-40% of the resources may have not been applied to its intended purpose due to deviation of funds, rent seeking and corruption. The UN Convention against corruption can be an effective instrument to deter corruption and regain access to the public resources devoted to water. The 2014 GLAAS report also points to the fact that funding may not be going to those in greatest need and even if resources are abundant, according to the criteria of financing institutions, there still are countries and communities with low absorptive capacity.

National commitments and local efforts will be a key part of achieving the SDGs, not only in terms of the mobilization of domestic resources but also for strengthening domestic investment, broadening tax bases and creating transparent and accountable institutions, while also limiting tax evasion and curbing corruption and illicit flows.

SOUTH-SOUTH COOPERATION IN NICARAGUA

MDG-F projects on water and sanitation in Panama, Nicaragua, Paraguay - ILO

This project funded by the MDG fund aimed to strengthen the government's capacity to manage water provision and water quality, including the poorest and excluded populations. It focused on three main topics: planning and consultation with indigenous communities, as a way of communities' prioritisation and identification of local knowledge on water provision (Paraguay); management and empowerment through the management of water systems and sanitation (Panama); and technical capacity building in construction and maintenance to participate in the local labour market (Nicaragua).

<http://goo.gl/YuOVb9>

THE FONAG IN ECUADOR

Financial sustainability created by FONAG

This fund is a financial mechanism, with the legal figure of a private mercantile trust, under the Securities Market Law of Ecuador.

The resources invested by FONAG allow the development of research, land tilling, surveillance and a control program, valuation of environmental services, sustainable productive systems, education and training, and monitoring and evaluation programs.

<http://goo.gl/oljn1P>

11. For instance, the 2014 Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS, 2014) highlights the case that current funding may not be going to those with the greatest needs.

12. 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/.

13. Global Water Partnership and the Organisation for Economic Co-operation and Development, "Securing Water, Sustaining Growth", 13 April 2015. Available at: <http://www.ox.ac.uk/news/2015-04-13-water-insecurity-drag-global-economy-0>.

14. Africa Regional Position Paper, 5th World Water Forum, Istanbul.

15. OECD (2008). Costs of Inaction on Environmental Policy Challenges: Summary Report <http://www.oecd.org/environment/ministerial/40501169.pdf>.

16. 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.

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 for the poor, streamline the economic cycle and support macroeconomic stability.

Financial planning to attract financing

Lack of foresight may be one of the most important factors that explain financial deficiencies in the water sector. 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 able to attract financing and cover operation, maintenance and capital costs (Hutton and Bertram, 2008).

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 place so that the finance available are used to achieve the greatest impact and to ensure that the poorest and most vulnerable are protected. These include:

- **Regulatory frameworks that enable the setting of affordable** tariffs and that make sure the poorest and the most vulnerable are not excluded.
- **Policies** that create an enabling environment for investment, so that investors – public or private – are confident that their investments will achieve results.
- Adequate human resource capacity at all levels – both nationally and especially at a local level.
- Robust systems to monitor progress and the impact of policies and resources.

Demonstrating good performance and the effective use of the financial resources will contribute to enhancing the reputation of the water sector and will help bring more resources. Trusty and sound financial practices can help reach the targets even when resources are small and people's willingness to pay is hampered by poverty and deprivation. But in many cases the focus should be shifted from gathering resources for investments to providing better services and guaranteeing the effective use and replacement of the facilities already in place.

Increasingly, professionalization 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 guarantees¹⁷.

Improving effectiveness of financing- Linking finance to performance

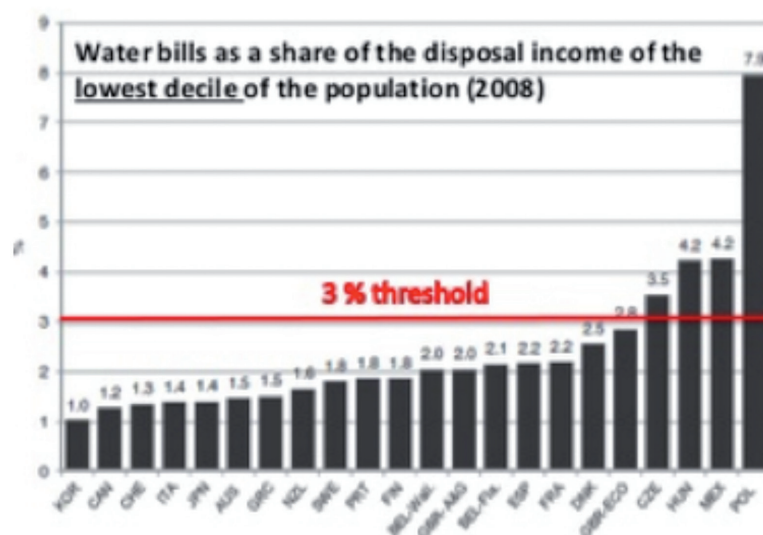
Results based financing (RBF) in water investments is a set of financial mechanisms and strategies purposely designed to link development financing and assistance to results and thus to incentivize the efficient application of resources provided by national and international agencies as well as the accountability of domestic constituencies. Results based financing (RBF) mechanisms are alternatives to traditional development assistance which is typically disbursed in advance of delivery. Well designed and properly implemented RBF schemes may result in better quality and timely delivery of water services, lower opportunities for corruption, a change towards a results oriented rather than a budget focused management, an improved monitoring system and more autonomy to the local agency to find the best way to deliver the intended services. Nevertheless these benefits come at the expense of some opportunity costs associated to negotiating and setting up a workable RBF scheme, the need to monitor and to assess the risk of wrongly designed incentives (World Bank, 2014).

Better and better focused pricing

Making water-users contribute to finance water services is an integral part of a sustainable water development strategy. People's willingness and ability to pay for water and sanitation services should not be underestimated. When financial,

¹⁷ World Water Council and OECD, (2015), "Water, Fit for Finance? Catalyzing national growth through investment in water security". Full article forthcoming, information available at http://www.oecdobserver.org/news/fullstory.php/aid/4825/Water:_Unlocking_the_finance.html.

Water prices are below affordability thresholds in most of the world



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 (OECD, 2015¹⁸). Water prices should be adaptable and should progress in line with local incomes and economic development.

Nevertheless, the political nature of water tariffs makes them resistant to increases. As a result, existing tariffs often lag behind people’s willingness to pay. Actually there is 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 (OECD, 2015).

Making water-users contribute to finance water services is an integral part of a sustainable water development strategy. Besides making services affordable to people and business, the ability to charge for water depends also on many circumstances such as the social perception that providing water services depends on people’s contributions and that revenue from water tariffs is not being used for other government purposes or even worse, captured by any social group, such as firms or trade-unions, or deviated 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 endeavor. All these conditions will ease the financial challenge of water development.

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 resource management. These should be underpinned by changes in behavior and education, including on the importance of charging and paying for services.

Tapping financial opportunities of the Water Nexus

Water is at the crossroad of sustainability and advances towards managing water resources integrally, as well as improving water quality and reducing water related risks may make significant contributions to different areas such as agricultural development, enhancing energy security, adapting to climate change, meet biodiversity targets, etc.

INNOVATIVE FUND RAISING

Innovative fund raising: The Leading Group on Innovative Financing for Development (UNITAID) has developed a fund-raising mechanism to raise additional resources, including the international solidarity levy on air tickets.

Only 10 years ago, multilateral climate finance was provided by a small number of large funds, which were associated with the United Nations Framework Convention on Climate Change (UNFCCC). There are now over 50 international public funds. Over this period, governments designed and reformed institutions such as the Global Environment Facility (GEF), the Adaptation Fund (AF), the Climate Investment Funds (CIF), and most recently the Green Climate Fund (GCF), as well as new evolving financial instruments such as performance-based payments for reducing emissions from deforestation, degradation, and forest conservation (REDD+). Nonetheless, there remains a large gap between climate finance needs and resources. In particular, progress towards implementing the financial commitments under the United Nations Framework Convention on Climate Change (UNFCCC) has been slow.

18. OECD (2015), “Water – the right price can encourage efficiency and investment”, available at <http://www.oecd.org/env/resources/water-therightpricecanencourageefficiencyandinvestment.htm>

NEW AND OLD FISHING GROUNDS FOR WATER

Private sector philanthropic investment is playing an increasingly important role for water and sanitation. Foundations such as the Bill and Melinda Gates Foundation have committed more than USD265 million to the WASH sector over a five-year period to 2011. 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. 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 (Gates Foundation, 2015).

Official Development Assistance (ODA) will continue to play an important role for water and sanitation in the world's poorest countries. 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. This is particularly important to scale up emerging South-South and triangular cooperation and to guarantee that all new sources are additional, predictable and applied to the priorities of developing countries (OECD, 2014)

In fact, when translated into the discussions about financing development, the sustainability paradigm and the green economy thinking provide a strong case for the fact that water investments are not competing for financial resources with other initiatives such as climate change adaptation, disaster risk reduction, biodiversity conservation or rural development but making a simultaneous contribution to all of them. Converting the Water Nexus into a new financial opportunity requires assessing water investments differently and paying more attention to the co-benefits of water development.

The sustainable development agenda can take advantages of these synergies and expand the opportunities to bring more financial resources. In fact, water is at the centre of any climate change adaptation and mitigation strategy. The new Green Climate Fund¹⁹ to support country actions in this regard may represent as much as USD 100 billion per year. Water is also key to promote sustainable agricultural development.

Water projects may be eligible, for example, to be financed by the Fund for Smart Agriculture in LAC, and other funds such as the Canadian Climate Fund for the private sector. Water is key to enhancing and protecting the environment (and has been funded by the Global Environmental Facility), etc. The creation of blue water bonds, similar to climate bonds, may be a future option to attract funds to water management and environmental protection.

Improve targeting: Pro-poor financing strategies

Making people part of their own water development solutions may be more effective than making governments responsible for finding and implementing all water projects. Provided local capacities are in place, awarding financial support to local communities may increase community ownership, and raise the ability to respond to eventual difficulties. Donors are not always fully aware of what is going on in civil society and are not always aware of the importance of social empowerment.

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.

According to the World Bank, there are three main instruments for viable financing of WASH for those with lower incomes (The World Bank Group, 2013)²⁰.

- **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.

GREEN BONDS

Green Bonds – Climate Bonds

Green bonds have emerged in recent years as a new financial mechanism that offers investors an opportunity to support climate friendly investments. Projects funded by green bonds have been located across the globe and focused on a variety of goals, from increasing the resilience of water systems to boosting energy efficiency. The involvement of multilateral development banks has expanded the interest in green bonds, with governmental agencies, municipalities and, more recently, utilities and corporations finding ways to use the financial instruments.

<http://goo.gl/2vEQo6>

19. Available at: http://unfccc.int/cooperation_and_support/financial_mechanism/green_climate_fund/items/5869.php.

20. 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>.

- **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 donors²¹.
- **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.

PRO-POOR TARIFFS AND FINANCING

Local governments and service providers can consider increasing the design and implementation of successful policy instruments such as Social Safety Nets (SSN). SSNs are part of a broader poverty reduction strategy and are used as social tools to help facilitate productivity, redistribute resources to the poorest and most vulnerable, and protect low-income households from the effects of economic shocks or inequities. SSNs tend to have a better targeting performance than consumption or connection subsidies and they are offered through cash or non-cash instruments. This model has successfully been implemented in Medellin (UN-Water, 2011).

Cash instruments include programs that provide transfers in cash such as income support programs, non-contributory pensions, and disability benefits. Non-cash programmes on the other hand include food transfers, training opportunities for beneficiaries, and subsidies. Public-works and micro credit are other forms of SSN instruments. Public works typically provide low skills employment opportunities (for example, construction or rehabilitation of much needed public infrastructures) to the poor willing to work for a low wage payment in cash or in-kind.

Source: Milazzo and Grosh (2008)

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, science and innovation

Goal 17 of the post 2015 agenda addresses technology, science and innovation aspects putting special focus on three particular points. First, enhancing North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation. Second, promoting the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms. Third, to fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology.

There are technologies, including low cost and locally adapted ones

There is an increasing range of innovative and low cost technologies and 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. There is an increasingly wide array of new technologies and approaches that are adaptable to scale, capacities and local conditions.

Technology, science and innovation development in recent decades have significantly widened the number and the scope of opportunities and options available to increase coverage and reporting of WASH access. Particularly in relation to the water and sanitation sector, mobile to web-platforms have emerged as an essential asset to aid in the long-term sustainability of water services.

Yet, transferring technology requires both local knowledge and local capacities to make these options meet local conditions. The effective adaptation and use of these technologies, which have been piloted already in Nigeria and other

WSSCC TOOLKIT 101: SANITATION AND HYGIENE

Water Supply and Sanitation Collaborative Council (WSSCC) Toolkit 101.

It is designed for professionals working in sanitation and hygiene. It consists of six learning modules and three chapters of reference materials. The six interactive learning modules are: Communication for Behavioural Impact, Community Led Total Sanitation, Inclusive Design, Outcome Mapping, Sanitation Marketing and Using DevInfo to Monitor for Equity. The reference materials include all reference documents from the WSSCC Global Forum on Sanitation and Hygiene; and a compilation of global materials on menstrual hygiene management.

<http://goo.gl/5Uubf4>

²¹ 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.

countries²², critically depend on the knowledge, the human and social capacities in place and the existing institutions and policies. Cost estimates for implementing these kinds of technologies are based on estimates of total facilities by population density, time required to move between facilities, and an overall management cost.

The SDGs will expand the range of existing technologies to be transferred and adapted for human development of the poor to the fields of water quality, water resources management and risk management. But in an important sense, meeting the SDGs should be different. The world will need new technologies and new ways to organize human activity to combine improving human development standards and environmental goals. And to fulfil the new post 2015 development agenda, technological change will be paramount, in both rich and poor countries alike.

Nevertheless, the technological challenges are not limited to the lack of know-how or innovation; they mostly consist in putting technology effectively at the service of fulfilling the human development goals and bridging the gap between knowledge and action.

The technology challenge refers to what is feasible, and even to what are the best technical ways to cope with particular obstacles. But when going from knowledge to practice, the set of options available narrows down to those that are socially acceptable and even more, if the engagement of business and people is required, the set shrinks down to those that are economically profitable or that can be made financially sustainable in the longer term.

Making knowledge accessible – Creating Knowledge Platforms and other mechanisms for dissemination and transfer

Knowledge-sharing, such as through Global Technology Platforms (GTP) 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 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.

TICs and social media represent a real opportunity to reduce the transaction cost of screening among existing alternatives and making technology choices for inclusive, global-scale problem solving around the main sustainable development challenges. Scientists, technologists, civil society activists and others are increasingly turning to online networks for collaboration, crowdsourcing, group problem solving, and open-source solutions such as for software and applications. The pathways to sustainable development may not be identified through a top-down approach, but rather through a highly energized era of networked problem solving that engages the world's universities, businesses, nongovernmental organisations, governments, and especially young people, who should become the experts and leaders of a new and profoundly challenging era.

**THE 'OCTOPUS' GIS PLATFORM TEST
WIPO GREEN**

The Octopus GIS platform

One of the main challenges of the Joint-Venture created with Veolia was to overcome the high level of water losses (>35% in early 2000's). Pudong Veolia has developed and implemented a dedicated information system to manage its network, with an advanced GIS-centric integrated platform, collecting reliable real-time data from the field. The data analysis results are shared to all staff and workers through Web and mobile platforms. Because of its architecture, the system has been named 'The Octopus', and it's now supporting Pudong's massive vertical and horizontal expansion with good efficient water infrastructures.

<http://goo.gl/cZGfIA>

Test

It provides a formal and systematic approach to leverage private sector investments in resource efficient cleaner production in order to reduce industrial water consumption, to enhance environmental performance and productivity of industries. It is a basis and an inspiration departing point for water technology platform and assessment methodology for SDGs.

<http://goo.gl/tRFqKb>

Wipo Green

WIPO GREEN consists of an online database and network that brings together a wide range of players in the green technology innovation value chain, and connects owners of new technologies with individuals or companies looking to commercialise, license or otherwise access or distribute a green technology.

It is unique because it assembles technologies at all stages of development in one place, from upstream research to marketable products (and everything in between). These technologies are available for license, collaboration, joint ventures and sale.

<https://webaccess.wipo.int/green/>

22. 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.

A critical issue is how technical and scientific knowledge can be integrated with local and indigenous knowledge so as to improve the selection and adaptation of techniques to better match local circumstances and manage water in an economic, environmentally sustainable and culturally appropriate manner. For this reason in many development areas, but particularly for water, this implies an unprecedented mobilisation of know-how operating across many sector and regions. Governments, international institutions, private business, academia, and civil society should work together to identify the pathways to success, in ways that combine technical expertise and democratic representation.

Technology assessment for making better technology choices

Technology choices are an integral part of water policy. They imply complex decisions based on non-technical criteria. Smart technologies choices requires comparing 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 these decisions require technology evaluation and assessment tools and good water governance so as to insure 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 the unsustainable development pathways of the past. 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.

Assessment need to consider the whole technology cycle, avoiding technology lock-ins (and the costs from abandoning inappropriate options). Special attention should also be paid to ownership, property rights constraints, monopoly power, and adaptability.

Dealing with the barriers for technology adoption

This includes initiatives to ease or remove barriers that inhibit the adoption of water technologies – such as 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 under the lenses of its potential to foster or inhibit the adoption and dissemination of new technologies.

Successful environmental technologies adoption requires well-functioning public and private sector institutions, with good governance, efficient administration, an effective legal system, strong management skills and investment in R&D.

Lack of good governance can specifically hinder the opportunities of SMEs to participate in the implementation of water related solutions, as it would prohibitively increase time and resources. The creation of enabling and flexible institutional setups is a clear pre-condition for technology development and innovation (Rohracher et al., 2008).

Institutional inertia often favours technology inertia: rules are shaped to routinely approve traditional and well established technologies while increasing the costs of adopting innovations that may not find an easy way through red tape.

HWTS

Household Water Treatment and safe Storage (HWTS) – WHO/UNICEF

Appropriate technology for water treatment rural areas is a concern as funds are generally limited for both the hard ware and maintenance. The Household Water Treatment and safe Storage (HWTS) Toolkit provides an overall framework for planning, conducting, and utilizing monitoring and evaluation data to improve programme outcomes.

<http://goo.gl/GZ2del>

MICROBIAL SOURCE TRACKING (MSC)HWTS

It is well known that improperly treated wastewater may lead to the transmission of pathogen viruses that are excreted in feces and urine of humans and animals at high concentrations. The EU-FP7-funded VIROCLIME project was developed with the aim of testing the presence of virus pathogens across different case study areas through the use of so-called 'Microbial Source Tracking (MST)' tools and see how different levels of wastewater treatment could reduce the exposure risk to these viruses.

<http://bit.ly/1lMaYQX>

EARTH OBSERVATIONS

Applications of Earth observations in monitoring the Water SDG

Earth observations (EO), which include both satellite and in-situ data, can provide robust monitoring for indicators because of their geospatial consistency, accessibility, repeatability, and global coverage. EO data are being used to derive population density maps that support monitoring and could assist in monitoring Waste Water and Water Quality Management indicators. Geographical Information System (GIS) platforms enable EO data to be combined with socioeconomic and survey data for more complex indicators. Water Resources Management (WRM) indicators lend themselves to the use of water cycle data used in routine water management purposes. Emerging integration capabilities such as land data assimilation systems and the University of Tokyo's Water Cycle Integrator can also track WRM indicators. In addition, the present and future role of novel data, including new 'Big Data' sources and citizen science will also play a significant role. <http://bit.ly/1IMbmyR>

Leveling the playing field may be another important pre-condition towards widening the options for innovations. Inappropriate protection of property rights may play against innovations that depend on new patented knowledge rather than public property knowledge.

New environmental technologies development may be the result of leading edge R&D, which relies on the protection of intellectual property (e.g. through patents) to recover upfront investment costs. In countries where intellectual property laws are weak or ineffective, or where technology plagiarism is high, technology investors prefer to stay away. Technologies for water resource management seem to be particularly affected by this challenge.

High transactions costs for SMEs, in the position to use low scale and better adapted innovation, may play in favour of big firms facing less uncertain regulations and having better access to public authorities.

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, for example in encouraging the adoption of water efficient technologies through water prices that reflect water scarcities. Pilot projects or demonstration projects, can help reduce innovation risk and minimize costs when scaling up. Global business solutions like the 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.

Science, technology and innovation strategies are integral parts of sustainable development strategies. Many innovations in sustainable water management are high risk and with uncertain return. 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.

Besides supporting basic research governments can play a key role to foster innovation by creating the conditions to transform good knowledge and sustainable technologies into feasible and profitable business opportunities. The development and diffusion of environmental technologies significantly benefit from policy incentives in the form of tax breaks, subsidies, tariff protection, preferential terms of trade or government endorsed promotional programs. Where these policies are weak, or uncertain, or where perverse subsidies for unsustainable industries exist, the chances of success are much lower.

The possibility of water related innovations to find their way through its implementation depends on the existing market opportunities which in their turn are heavily dependent on market prices, particularly for water but also for energy, labour and other resources.

SUPPORTING SME FINDING THEIR WAY

PRE SME Promote Resource Efficiency in SMEs

The resource kit is an integrated Resource Efficiency package by resource category (water, energy, chemicals, wastes and materials) with a clear methodological guidance, based on an in-depth survey and review of existing tools and techniques to be used by SMEs.

<http://goo.gl/G1wylw>

STRATEGIC FINANCIAL PROGRAM FOR CLIMATE RESILIENCE

Strategic Program for Climate Resilience in Jamaica - IDB

IDB's Structured and Corporate Finance Department has started an initiative to promote water efficiency measures and technologies among small farmers in the company's supply chain through a loan to a private sector client in the sugar industry. Some of the potential investments identified are drip-irrigation and fertilization, mechanized harvest on state and third-party lands; wastewater treatment; training/capacity building to create more employment opportunities for youth and women; and financial literacy and agribusiness management practices to enable the participation of all types of farmers.

<http://goo.gl/3ohtm4>

If water prices do not reflect current scarcities then market gains from savings in the water sector will be a poor driver to trigger the adoption of water technologies. In the same sense, the financial risks of innovation are higher for early adopters, and get reduced as it is disseminated. Pioneers reduce uncertainties and the costs to followers but the process might not start if uncertainties are high at the onset. Pilot or demonstration projects are means to trigger innovation and to speed up their diffusion as they can help reduce innovation risk and costs of scaling up.

Most research on infrastructure costs and needs has focused on drinking water supply and sanitation²³, leaving behind other important aspects that highly influence vulnerability to climate change. Particularly, further research should be done on the need 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 (SDSN, 2014). 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.

SUSTAINABLE WASTEWATER TREATMENT FOR SMALL VILLAGES

The main problem for implementing wastewater in small villages in the Duero River Basin, Spain, is not a technical problem but a cultural one, that is, the lack of awareness about water quality, with the local councils preferring to spend the money on sports facilities or festivals rather than in wastewater treatment plants.

Part of this program is focused on raising awareness and giving training and support to small villages through a project called Mayors School, with workshops and field visits to the pilot plants. The program also promotes agreements with other stakeholders and public bodies to engage them in the implementation of the water quality regulations.

Innovations in environmentally sound technologies, which are not already in the market, are often more expensive than incumbent technologies, and do not have the necessary supportive infrastructure. This lack of infrastructures makes it easy for incumbents, including 'unsustainable technologies', to compete. Such challenges would be relevant for water quality, WASH and WRM.

Capacity-building in the use of technologies

By their very nature, technologies require specialized knowledge and skills, which are often lacking in countries where education levels in science, engineering and technology can be low, and emerging areas like environmental engineering, biotechnology or clean energy are underdeveloped and not supported in universities. This is very relevant for all themes, but very much stressed in the case of WASH and water risk.

Capacity to respond to water risk may be strongly hindered by the lack of understanding of the interdependence of disasters with development, climate change, disaster risk and adaptation are the foundations of a culture of risk reduction.

As regards the technological aspects of water quality and WASH, professionalization of water technology related practices is key. Codes of Practices may offer a relevant solution to this challenge.

Empowerment as a means to deal with cultural barriers to technology

Innovative environmental technologies are prone to be perceived as a threat to cultural traditions. Environmental technologies can also face barriers such as language, the role of women in society, lack of support for entrepreneurs, or dependencies created by decades of development aid. This obstacle acquires a very high importance in all water themes, and especially for those activities that call for a significant engagement of local communities. It is worthwhile to recall the importance given to local community participation in water management in the current post 2015 Agenda (High Level Forum on Sustainable Development, 2014).

MAKING THE MOST OF EXISTING CAPACITY

Rural Supply Network

It is a local network of professionals and practitioners working to raise standards of knowledge and evidence, technical and professional competence, practice and policy in rural water supply.

<http://goo.gl/3ypz4A>

²³ 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.

Empowering local communities and providing them with access to technical knowledge may be a powerful instrument to avoid the risk of technology projects failures due to the inability of host countries to absorb the technology into their infrastructure, culture and society.

In addition to favouring innovation, this can support technology screening and adaptation to local conditions as well as to avoid going further with options that are not properly aligned with the host country's political and social priorities.

In the same sense, empowerment can help identify the existing gaps that could potentially make promising technologies fail at the end. Fluent social dialogue helps identify and tackle skills, insufficient financial support, market barriers and mismatches with existing infrastructures.

3.3 Governance: Policy, institutional coherence and partnerships

The integrated responses required must be based upon sustainable development strategies at the national and subnational level and a global partnership for sustainable development at the international level. Policy and institutional coherence are covered by goal 17 with special stress on the following aspects: the enhancement of global macroeconomic stability, policy coordination and policy coherence; and the respect of country's policy space and leadership to establish and implement policies for poverty eradication and sustainable development. Particular emphasis is also made on the importance to promote multistakeholder partnerships (all public, public-private and civil society partnerships) as a support to the global partnership for sustainable development. These can help mobilize and share knowledge, expertise, technology and financial resources to support the achievement of the sustainable development goals in all countries. Last but not least, supporting and strengthening the participation of local communities for improving water and sanitation management is key for the implementation of the water development goal as included in target 6.a.

REPUBLIC OF KOREA WASH TARGETS AND INDICATORS

Fact Sheets on Post-2015 WASH targets and indicators - WSSCC

The fact sheets were produced by the WASH community to help advocate for specific targets and indicators to be included in the Post- 2015 agenda: WASH Post-2015, Sanitation and Hygiene WASH Post 2015, Ending Inequalities. WSSCC has equally elaborated the Post-2015 WASH Targets & Indicators - Questions & Answers. These sheets are a solid background work to informing decision-makers.

<http://goo.gl/Ynk3yA>

Bridging the Governance Gaps

Implementing the water related sustainable goals, requires that societies bridge different governance gaps. These gaps should not be considered in isolation as they can mutually reinforce each other, and can be more or less acute from one country to another. According to the OECD, these gaps can be defined as follows:

1. **Administrative Gap.** Water cuts across administrative boundaries, be it local, provincial or even national. Hydrological perimeters often do not coincide with administrative ones and raise the question of the relevant scale at which water resources and services should be managed. The international community has been advocating for basin (rivers, aquifers, lakes) and many countries have set up river basin organisations in the last decades. The question of their effectiveness in achieving intended outcomes (and supporting the implementation of a water SDG) is legitimate and requires thorough assessment of their capacity (expertise, financial resources, staff) to carry out their duties properly.
2. **Policy Gap.** Water-related tasks are fragmented across authorities and levels of government which raises the question of vertical and horizontal coordination for effective implementation of a water SDG. A whole of government approach that goes beyond 'silos' is needed not to jeopardize the implementation of the water SDG. This implies often a full-fledged national strategy and commitment at the highest level to tackle the water challenge, which also embarks local authorities and the broader range of stakeholders in the implementation.
3. **Information Gap.** Information is power. Information is the new currency. Improving access to WSS and managing WRM more effectively requires precise, accurate and up-to-date information on water demand and availability, users' registry, water permits, water risks, who pays for what, the status of networks and infrastructure, but also in terms of who does what and who is held accountable for what. In practice, many countries are still lagging behind and a huge asymmetry of information exists between authorities, end users, service providers and other stakeholders, be it voluntary or not. Though progress has been made in terms of hydrological data and water information systems have spread across

the globe, much remains to be done in terms of socio-economic and financial data to guide decision-making in the water sector.

4. **Capacity Gap.** Capacity in terms of human resources, expertise and infrastructure remains a major challenge. Designing and implementing water policies with a view to reach the SDG targets requires resources and knowledge. In many countries, water managers (service providers, river basin organisations, and other authorities) do not have the proper means to carry out their responsibilities in the sector. Implementing a dedicated water SDG requires transferring these resources and providing the needed technical and financial assistance for those in charge to deliver effectively.
5. **Funding gap.** Increasing the number of *people with safe access to drinking* water and sanitation and meeting more and more stringent environmental regulations will require financial resources. Three ultimate sources of revenues exist in the sector: taxes, tariffs and transfers from international development. The share of these is a political choice, taking into account issues of economic efficiency, social equity, environmental sustainability and affordability constraints. The call for sustainable cost recovery requires increasing attention on user's fees for sustainable water management. In many countries bill collection is a primary issue to tackle before increasing tariffs. ODA flows also raise absorption capacity in recipient countries.
6. **Objective gap.** The multiplicity of stakeholders in the water sector makes it vulnerable to lobbying, and risks of capture which can freeze decision-making. If a water SDG can certainly be conceived as a universal, aspirational goal, its effective implementation will require managing a number of trade-offs between diverging objectives, interests and priorities. Decisions taken in other sectors like agriculture (e.g. subsidies to farmers) can work against water policy while not incentivising rational use of water resources. Similarly, those who take decisions about spatial planning (urban dwellers, property developers) generate future liabilities for which they do not always bear the costs. These split incentives have to be managed for a holistic implementation of a water SDG. These imply flanking measures and compensation mechanisms, where need be, to transition.
7. **Accountability gap.** Many countries are going through a crisis of trust in their governments. The Arab spring has been an emblematic example in the last few years. Often, the capacity of governments to deliver quality public services at an affordable cost is an indicator of accountability vis-à-vis citizens. Issues of transparency and integrity are also important in a sector that has a high degree of monopolistic behaviour. Implementing a water SDG will require an enabling and regulatory environment that allows monitoring and assessing progress in a transparent and inclusive way. Engaging all stakeholders at different levels from information to partnerships or co-decision according to the needs, also stands as a prerequisite for effective buy-in and accountability.

Tools would only serve the intended goals when they are part of an Integrated Water Resource Management framework and particularly when they fulfill with three basic criteria (see OECD 2014):

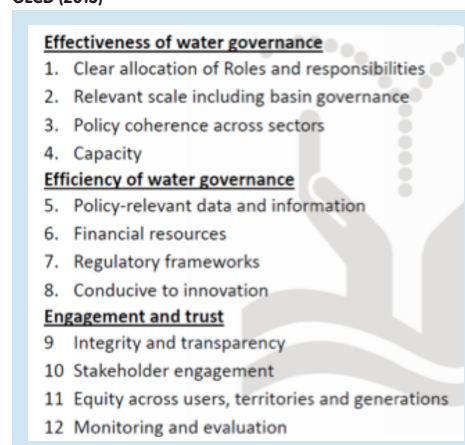
- **Effectiveness:** meaning that the governance tools contribute to define precise policy goals and serve to achieve the expected outcomes in terms of water development and sustainability.
- **Efficiency:** meaning that governance tools contribute to help society make the most of the water resources available, maximizing the benefits of water, allocating the scarce resource to its most productive uses and producing more

TRACKING GOVERNANCE EFFECTIVENESS

OECD Indicators on Water Governance

Set of policy indicators to track the **effectiveness of institutions** in delivering water policy outcomes, with the ambition to 'measure' what needs to be improved. The indicators target different scales (from local to national), help assess the **performance of water institutions** (vis-a-vis intended policy goals), and build the **economic case** for effective water governance. <http://bit.ly/1IMfJdb>

**THE TWELVE COMMANDMENTS:
 THE OECD PRINCIPLES ON WATER GOVERNANCE TO MAKE
 THE SDG HAPPEN
 OECD (2015)**



with less while enhancing the efficiency with which water is used in any of its possible applications in the economy. Efficiency also means that the sustainable development goals are reached with the lowest opportunity costs for anyone and for the society as a whole.

- **Trust:** meaning that governance tools allow for transparent decision-making, ensure inclusiveness, and are legitimate and their outcomes contribute to improve fairness and equity.

IWRM, appropriate adaptive planning and integration in national strategies

Planning is a key instrument for building policy coherence and coordination between the different policy areas where water plays an important role. Planning is instrumental to coordinate decisions in multiple areas such as rural and urban development, food, energy, tourism, disaster risk reduction, climate change adaptation, etc. and to take advantage of the multiple synergies between water and food security, energy development, industrial progress, etc. When all these particular areas are seen in isolation there is the risk of failure because actions to tackle one problem may end up by increasing water scarcity and water associated risks.

Coordinated policy approaches are required to overcome the institutional silos in which water, land planning, agriculture and industrial policies are defined and implemented. The integrated responses should be based upon sustainable development strategies at the national and sub-national level and may be supported by a global partnership for sustainable development at the international level (High Level Forum on Sustainable Development, 2014).

Integrated water resources management (IWRM) plans have so far been developed by 64% of countries²⁴, 34% at an advanced stage. These need to be implemented to achieve SDG 6. 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 disasters²⁵.

Policies and plans need to be developed across different sectors and between central and local governments. In risk management, responses should go further than getting ready to respond to likely disasters. Plans may require us to consider adopting structural and non-structural approaches, implement monitoring and people-centred early warning systems for communities most at risk from water-related disasters and apply an end-to-end preparedness approach to water-related disaster management which sees the needs of user communities being met.

Integrated water management plans should therefore be an integral part of national development strategies, but they are of little use unless they are implemented. External support agencies, UN, donors, pressure groups need to help countries to go one step further from intent to formulate technically sound plans, to commit from the onset only to strategies that are feasible, acceptable and that may lead to constructive partnership for their proper design and successful implementation.

Institutional reforms

Institutional reform is on track in many countries, yet implementing it 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 stakeholders²⁶.

IMPROVING SERVICES IN THE REPUBLIC OF KOREA

A WASH plan for Korea – Government of the Republic of Korea

The key factors for a successful water service system included the government-initiated financial investment, executed in a timely manner to deal with the boost of water demands, and the adequate preparation of a water resource management system for various fields of waterworks and sewage services. At present, the maintenance of existing facilities and improvement of service quality and long term funding are the biggest challenges, for which the government is encouraging the participation of private companies.

<http://goo.gl/GIVgtc>

24. UNEP 2012. The UN-Water Status Report on the Application of Integrated Approaches to Water Resources Management. http://www.un.org/waterforlifedecade/pdf/un_water_status_report_2012.pdf.

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

26. Ibid.

For the water sector, legal and policy reforms should be encouraged which increase joint decision-making at national level, facilitate management of water resources at basin level and legitimize stakeholder structures at community level.

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

GUIDE FOR ACTION

UNESCO/GEF/World Bank Groundwater Governance global framework for action

Set of policy and institutional guidelines, recommendations and best practices to improve **groundwater management and governance** at local, national and transboundary levels.
<http://bit.ly/1IMgiDZ>

NEW WATER MANAGEMENT INSTITUTIONS IN MYANMAR

Myanmar established the National Water Resources Committee (NWRC), an APEX body that promotes coordination and cooperation among water related Ministries and Organizations, and constitutes a consolidated coordination mechanism that oversees, monitors, directs and supports all water related activities leading to inclusive water governance. The intellectual and technical support has been provided by the Expert Group of the NWRC that consisted of long standing Myanmar water professionals from various water related fields with the experience of 25 to 40 years, with additional support from the Dutch government.

<http://goo.gl/cugTml>

Development of regulations and the existence of effective, independent and transparent 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 worldwide²⁷, 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.

Regulations can help improve water security through a well-designed institutional framework of water use rights, regulations and water allocation while preserving the environment vis a vis or combined with more conventional engineering works. Strengthening safety regulation dealing with water-related risks, would contribute to better plan, development and monitor mitigation measures and ensure resilience of societies and the environment. This will imply 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.

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

MONITORING AND REGULATION

ERSAR regulatory system: 16 wastewater performance indicators to carry out **audits** and encourage **transparency** in water and sanitation utilities

UNESCO-IHE Online Course on Water Quality Assessment: training on integrating the different steps of the **monitoring cycle**, from the information needs, monitoring network design, field and laboratory procedures up to data collection and processing. It is designed for professionals actively involved in **water quality monitoring and management** (environmental agencies, consultants, environmental or water management officers in local, regional or national governments, NGOs etc.)
<http://bit.ly/1IMir2w>

²⁷. See WHO drinking water quality guidelines, available at http://www.who.int/water_sanitation_health/dwq/guidelines/en/

institutions to improve planning, analysis and decision making as well as to build a better connected and empowered society which enables transparency and trust in the pursuit of collective goals.

Information can help create an enabling playing field for cooperation and policy cooperation. Information is costly to obtain, organize, store and make available; it may be excludable, but is a non-rival asset. Making it publicly accessible avoids redundant costs and allows for the creation of scope economies by standardizing the methods and the data and facilitating comparisons, the definition of benchmarks, the standardization of assessment methodologies for risk management, technology choices, cost effectiveness analysis, etc.

Reliable information is essential for building a shared perception of the water challenges and then to promote agreement and cooperation as well as to monitor advances, assess the effectiveness of past decisions prospect the expected impact of the existing alternatives, foster innovation, etc.

A necessary prerequisite for this is 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.

FLOOD FOOTPRINT ACCOUNTINGS

A new and transformative disaster accounting framework

Flood footprint is a measure of the exclusive total economic impact that is directly and indirectly caused by a flood event to the flooding region and wider economic systems. Flooding in one location can impact the whole EU or world economy, since the effects of the disaster are transferred through the whole supply chain. For investment in flood risk management options, it is critical to identify the 'blind-spots' in critical infrastructure and vulnerable sectors along with the economic supply chains and social networks. This in turn allows for sufficient adaptation to the damage that is transferred from the current event to future events. Adaption to flood risk is not limited to the area suffering the direct damage. It also extends to entire socioeconomic networks and this must be considered in order to minimize the magnitude and probability of cascading damage to the regions not flooded. This new tool is being developed under EU FP7 project – BASE, UK EPSRC funded projects of Sesame and Blue Green Cities.

<http://bit.ly/1IMiH1z>

Information on the extent, condition and functioning of water services infrastructure is also important, but monitoring that is variably a public sector-private sector joint effort. Remotely sensed information can valuably support water resources planning and decision-making, contributing, for example, in areas of flood control and monitoring of pressure sources on waters.

This can serve to support holistic decision making approaches able to cope with water management, water and sanitation services and water related risks. 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 policy domains 'outside the water box', revealing opportunities to improve, for example, water use efficiency in energy planning and agriculture.

Facilitating public involvement, stakeholder engagement, trust and effective partnerships

Promoting partnerships as a governance model to implement the water related SDGs is of crucial importance and can serve different purposes (see the OECD Programme on Water Governance)²⁸. Governments need to act in partnership with civil society, the private sector and the broader range of stakeholders, by:

THE CLARA SIMPLIFIED PLANNING TOOL (SPT)

CLARA (Capacity-Linked water supply and sanitation improvement for Africa's peri-urban and Rural Areas) – Bioazul

CLARA aims to provide the missing link for the technical part of the overall planning process by designing a tool that both allows and encourages local planners for the comparison of fundamentally different water and sanitation systems at a very early planning stage. Using the tool gives the planner - i.e. consultants and/or municipal planning departments - real costs of various alternative water supply and sanitation systems.

<http://goo.gl/NbvZOq>

28. Available at <http://www.oecd.org/env/watergovernanceprogramme.htm>.

- Allocating roles and responsibilities for policymaking, service provision and regulation and ensuring sound coordination between stakeholders
- Managing water at the appropriate territorial scale(s) including coherent and integrated basin governance systems to accommodate needs and priorities across levels of governance.
- Going across silos and fostering policy coherence between all areas linked with water, and essential to build a sustainable water future, such as climate change adaptation, food, urban development, energy, trade, etc.
- Ensuring that increased decentralization and empowerment of local government and communities comes with increased financial resources and capacities at this level, in particular in places where access to services is most needed.
- Producing, updating, disclosing and sharing meaningful, quality, timely, consistent, and comparable data and information on water and water-related issues, and using it to guide, assess and improve policy formulation and water management.
- Fostering integrity and transparency, as corruption and rent-seeking are still a barrier to making public action serve its intended social goals; it is estimated that the revenues captured by corruption in the water sector accounts for 20 to 30% of the income from tariffs collected;
- Engaging 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.
- Conducting 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 adjusting when needed. This also requires robust, timely and comparable data and information at all levels of decision-making.

Public and private transparency and accountability

Transparency and accountability are essential and should be promoted within the public and private sectors to achieve a sustainable and efficient water management that allows for participative governance. Collective governance cannot

THE UPGRO PROGRAM

The 'Unlocking the Potential of Groundwater for the Poor' (UPGro) program – IAH

It focuses on improving the evidence base around groundwater availability and management in Sub-Saharan Africa (SSA) to enable developing countries and partners in SSA to use groundwater in a sustainable way in order to benefit the poor. The work in this project was aimed at developing a methodology for unravelling the complex and often interlinked technical, institutional and social reasons for this high level of failure.

<http://goo.gl/prlwPF>

be achieved without transparency and a flux of information among the stakeholders. Business is capable of providing solutions at scale in this sense when given the right tools and incentives. There is growing awareness amongst the

PARTNERSHIPS: MEANS TO AN END

Veolia Innovation Accelerator: initiative to support green growth around the world by promoting the development and deployment of leading **clean technologies** in partnership with entrepreneurs such as related to industrial wastewater management, wastewater treatment, and innovative systems and existing wastewater treatment plant optimization. <http://bit.ly/1IMiVpf>

EDF Multi-purpose project: relates to hydropower, irrigation and drinking water through **water saving convention** between the energy providers, irrigators and river basin organisations. <http://bit.ly/1IMj0cs>

Global Public-Private Partnership for Handwashing (PPPHW) is a coalition of international stakeholders focusing on the Water and Sanitation Program's development of the Mrembo handwashing station. Habit formation through partnerships is essential to improving handwashing behaviour change at scale. <http://bit.ly/1IMj3Fj>

CULTIVANDO AGUA BOA PROGRAM

Cultivando Agua Boa program – Itaipu Binacional

Program aimed to protect natural resources and fight against poverty in the region. It thus works on social and environmental problems, promoting a new vision of water resources use through the participation of all stakeholders involved. It represents a new way to substitute the old habits for sustainable and participative practices focused on those territories where natural resources are threatened. This is a systemic program composed of an awareness plan with 60 actions including recuperation of 200 micro-basins in the region, upgraded water quantity and quality, reduced soil erosion, improved life quality and social insertion of local people, increased nature conservation and a participative water management promoting water stewardship.

<http://goo.gl/McUvWO>

business community of the importance of sound water resources management in supporting their ability to operate, buy and sell. Both water suppliers and users are increasingly expected to justify and demonstrate their roles in water management within the communities they operate in. While awareness is increasing, particularly amongst larger businesses, existing and new capacity, as well as accountability, frameworks are needed in order to ensure a robust and meaningful response. There is some way to go, particularly within the SME community. It was anticipated however that as larger business engages, this will be passed through supply chains thereby influencing the rest of the market.

WATER STEWARDSHIP: ONE CONCEPT, MANY SYSTEMS. WHAT ARE THE MAIN INGREDIENTS?

Four cases of water stewardship frameworks were presented: the UN CEO Water Mandate, the European Water Stewardship system, the Global Alliance for Water Stewardship system and the industry-based International Council on Mining and Minerals (ICMM) Water Stewardship Guidelines. These four codes can work together in a seamless way. Indeed, the European Water Stewardship system and the UN CEO Water Mandate are both members of the Alliance for Water Stewardship (AWS) and sit on the AWS Board. The ICMM Guidelines draw on AWS principles. Common ingredients include:

- Water stewardship creates a focus for business on a holistic water policy and encourages them to understand water issues within their catchment (outside the gate).
- It encourages business to take a leadership role in their catchments.
- It gives an answer for business on how to respond to the exposure to water risks and provides a framework around which business can create a water strategy.
- It is built around outcomes and measurement of those outcomes at a catchment level.
- It encourages collaboration with government, civil society and other businesses as well as transparency in water reporting.

<http://bit.ly/1IMjEHO> ; <http://www.allianceforwaterstewardship.org/>

Trust-building and collective action

Promoting effective social dialogues leading to legitimate decisions requires that these are based on shared perceptions of the water management problems to be faced as well as in the 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.

RIVER CONTRACTS

'River Contracts' – ECODES

The 'River Contract' is a management and participation tool born in France around 1990, as a means for river restoration, improvement or conservation through joint actions by users and the public administrations. This tool has proven effective for river management and restoration and thus maintained after the implementation of the Water Framework Directive. It was first implemented in Spain in the Matarraña basin where it proved successful.

<http://goo.gl/x2xG5d>

3.4 Capacity-building

Goal 17 promotes capacity building by stating the need to enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the sustainable development goals, including through North-South, South-South and triangular cooperation. The water development goal (Target 6.a) highlights the need to expand international cooperation and capacity-building support to developing countries in water and sanitation related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.

Investing in capacity-building

Capacity-building can be the engine and driver for achieving the SDGs, yet increasing investments in capacity-building is a major challenge facing not only the water and sanitation sector. It is important to note that capacity development costs can represent a significant portion of the overall costs of projects, especially in the initial stages, and should be fully taken into account in planning programme budgets. Yet there is strong evidence from other sectors 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 the water and sanitation sectors, capacity-building is closely linked to investments which support the use, adaptation and transfer of new technologies. The water development goal (Target 6.a), for example, highlights the need to expand international cooperation and capacity-building support to developing countries in water and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.

Water education should not be limited to a specialist group but extend to the general public, starting with children even at primary school level. Making the general public aware of the issues involved is vital in galvanizing support for the global goal for water at all levels of society.

There is indeed a major demand for improved capacity not only in the water sector but also out of the water box, and particularly in the entire water supply chains. The areas where CB may be required include the use of technologies, the design and implementation of new financing instruments as well as capacities to water resources management, and especially to make the most of water cooperation and stakeholder engagement.

The capacity-building model – building upon and involving local knowledge

Obtaining new skills requires improved access to information, sharing capacity (e.g. when trainees become trainers) and its application. Information materials, training materials, knowledgeable capacity builders and experts are part of the inputs to a capacity-building programme, and online platforms of open content education and training materials can help facilitate these processes²⁹. 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 and adaptive knowledge management systems.

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. Capacity building cannot be approached solely as an adjustment variable. An alternative approach claims that policies and CB actions should reflect existing capacities, instead of assuming that capacities can be adjusted to meet the requirements of projects and policies. This also requires identifying local knowledge and mobilizing it from the start. Decision-making and capacity-building should therefore be considered simultaneous and mutually reinforcing. Otherwise, innovative solutions cannot be adopted and the required capacities never built – and the cycle continues.

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

MENSTRUAL HYGIENE MANAGEMENT KNOWLEDGE SPACE

Menstrual Hygiene Management Knowledge Space - WSSCC

Provides access to practical materials that can be used to educate and train, strengthen policy and advocate for and enhance research strategies on menstrual hygiene management. It is divided into 3 sections:

<http://goo.gl/S4ET9D>

AWHHE ACTION ON WASH

WASH projects in Armenia - Armenian Women for Health and Healthy Environment (AWHHE)

In recent years, the topic of water and sanitation has become the main priority of the NGO Armenian Women for Health and Healthy Environment (AWHHE). Since 1999, AWHHE has implemented more than 90 projects on promotion of sustainable sanitation, improvement of water supply, monitoring of the state implemented project, involvement of local people in the projects and strengthening their participation in decision making processes, etc.

<http://goo.gl/zG0JFF>

SANI FOAM TOOL

SaniFOAM Tool - Water and Sanitation Program (WSP)

The SaniFOAM framework to Analyze Sanitation Behaviours to Design Effective Sanitation Programs categorizes sanitation behavioural determinants under Opportunity, Ability, and Motivation. With the letter F for Focus, these categories spell out F-O-A-M.

The SaniFOAM framework can help to accomplish the following: analyze the results of available formative studies; inform the design of new research; prioritize the behaviours to be changed and the populations to be targeted; understand and consider the range of factors that influence a particular behaviour; focus and prioritize interventions on particular factors for behaviour change; improve the effectiveness of interventions aimed at changing the behaviour; identify the appropriate indicators to monitor.

<http://goo.gl/PD4EQB>

<http://goo.gl/S4ET9D>

²⁹ 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/>

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 and should be focused on implementation.

Capacity-building should involve awareness creation/sensitization. Once the communities understand the value of water protection or eliminate open defecation, they become willing to adopt technologies (for example to monitor and control the status of water resources) to protect their water resources.

Effective partnerships should be developed, enhancing peer-to-peer learning and North-South and South-South cooperation. The promotion of regional cultures, local knowledge and improving communities' communication and negotiation skills are important to enable empower people to participate and negotiate.

Improved access to information, sharing capacity (trainers become trainers). Online platforms of open content education and training materials can facilitate these processes. Good planning and demonstration projects have also proved to be useful.

People-centred approaches

The SDGs call for people-centered approaches to development, yet human resources are perhaps the most underused resources that should be unleashed in order for communities to achieve the water goal. 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.

WOMEN EMPOWERMENT FOR BETTER WASH SERVICES

The Tegemeo Women Group

When the Mweteni Village did not become among the 10 villages included in the Tanzania Water Sector Development Programme (WSDP), the Tegemeo Women Group of Mweteni took the initiative to address the challenge of accessing adequate, reliable drinking water for their community themselves. With the support of the Women for Water Partnership, the Tanzania Gender Networking Programme and Aqua for All, TWG engaged the village leadership and district authorities to jointly develop a comprehensive WASH scheme covering the four sub-villages and approximately 12,000 inhabitants. These women have built trust and restored confidence among the Mweteni people, effectively prevented corruption and achieved a financing scheme on the basis of ability to pay to cover costs of maintenance and reparation.

<http://goo.gl/ce3rqj>

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4. The actors

Having all the stakeholders involved in the implementation of the SDGs will be critical to advance their implementation, since all have fundamental roles to play from both an individual and a collective perspective. The different actors, including Academia, Business, Civil Society and Governments and others, have a lot to contribute, a lot to share, a lot to improve to make the ambitious SDGs agenda attainable. But this will only be possible within an atmosphere of mutual engagement, communication and collaboration; an atmosphere of dialogue, transparency, understanding of self and each other's roles and commitment to 'row together' in the same direction to design and facilitate paths to implement the SDGs. In order to put this into practice, it is essential for the stakeholders to become aware of their roles, their potential contributions and their own challenges, and to undertake the required changes. These start with the adoption of an open-minded, collaborative, objective focused and prone to listening approach, which will contribute to maximize the individual and collective gains and promote win-win solutions.

Looking into the views of the different stakeholders and reflecting on and expressing their concerns and challenges, their lessons learnt and their perceived potential and capacities to contribute to the SDGs agenda provides the ingredients to start building the plan for the implementation of the water related Sustainable Development Goals.

4.1 Academia: Knowledge for Action

Integral responses, such as those required to implement the sustainable development agenda, require holistic approaches and better integrated knowledge. Science and scientists have progressed in their understanding in areas such as climatic change, economic growth, pollution processes, environmental risks, ecosystems and ecosystems services, trends of resource consumption, demography, environmental degradation and other critical areas of knowledge that may help us working out long-term strategies for sustainable development. Significant research efforts has been devoted to better understanding human's impact over land, oceans, atmosphere and their interlocking water, nutrient and biogeochemical cycles and energy flows which all form part of the Earth system. All this is essential for a more accurate understanding of our impact on the environment, the potential ways to respond to these impacts and their potential resilience under the many stresses placed upon them by human activities.



The role of Academia

Academia as a knowledge and information repository. Academia can provide information for the formulation and selection of policies. In order to fulfil this requirement, it will be essential to enhance scientific understanding, develop new scientific approaches, improve long-term scientific assessments, strengthen scientific capacities in all countries and ensure that the sciences are responsive to emerging needs. Particularly in the field of water quality, Academia can play an important role in generating adequate knowledge to support the definition of frameworks to define the status, risks and trends in water quality, as well as specific frameworks and tools to provide appropriate policy and investment advice to achieve changes and improvement in water quality.

Unravelling the fundamentals of the Earth system. Science is actually playing an important role in linking the fundamental significance of the Earth system as life support to appropriate strategies for development which build on its continued functioning.

Providing the basis for resource efficiency. The sciences can continue to play an increasing role in providing knowledge for improving efficiency in resource utilization and in finding new development practices, resources, and alternatives. There is a need for the sciences to constantly reassess and promote less intensive approaches to resource utilization, including less intensive utilization of energy in industry, agriculture, and transportation.

Providing education and training to reduce poverty and enhance capacities. UNESCO strongly believes that science and education are key contributors to reducing inequalities and poverty by bequeathing the conditions and generating the opportunities for better, sustainable lives. Meanwhile, adapting technological tools to different local conditions, particularly

in rural contexts of developing countries, requires providing adequate training to local practitioners in all the groups (private sector, public sector, farmers, etc.), to guarantee the achievement of water and sanitation goals in the long run, as well as making technologies more affordable.

In the field of water quality considerable training will be also required. Future water professionals would need not only to have technical skills that allow them to carry out diagnosis and monitoring activities, but also others related with how to interpret the implications of test results, including economic aspects and resource management. Such training will equip future water analysts with the necessary skills to support the development of adequate national and institutional capacity to ensure a sustainable programme. An effective way for Academia to address this challenge could be through the development of global and regional water quality centres of excellence, in order to achieve testing and educational opportunities to meet the needs for human resources in the water arena.

Providing accounting and monitoring tools to control and monitor efficient use of water. Scientists have developed different tools for water resources accounting in the urban, agricultural and industrial sectors, but possible margins for improvement exist. There are different solutions to address water management in agriculture, including efficiency improvements or even virtual water trade (ie. importing water embedded in food production from third party countries). The gap between what is technologically achievable and is commonly achieved is very substantial in many areas, which implies that there is still a large margin for increasing water use efficiency (in agriculture but also other sectors) in many countries. Bridging this gap is not just a question of technological innovation but also about science helping gain understanding on what are the barriers to making the more efficient use of water in individual cases, and developing tailored incentives to overcome these barriers.

Challenges for Academia

Providing a rationale for research funding

Academia can play a significant contribution in the implementation of the water goals but it requires greater public support. Research is not a major priority in most public funding agendas, limiting a more active participation of the Academia. National funding opportunities need to be promoted to enhance the role of researchers in achieving the water goals but research requires greater public funding support. Governments from developed countries barely support research activities in this field. Likewise, donor agencies can realize that Academia can play an important role in the implementation of national water and sanitation plans, particularly in the planning and monitoring phases.

Learning from experience and finding practical ways to enhance the value of knowledge for sustainability

Academia has already developed a large number of tools that can help addressing the main challenges related to water-related SDGs in a cost effective way. Successful implementation of these tools requires, however, investing in local capacity development and knowledge sharing to ensure its adaptability to the local conditions, with greater focus on the prevention and early identification of emerging problems and opportunities, as well as maintenance and good-function in the long term.

More emphasis on applied research, evaluation and generation and integration of new knowledge

Academia needs to put more emphasis and resources into applied, practical or 'engaged with the community' research. The development of pilots is very important for the testing and evaluation of scientific advances and new approaches. National WASH plans, for instance, are frequently implemented without evaluating the effectiveness of the tools on-the-ground. Pre-assessment or ex-ante evaluation of tools and strategies would largely benefit the overall success of plans and will contribute to allocate financial resources more effectively.

Academia has a strong mandate to publish, in order to gather scientific recognition, validation and funding ('The written word carries a lot'). These written, peer reviewed works constitute a reliable evidence base to support governance. However, further emphasis should be put on the exploration of neglected aspects and generation of new knowledge, which are essential to advance the SDGs. For instance, little consideration has been given so far on how to promote hygiene practices to improve public health.

Further research and investments in data collection and monitoring

Having reliable data is key to developing simple planning indices that can inform planners/decision-makers and guide policy-making. Reliable data will also help identifying better the problem at hand, and decide on what are the most appropriate options to adopt. For instance, WASH-specific and updated data has been essential to support evidence-based planning, while the cost of data collection is low in comparison with sector-related investments (new infrastructure) and the returns are high.

Reliable data is also essential to overcome risk aversion and promote risk reduction responses, as well as to advance in the improvement of water quality. In the water quality field great efforts are also required in data collection and monitoring. Unless we know what the quality of the water is to start with, it is difficult to ensure that improvements will deliver the required quality as well as quantity and convenience. In this respect, investment in two types of monitoring are required: 1) Investigate monitoring to understand what important contaminants might be present in a water source and what changes are occurring over time; and 2) in operational monitoring as a means of checking that system keep working properly over time.

Reinforcing scientific capacities

It is necessary to recognize the gaps in scientific capacities, especially in developing countries, as well as the need for strong and concerted action at the national and international levels to urgently build up and strengthen the national scientific infrastructure and research management capabilities of these countries. This can be done, for instance, by strengthening research and teaching infrastructures in universities and their proper re-equipping, and by linking technical assistance programmes to education and research in the broad field of environment and sustainable development. It could also include the formulation of national strategies, policies and plans for that purpose and the reinforcement of their science education programmes at all levels.

Avoid scientific isolation and irrelevance: the importance of networks

In its world of concepts, hypotheses and experimentation, the academic and scientific communities run the risk of distancing themselves from reality and falling into isolation. Science should make an effort to keep a close link with real problems to remain useful and problem solving focused, avoiding getting lost in theoretical loops and falling into irrelevance. Knowledge and expert networks have an important role to keep scientists connected among them and with other stakeholders, providing the opportunity to share knowledge, experiences and needs. This is particularly relevant for the case of professionals and experts from developing countries trained abroad who can feel isolated when returning to their home countries. Solutions proposed for this problem include the creation of expert associations and networks, or the so called 'Centres of excellence' which provide cluster-education at the interface of science and policy, thus creating 'interactive expertise' among selected groups of professionals that can later enter the political sphere in their home countries.

Building a communication bridge between science and the other stakeholders

Academia should find the way to work together with government authorities, the education community, major groups and international organizations to strengthen science education at all levels and to overcome the communication gaps within the scientific community and between scientists, policy makers and the general public. A shared knowledge will help in building a shared vision of the development challenges ahead and will help in raising awareness on the need to move together towards the socially agreed goals.

Science as a work partner: creation of multistakeholder partnerships

Fostering university/business/civil society partnerships within and among the science community is crucial in achieving sustainable development. The scientific community has already provided significant contributions to setting meaningful and feasible goals, supported by scientific evidence, and has a great potential to complement sustainable development projects (in WASH or any other sectors) with robust knowledge, tools and scientific methods. Partnerships and multidisciplinary projects can help science tackle real problems and needs where they can greatly contribute, while finding additional ways of funding and getting directly involved in the SDGs implementation process. A lot of good work is being done in the interdisciplinary and multidisciplinary fields in the water space, leading to a number of examples of promotion

and larger funding of water projects that involve interacting disciplines like social sciences. These success stories ought to be upscaled to a global level as a pattern for other institutions where support for water projects is constrained by the perception of large funding requirements.

Finding the appropriate methods/tools for reducing the risk of capital loss and enhancing resource mobilization

Since water management is so capital intensive, we have to get the most from every penny invested. We need to increase capital availability but do so in a way that enables capital to be raised at the lowest possible cost. Getting the most from every penny means that we have to make every penny or cent do the work of two or three; we have to look for approaches/solutions that involve synergies between problems, and specifically to avoid addressing one problem in a way which makes another problem worse. Alternative options to reduce the costs of capital also include maintaining and promoting the role green infrastructures as well as promoting incentives like payment for ecosystem services.

4.2 Business: towards corporate stewardship

Today's development challenges cannot be adequately addressed by any single actor or approach. Rather, a concerted effort by a range of actors, including business, working together to address the integrated nature of development is vital to ensuring positive outcomes and a vibrant society. Water represents a key cross-cutting theme that underscores the successful realization of sustainable development goals through its impact on a range of areas including education, health, energy, climate change, and food.



The business case for corporate action for sustainable water management serves as a strong starting point for action on development. Beyond these items, action by companies specifically on development also serves to play a role in businesses' long term longevity and success. The business case revolves around a number of areas:

- **Ensuring Good Water Governance:** Businesses that depend upon water realize that meeting development goals necessitates addressing aspects of water sustainability more broadly including: improving water governance systems and addressing water security and water quality; all issues of importance for addressing water-related business risk.
- **Healthier employees:** Business action to ensure adequate water and sanitation in the workplace provides the opportunity for companies to ensure their employees are sufficiently cared for. Healthier employees contribute to overall long-term company productivity through less frequent sick days and absence of costs associated with the need to replace or train new employees.
- **Vibrant communities:** Beyond their employees, businesses also realize that healthy communities have a positive impact on their businesses as well. Businesses are engaging in activities that focus on not only employees, but increasingly the families of their employees and communities at large. Healthy families ensure a high level of productivity in their workplace while vibrant communities often serve to bolster not only a company's social license to operate, but also a healthy customer base.
- **Triple Bottom Line:** Business realizes that a strong business case can be made that helping to achieve sustainable development goals offers opportunities to create innovative new products and markets. Companies, such as Unilever, are taking this approach through the creation of new products that use less water (such as detergents or soaps) to help meet water and sanitation goals while also creating a new market for their products.

Since Rio+20's Corporate Sustainability Conference in 2012, the business community has continued to engage with UN agencies towards refining how the water related Sustainable Development Goals might be advanced as well as to identify key mechanisms through which the business community can facilitate their implementation. These processes have affirmed businesses' commitment to a standalone goal related to water and sanitation as well as focusing this goal around WASH, water security, quality, and governance.

The role of Business

Improving access to water and sanitation to safeguard their future. Business has an imperative role to improving access to water and sanitation as central to their own long-term growth. Not taking action, on the other hand, is untenable, leading to potential greater conflict over water resources, decreased social license to operate, and increased reputational risks. The business case for action on WASH is based on the recognition that adequate water for employees, communities, and society is essential to the long-term well-being of businesses. Improving access to water, sanitation, and hygiene ensures that businesses have a thriving work force and consumer base, ensures high levels of productivity, and overall economic wellbeing. The business sector is taking a number of approaches to increasing access to water and sanitation by first ensuring that they are meeting their responsibility to respect the human rights to water and sanitation, and in some cases are going even further to support the rights.

Providing dissemination of knowledge, techniques and skills. The private sector plays an important role in the dissemination of the knowledge, techniques and skills (best practices) and, given the right tools and incentives, can deliver solutions at scale. Examples are known where companies like Nestlé and Yara are working. For instance, Nestle is engaging 50,000 coffee growers in Vietnam to build sustainable agricultural capacity that ensures resiliency of supply while contributing to large-scale improvements in water quality and quantity issues within key regions of the country.

Fighting water pollution. The issues of water quality and pollution prevention are seriously under-rated today, but their importance is gradually becoming recognised. Business has an important role in contributing to reduce water pollution through the application of the 3R's - Reducing pollution by preventing emissions (R1), - Removing pollution from used water by treatment (R2) and - Restoring water resources by recycling or re-using the water that has been treated (R3).

Moving towards holistic approaches to risk management and stewardship. Moving from water management to stewardship is a strategic priority. This is a philosophical shift for business, many of whom are still grappling to make a business case based upon price and return on investment. As a result, the perception of water problems within business has led to fragmented, uncoordinated responses that must be replaced by integral, coordinated and planned responses. Promoting transparency on key corporate data points, such as the potential business value at risk within each river basin is key. This information will support the business in realizing what they stand to lose should they choose not to engage in collective action within the river basins they operate in, buy from or sell to.

Challenges for Business

Partnering with other stakeholders for higher value services

In many cases, company action is heavily reliant upon not only sole company action, but greater cooperation across sectors, with governments, civil society, and academia. Business actions often go beyond merely providing core services but also through working with other partners on local projects and through promoting education initiatives and policy reform that ensure the Human Rights to Water and Sanitation (HRWS) are appropriately understood and integrated into water planning processes.

Reducing misconceptions and miscommunications

There are misconceptions and miscommunications that are leading to missed opportunities. For example, an overriding concern amongst many businesses that adopting a public commitment to respecting the human right to water and sanitation may in some way harm their business by exposing them to greater liabilities. In addition, many businesses view this issue as something additional rather than something that can be achieved as part of their overall efforts to reduce their impacts, eg. effective reductions in pollution from industrial effluent.

Reducing business driven water pollution: the 'blindsides' of water

The approach to reduce water pollution through the application of the 3Rs is being gradually introduced by industries and needs to be enhanced. Certain industries are including water quality management in their own activities, in supplier codes of conduct, in contracts, as well as through training and capacity building measures with their suppliers. The long-term objectives are to 'pass-down' good practice throughout the supply chain thereby upscaling the reach of these programs. Corporations are also investing in water management and water-reuse technology, as well as finding alternative uses for

waste water that benefit the economy and the environment, particularly in areas of high-water stress. Certain companies are developing broad coalitions of different brands to deal with water quality concerns affecting the entire industry by focusing on particular topics such as toxics, or by focusing on particular regions where there is shared interest. Through coordinated action that includes leveraging financial resources across the industry group, developing capacity building and training modules, and implementation of new technologies to monitor water quality issues, companies are working together to tackle concerns over water quality. On the 'supply' side, water technology and water services companies are continually developing and innovating with methods, processes and technologies aimed at improving water quality, water productivity and the ability to remove an ever increasing range of polluting substances from used water and at the same time reduce the environmental footprints, make water available for subsequent uses and recover and reuse the resources removed from polluted water.

Catalizing collective action through water stewardship

Because of the global nature of these challenges, no single government, sector of society, or company can ensure a water secure future on their own. Business leaders are starting to realize that long-term profitability and business continuity will not depend on how water is managed within a company, but rather on ensuring water security within a watershed and across the value chain; for them, and for all other businesses, people, and the environment. Coordinated collective action is needed to find new and sustainable ways to protect water resources and mitigate risks in a rapidly changing world. This coordinated approach can be achieved through engagement in water stewardship, since a multi-stakeholder governance system belongs at the heart of corporate water stewardship. However, it is a complex process that goes far beyond simply inviting stakeholders to participate. There is an inherent responsibility to show respect for stakeholders, particularly civil society who have poor resources and often depend on voluntary contributions. Multi-stakeholder governance needs to review the whole process of stakeholder engagement to find the appropriate mechanisms to achieve an effective and harmonized governance.

Overcoming the challenges of water-related risk management

Widespread engagement in water stewardship has yet to take place, in part because of a poor understanding of the complex nature of climate and water-related risks, and in part due to a number of specific challenges.

- Long-term investments in sustainable water management and climate and water risk mitigation are often perceived as risky and financing is therefore scarce. Such projects have longer payback periods, are subject to technology risks, and stakeholders often lack the knowledge and financial capacity to make such investments.
- Integrating water stewardship into standard business activities and building internal and external capacity to take actions to scale at the watershed level to reduce climate and water-related risks is a challenging and complex process, and foreign to most companies.
- Developing effective corporate and public water policy is difficult because the collection and disclosure of water-related information is inadequate. The financial impact of climate and water risks on sectors and companies is unclear, in part because information on water use and impacts is spotty and partial. Adequate information is needed to support the required decision-making and policy development to mitigate both climate and water-related risks.

4.3 Civil Society: the voice of our conscience

Civil Society does not manifest itself as a single, homogenous set of actors with shared goals, norms and values. Actors are varied in socio/economic status, in cultural appreciations, in aspirations, etc, and all of them conform to a mosaic of plural civil societies that endow richness and diversity. They have common but differentiated responsibilities in achieving these goals and thus partnership are key in overcoming the obstacles of implementation and to scale up the many existing successful pilot initiatives. It is key that this reality is understood and accepted by all the actors themselves.

A real issue in the relationship between Civil Society and Governments is the lack of trust or mistrust, which might be one of the biggest threats in the near future. This is due to the mistaken conflation of governments



with governance. Governments have the role to make the rules and enabling conditions, but governance is a shared responsibility that falls on the whole society. A mosaic of actors have to share the space allocated to Civil Society in water governance, and this has to be done through the creation of trust relationships. The process of trust building is a slow process of linking people that cannot be done in a mechanic way; it involves a mindset, perceptions, behaviors, and needs willingness from all the sides to make it happen. Trust is needed to make governance an inclusive and equitable process, where the relation among actors has to be based on informed participation, inclusion in decision making on roles and responsibilities, access to risk and benefit sharing, risk sharing and conflict resolution, accountability and transparency in political and financial terms. But, above all, it is essential to get from localized solutions to larger societal models and approaches that empower both the roles and responsibilities and the rights and obligations of Civil Society constituents, also known as pro/active citizens.

Trust building between decentralized, segmented and local governments and civil society is easier when land and water governance issues at stake are local. Here segmentation reflects diversity and multiple perceptions that can lead to broaden views, overcome fragmentation and consolidate common approaches in a shared river basin. Meanwhile, local languages, customs and norms enrich and complement the national culture, facilitating communication and knowledge sharing. However, several 'P words' are required, from politeness to perseverance, and the consolidation of mutual understanding and trust takes time.

The role of Civil 'Societies'

Monitoring and making governments accountable: Civil society organizations have the vital role of holding governments accountable, ensuring that the needs of local communities are effectively reflected in national policies and plans, and that the necessary resources are mobilized to enable local communities to take adaptive action. They also have the mandate to incorporate cross-cutting issues like gender, youth, health, education, culture.

Promoting transparency to strengthen dialogs. Claiming for transparency of governments and other stakeholders is vital to strengthen dialogs and interactions, since 'Government and Civil Societies are people, not acronyms'.

Building the capacity of civil society through education, awareness raising and motivation. Civil society organizations and NGOs can play a vital role in building the capacity of civil society through education and creating awareness. Trust building between governments and civil society requires efforts from both sides and takes time, often more than a decade. Civil society organizations face frequent misconceptions, including between gender equality and feminism approaches, the perception that water should be free, and misconceptions between capacity building and training. In this sense, it's important to underline that too much focus on training does not necessarily lead to capacity development. Civil societies have also the role of motivating the community to get involved in water and sustainable development issues.

The role of women and youth as pillars of sustainable development. Women as a civil society group has strengthened considerably, and their role in realizing access to water and sanitation has gained acknowledgement and is increasingly practiced, both at the national level and, more importantly, at the local level. However gender equality is a gain that still needs to be further worked upon. Women and youth are no longer perceived solely as a vulnerable and disadvantaged group; they are increasingly seen as actors in their own rights in this development process and as agents of change. They are increasingly included as an equal partner in participation processes, which sometimes does not only mean being invited, but also being given the facilities and means to make participation possible. In fact, training young people to contribute to the delivery of basic WASH services can also help addressing youth unemployment. Successful examples exist whereby young people were trained at community-level to build and maintain low-cost toilets, or hand pumps in rural areas.

Indigenous people as guardians of their living environment. Indigenous people traditionally play an important role as guardians of their living environment. Including indigenous people will help us gain from their knowledge.

Civil Society participation in water resources management: People must be able to participate in decisions on water and sanitation that affect their lives. Meaningful participation of civil society (water users, farmers, women, youth, etc.) in water resources management requires adequate information available to the public, public awareness about water issues, and

institutional channels which allow the public to have a voice. True participation of the public requires that the guaranteed possibility to get involved in water resources management is the subject of formal procedures. The institutionalization of such mechanisms is therefore crucial. Local languages, customs and norms enrich and complement national ones which make communication easier and knowledge sharing somewhat more accessible.

Challenges for Civil Society

Financial limitations for Civil Societies

It is an overall finding that participation of Civil Societies pays off in many ways. However, Civil Society organizations usually have no access to funds. The financing of Civil Society institutions by governments may cripple their role and capacity to control and monitor governance performance. Financing is lacking integrative and long term approaches and governmental budget allocations are not moving with the demands, with gaps in connecting to communities leading to inefficiency. Donors are not always fully aware of what is going on in civil society. Funds are directed to implementation, not to social empowerment processes. Challenges also come from the side of community and civil society, who lack information, particularly in rural groups, as well as knowledge and capacity in regards to financial resource finding and mobilization. Leadership, communication and integrity are important challenges in this sense. Decisions must be taken coming from the local culture and bearing in mind how the financing tools are effective for the grassroots people. Multilevel involvement is needed, and therefore funding to engage stakeholders from the different levels. It is not always necessary to increase budgets, rather to allocate resources differently. Decentralized financing, where financial support is awarded to local communities, turns out to be an effective solution for increasing community ownership and response capacity: learning from practical examples will allow to identify conditions for success. Additionally, pre-investments and investments in human capacities to create participative governance in decision making are a 'yellow card'.

Finding ways of win-win cooperation to avoid competence and function distortions

- NGOs have the primary role to monitor and audit public policy performance and challenge governments to ensure the fulfilment of human rights and the provision of basic services to communities. However, NGOs may be acting in competition with one another to pursue these goals: competing for funds, for proving results and for proving themselves useful. NGOs need funding to implement their activities and fulfil their roles. However, when they are funded by governments for the provision of certain services, they may be aligning with government goals, and they may lose their independence and capacity to challenge them. NGOs need to find ways to align and support themselves and find alternative ways of financing that allow them join forces and row in the same direction to fulfil their primary function.

Involving Civil Society for technology adoption and adaptation

An important challenge is to attain affordable and adequate technology that is adapted to people with special needs and requirements and that aims at universal access. For this to happen, the involvement of civil society in technology interventions is required from the very beginning, so as to ensure that the interventions meet the real needs of the community, are adapted to the local context and can be managed by the local community. Therefore, civil society can take a lead not only in deploying, but also in designing technological interventions. They can engage in the development of custom-design systems with communities in order to push the shift of social norms and behaviours and create lasting change, while ensuring equity among communities and citizens. This will also ensure their ownership. Finally, there is also a gap in relation to technical skills, as highly qualified staff are needed in this area.

Local governance and local ownership

Local governance, which is not the same as government, and local ownership within civil societies are seen as the most important challenges. Civil society organizations should also look at their own governance and encourage others to do so. There is need of democratic processes and systems, clearly defined roles and responsibilities, financial stewardship and control, and clear measurement of indicators of success. Governance is not the same thing as government, and there are often misunderstandings. Civil society organizations should also look at their own governance and encourage others to do so.

There is still work to be done to create clear definitions, as hygiene, for instance, is more than just washing hands and access to an improved water source does not necessarily guarantee all components of the human right to water and sanitation.

Further involvement of women, youth and indigenous people

Women, youth and indigenous people are important civil society groups with a great potential to catalyze the shift towards sustainable development, particularly in developing countries. The inclusion of women and particularly youth are essential as a first driver towards the SDGs. Youth are an important driver and agent of communication but while there is a dedicated SDG for women, there is not a specific goal for youth beyond some punctual targets. Indigenous peoples have valuable long-standing knowledge of their lands and waters and are yet often marginalized from water governance. There is need to recognize, integrate and further listen to them, their concepts, needs and visions, by governments and civil societies to enrich water governance and build trust among actors, as illustrated by cases in Tanzania and LAC.

Managing and tapping the challenges and opportunities of innovation for Civil Societies

There are a series of innovative aspects that need to be accounted with regards to innovation within or related to Civil Society:

- Governance of communication: it is no longer a question of affordable access to communication but of ownership and use, and possible abuse, of social media and big data. Encouraging examples of constructive use of smart ICT for DRR were seen in Bangladesh and Eastern Africa³⁰.
- Governance of consumers: consumers, and especially youngsters, are a driving force of change in water governance through more informed and responsible consumption, increased involvement in water and land footprinting, sustainable brand selection, etc.
- Governance of the use of social security networks and guaranteed work schemes as part of a Green Economy in attaining water objectives and securing green jobs.

Decentralization for rural and remote areas

Decentralization is required when working in rural areas and under highly variable local circumstances in different cultures is a challenge. Thus tailor made approaches are needed, as well as a process of coaching and continuous support that allows for a lasting change.

The upscaling challenge

It is a package, a holistic approach including technology, skills, knowledge and information, mind-set change, confidence, cultural sensitivity: a combination of hard and soft tools that are often the domain of different institutions/organizations.

4.4 Governments: the arena for decisions and implementation

Political will is the first step and condition to advance towards sustainable development, overcome financial challenges and start wise and effective implementation. The world has enough funds to address the necessary investments to achieve the water related targets, but it requires political will and a global focus where both the private and public sectors contribute.



The role of Governments

Governments as legislators and regulators. Governments have in first instance the role to make the rules and enabling conditions for the SDGs targets to be successfully implemented. In the case of water quality, by regulating the discharge of pollutants into the environment, and through wastewater management, recycling and reuse. In some cases the presence of an independent regulatory body can offer considerable advantages to establish a stable regulatory environment for water, such as guaranteeing the stability of the regulatory framework, including the fact that it is not influenced by the

³⁰ ICT for disaster risk reduction: an overview of trends, practices and lessons
<http://www.preventionweb.net/english/professional/publications/v.php?id=14338>

political calendar, namely the elections; it is founded on technical aspects and not influenced by political opinions or decisions; and has the possibility of self-financing and independence from the national budget. This independence is crucial to look freely to the sector and make the right decisions also for disadvantaged groups (eg. social tariffs).

Setting of the financial environment. Financial institutions and governmental agencies have the role to create the appropriate financial regulatory frameworks, incentives and financial conditions to facilitate the required investments in water and sanitation provision, water quality and infrastructures, as well as to manage and allocate funds appropriately, including local initiatives and civil society groups.

Implementation of integrated frameworks and management approaches. Governments can play an important role in addressing water scarcity problems through the application of good water management strategies. In order to do that, the first essential step is to acknowledge water as a priority, as well as the need to develop strategies, tools and capacities to achieve an efficient and fair water management.

Role in the dissemination and transfer of technology. Competition, policies and finance are key issues that can have both a facilitator and an inhibitor effect in the adoption and dissemination of new technologies. The role of governments is not to choose the technologies themselves, but to create the appropriate policies, regulations and targets that guide and facilitate the decisions on the selection of the most suitable and beneficial technologies, as well as creating incentives for companies to invest in the development and adoption of new technological advances. However, they also need to consider the human aspect: platforms can help inform, but technology transfer takes place from person to person through different mechanisms, ie. through training.

Raising awareness about the urgency of adapting to risks and climate. Governments have an important role to raise awareness among all stakeholders on the urgency to act in prevention and adaption to water risks related to climate change and other global changes. The effects of global changes on more frequent and hazardous water risk are impacting wellbeing and economic growth in both developing and developed countries. Meanwhile, increasing economic and human capital is getting concentrated in high risk areas. Planners, investors and politicians need to know the risks they are exposed to in order to build adequate measures focused on prevention, acknowledging that 'zero risk does not exist'.

Challenges for Governments

Setting water as a priority

The preservation of water resources has to be set as a top priority by governments in order to start the promotion and implementation of a sustainable water governance.

Dealing with water quality challenges and management

Improvements in water quality call for developing capacity building and this requires further investments in training and equipment, especially to address the chemical pollution. Such investments might be relatively modest and when used properly, they can save a considerable amount of additional and unanticipated costs at later stages (eg. health costs), and underpin drinking water quality standards. Greater efforts are also required in monitoring. Unless we know what the quality of the water is to start with it is difficult to ensure that improvements will deliver the required quality as well as quantity and convenience. In this respect, investment in two types of monitoring are required: 1) Investigate monitoring to understand what important contaminants might be present in a water source and what changes are occurring over time; and 2) in operational monitoring as a means of checking that system keep working properly over time. Addressing water quality management requires the development of comprehensive frameworks to define the status, risks and trends in water quality but also specific frameworks and tools are required to provide appropriate policy and investment advice to achieve changes and improvement in water quality around the world.

Improving the flow of information between countries

In addition to generalized poor data availability, the exchange of data between countries is largely impeded by the existing intellectual property rights, and this is a major obstacle for advancing in the modelling and monitoring of SDGs. There is need to change the culture of data exchange and acquisition to facilitate cooperation across countries.

Risk management and governance: towards adaptive planning

Building resilience against future risks and uncertainty requires framing risk appropriately; as risks can be framed differently in different contexts. Alongside, depending how risk is framed, different governance approaches can be implemented.

Governments need to take actions to improve risk governance, which will require developing appropriate institutions and coordinated plans to minimize the negative consequences of the associated risks. In this sense, there is a trend to overestimate the capacity and role of planning in water management, whereas giving room for adaptation, flexibility and adjustment to uncertainty are necessary to avoid unintended or suboptimal outcomes.

- Realizing that the costs of inaction are a lot bigger than investments required for prevention
- With regards to financing and water related risks, costs of not acting are a lot bigger than investments required for prevention. A focus on preparedness, mitigation and adaptation is a condition for success to ensure the security and resilience of communities and their economies. They are less costly than emergency reaction. Besides, assessments of the costs of post-disasters remediation do not usually include droughts, as it is a slow process, but the costs caused by prolonged droughts can be substantial.

Overcoming the main financial barriers: political will and institutional barriers

- According to the GLAAS report, most countries consider that finance is insufficient to address the challenges of sanitation. But in some cases the main barriers are not the availability of funds, but rather the lack of political will, the political capture of funds and the institutional barriers to mobilize financial resources, together with the existence of fragmented markets. In this sense, public participation and increased awareness is necessary to increase political priority, apply pressure and create commitment for the mobilization of funds.

Transparency, accountability and appropriate management and allocation of funds

Despite the existence of appropriate regulatory frameworks, these are not effectively applied in many cases due to the weakness of existing management institutions. There is great potential for social participation and inclusion in governance processes, mainly through the creation of technical capacities and participation platforms, acting as promoters and vehicle forces towards sustainable water management initiatives.

A shift from autocratic approaches to decentralized and participative processes

- The decentralization of drinking water and irrigation services and infrastructures, with shared management and cost responsibilities between governments and users, can provide local incentives and financial capability for improvements in water infrastructure development and maintenance. The creation of local capacities is required, but it pays off in terms of more responsible and conscious valuation and use of water resources and their provision.
- Building capacities for a good service provision
- Capacity development is only possible within a shared effort to improve information systems, communication tools and public/stakeholder participation. All this enables adapting knowledge and transferring technology and skills. Building capacities within public institutions is also a condition for an effective management of financial and natural resources as well as for the performance of appropriate planning, maintenance and evaluation of public services. In some cases, rather than bringing technical knowledge from abroad, capacity development is a 'learning by doing' exercise that has to be promoted across all the stakeholders, from the first to the last link of the chain.
- Comprehensive evaluation and upscaling of successful initiatives
- Going beyond project level in the assessment and dissemination of results of successful financial models is important to upscale successful initiatives. The performance of transparent evaluation analysis including not only the financial aspects but also the environmental cost is important to assess sustainability. Comprehensive evaluation systems are a useful and necessary to assess progress though it is not something that is attractive for politicians due to costs.

Building capacities for a good service provision

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Stakeholders’ perspectives on each other’s roles

From/to	Academia (A)	Business (B)	Civil Society (CS)	Governments (G)
Academia (A)	Academia can build a system where applied science recognition is not only based on publications but also on impact of achievements and contributions.	Academia can ally with business to develop applied R+D, pilot projects and get shared funding.	Academia can try to make scientific knowledge more accessible to CS through, i.e. using the media and a more familiar language for knowledge dissemination.	Academia can make sure that scientific knowledge permeates to policy makers in a practical and comprehensible way. There is need to build the A-G bridge.
Business (B)	Business should ally with Academia to reinforce private R+D, develop applied research and pilots and build consortiums to access international financing.	Business must commit and encourage itself to adopt Sustainable Water Stewardship Approaches.	Business can try to listen and understand CS. Valuing their knowledge and looking into their needs can catalyse business opportunities. They can also consider the need to train the people on the use of their products.	Business can help governments to fill the financial gap required for water infrastructure and water services. Both will have to keep the appropriate pricing and cost recovery principles as a priority to provide sustainable services.
Civil Society (CS)	CS organizations can help try to catalyze the bridge from academia to civil society through the dissemination of scientific knowledge in more ‘friendly’ and accessible formats.	CS can promote the dialogue with business, to identify common goals and help them find strategies to find the balance between private economic interests and sustainability. CDP initiative is a good example ¹ .	CS can work to build more internal communication, coordination and consensus among civil society organizations, working more in alliance rather than in opposition, which is a result of the hard competence for funds.	CS has the role to monitor governmental action and hold governments accountable and transparent. CS-G connection mechanisms are required, like through National Water Resources Committees
Governments (G)	Governments can rely more on academia as a repository of knowledge, and engage them as advisors in decision-making and public funded projects.	Governments can provide the regulatory and enabling conditions to promote within business the adoption of innovative and environment-friendly technologies, technology transfer and sustainable business practices.	There is a need for a trust building process between governments and CS. Enabling-though-funding is an effective mechanism for building capacity of local CS.	Governments can collaborate with one another, through the transfer of knowledge on successful initiatives, sharing of data and establishment of alliances for water cooperation.

³¹ CDP Supply Chain Program <https://www.cdp.net/supplychain>

Stakeholders and Water Themes: potential contributions

From/to	WASH	WATER QUALITY (WQ)	WATER MANAGEMENT (WM)	RISKS (R)
Academia	Academia has the potential to educate skilled WASH professionals who can operate in urban and rural areas, to develop applied WASH research projects and further develop data collection and monitoring methods.	Academia can further promote awareness on the importance of water quality, develop research and capacities on water quality characterization, testing and monitoring, as well as evaluation and restoration methods.	Academia can play a significant role in providing evidence-based data on what are the barriers and options to improve WM.	Academia can guide governments in the adoption of adaptive risk assessment and management approaches, further research on tools and good quality data that is freely available, to develop approaches to deal with risk aversion and promote risk reduction responses.
Business	Business can and can support the public sector in putting the financial resources, infrastructure and capacities in place to extend the access to WASH. They are playing an important role in bringing good services to regions where the public sector lacks the capacity.	Business can support the WQ challenge by including water quality management in the operations, investing in R+D and technologies to reduce industrial toxic emissions and monitoring water quality of their water discharges.	The business case for corporate action for sustainable water management serves as a strong starting point for action on development that the rest of the market will follow. They can set targets for water efficiency and wastewater management in their supply chain.	Business is starting to realize that water security, and thus long-term profitability and continuity, will not depend only on internal water management but on collective water management within the basin. Thus engaging in water stewardship and collective action can be a way to reduce risks.
Civil Society	CS can keep governments accountable in their allocation and management of funds for WASH, ensuring that they get to the poorest, that adaptable solutions for remote areas are sought and the communities are engaged.	CS can play a key role as guardians of their living environment if enough awareness and capacities are created. Engaging CS in water quality restoration can help change behaviours and demand a change from others.	CS can promote local water governance and ownership that includes indigenous knowledge, citizen water user groups, women and youth, to provide low cost adaptable solutions.	CS can help dealing with and adapting to risks by integrating young people and traditional knowledge perceptions, while underlining the big gap between decision makers and the reality in the ground.
Governments	Governments have the role of mobilizing and properly allocating the financial resources to undertake the required investments in WASH, while monitoring the optimal performance of WASH services.	Political will to address water quality is essential, providing the appropriate regulatory frameworks, promoting shared funding for water quality testing, monitoring and restoration programs and technologies, promoting transnational data sharing and creating public awareness.	Governments are key to deal with water scarcity by applying the most appropriate mix of management actions. The first essential step is to acknowledge water as a priority, as well as the need to develop strategies, tools and capacities to achieve an efficient and fair WM.	Governments can promote close interaction and integration of risk assessment, water management, and spatial planning, upscaling and disseminating successful experiences in water risk reduction to the different regions and sectors, keeping proactive and flexible.

Wrapping up

All the stakeholders have sound potential contributions to make for the advance of the implementation of the water related SDGs in the different water themes.

Academia should stand as the knowledge pillar underpinning SDG implementation in all sectors, ensuring the diffusion and transfer of knowledge, data and scientific advances and creating the required capacities by educating present and future generations of skilled professionals. Scientific work on data collection and monitoring will be essential for all water related aspects (WASH performance, water quality, risk prevention and management, accountability and allocation of water resources) and an effort to build a communication bridge with other stakeholders will be needed.

Business should work as both the lever and engine of innovation and implementation by engaging in Corporate Water Stewardship approaches and stakeholders dialogues, as a pioneer driver for global transparency, accountability and cooperation. Private funds and R+D will need to support public initiatives to meet the financial, capacity building and knowledge transfer gaps, particularly in the WASH and water quality sectors, while business continues to engage in participative resource management.

Civil Societies will need to work in alliance in their mission to keep governments accountable, promote the inclusion of women, youth and indigenous communities, and the participation of the communities in water resources governance. Increasing internal unity, communication and cooperation can help find constructive solutions for their financial challenge and catalyze a higher perception of the great array of opportunities that valuing and reinforcing the potential and capacities of women, youth and indigenous communities can have to achieve sustainability.

Governments will need to build the facilitating arena for implementation by creating enabling regulatory frameworks and financial instruments that catalyse technology adoption and knowledge transfer to face water challenges in all the areas. It will be crucial for governments to adopt participatory approaches, building alliances and dialogues with all stakeholders, facilitating their contribution to the decision making processes and remaining accountable, proactive and flexible.

Generating and growing awareness of these roles and taking them into action will allow stakeholders to join forces for succeeding in the implementation of the Post 2015 SDGs Agenda, a process that will certainly lead to win-win results and increased sustainability and integrity for both human and ecological systems.

5. The road ahead: a selection of lessons learnt and key messages

On improving technology choices

- Access to water technologies is still very unevenly spread, both within and between countries, with developing countries frequently not having access to basic water technologies.
- Technology solutions require a good understanding of the context in which they are applied. Understanding of and access to reliable context information is essential to inform choices both in the public and private sectors.
- Effective technology solutions need to be based on a holistic approach which goes beyond the identification of 'quick fixes' and looks at cost-effectiveness along a lifecycle perspective.
- The adoption of Information and Communications Technology (ICT) and satellite remote sensing data has great potential for improving transparency in monitoring.
- Industry and business play an important role as technology provider in global value chains, both for the physical equipment (e.g. water treatment plants, irrigation infrastructure, etc.) as well as in the dissemination of the knowledge, innovation, techniques and skills (best practices).
- Periodic assessments of progress in technology needs, gaps and achievements are instrumental to orient decision makers.

On the transfer and effective appropriation of technology

- Better access to reliable information on technologies with proven impact, can help overcome the concern of local communities and the risk of failure in technology adoption or adaptation.
- Sharing lessons learned from technology implementation in particular over the barriers overcome and the impact achieved through technology transfer is critical for replication and dissemination. The assimilation of big data and social media do provide good platforms for replicating technologies and transferring solutions.
- Having taken into account the recommendations of the structured dialogues of the General Assembly, a proposal to establish an online global technology facilitation platform building on complementing existing initiatives and with the participation of all relevant stakeholders was raised (paragraph 125).

On technology adoption and adaptation

- Academia and civil society can play a key role adapting technology to the local reality, empowering people and providing a combination of technical skills with local and traditional knowledge on the local conditions. Both academia and civil society deserve to be trusted, especially those of the South.
- Local capacity development needs to include the strengthening of skills to operate and maintain technologies. Promoting sustainable patterns of consumption and production along supply chains is key for an effective and sustainable embracing and accommodation of technologies in the long term.
- 'Social technology' enables out-of-the-box communication required to deal with social and environmental impact of major infrastructures.

On aligning incentives and improving regulations

- Making the case in favour of sustainable investment as good business in the water sector is often hampered by the fact that the water prices seldom reflect their true cost. Efficient incentive water pricing for households, irrigated agriculture, energy and manufacturing - without putting at stake the human rights to food and water- are feasible and strongly recommended.
- Sustainable development projects are missing deadlines for investment decisions due to stricter and more time-consuming review and compliance rules compared to traditional projects

- A better regulatory framework and the existing pressure from international buying groups requiring sustainable certified products are just two examples of the right type of incentives for investments in sustainable technology.
- Demonstrating the business case through a proper risk assessment (understanding of total business value at risk) and a total life cycle cost approach (capital expenditures plus operating expenses) are key to securing financial assistance and implementing the technology available.
- A strong business case, thinking beyond the water box, developing a proper risk assessment and applying a total lifecycle cost approach, is fundamental for the success and sustainability of water-related financing and investment decisions.
- The availability of a reliable Water Governance Index is a potential facilitator for quicker and easier investment decisions. Moreover there still is a great deal of room for improvement as existing indices as developed by OECD or World Bank are of a too coarse granulometry.

Lessons learnt from applying financial and economic tools

- Besides funds availability, the main barriers for sustainable water investments lie in the lack of political will, the capture of funds and the institutional barriers to mobilize financial resources, together with the existence of fragmented markets.
- The services and benefits that water delivers are costly to produce and to sustain in time and have to be paid for. There is need to provide solutions for the minority who cannot afford the service. In some cases, implementing water prices to drive a change is politically unviable, so there is a need to find alternative ways.
- Besides gathering new financial resources, it is also important to use those already in place more effectively and efficiently. Efficiency must go beyond building new facilities to guarantee their effective use, operation and replacement.
- In some cases costs exceed revenues leading to a deficient services with low value perception. Rather than a lack of funds this is often associated with a business case failing to promote sustainable water investments.
- There are risks in combining financing with economic instruments alone, and from expecting to get to a secure low cost revenue stream to raise sufficient cost recovering revenues without changing anything in the system.
- There are still many remaining challenges ahead that impede the implementation of innovative and more sustainable economic and financial instruments. The main remaining challenges are lack of trust, particularly of women and youth initiatives, action detached from communities, lack of coordination between donors; inefficient resource allocation, perverse subsidies; deficient transparency and communication of information and complex and inefficient bureaucratic and administrative procedures.
- The bottlenecks are not in the availability of functional economic instruments, but on their adequate selection, design and implementation.
- Many of the smart financing mechanisms are only possible when accompanied by better governance, enhanced capacities and properly adapted technologies. In fact many are only possible if there are appropriate tariff systems and institutional and regulatory frameworks in place.

On implementing financial and economic instruments

- The nexus of water, environment, energy, food and climate change adaptation can create new and expanding opportunities to bring more financial resources to the water agenda.
- Improving use of resources through results-based contracts and output-based aid has been a reported success. This includes using existing aid to provide collateral and warranties designed to attract private capital to risky projects – including local community projects and supporting the establishment of local credit systems.
- Extended access to WASH requires sustainable business models for service delivery that can cover their costs. The private sector has a role in contributing to fill in the financing gap.

- Sustainable business models that provide good quality services are a critical ingredient to achieve the WASH goals, but those can only be possible by applying cost recovery and fair water pricing mechanisms.
- Meanwhile, current low prices entail low incentives for innovation and upgrade of infrastructure, leading to a perverse loop of infrastructure degradation swelling the investment gap and increasing the vulnerability against water related risks.
- With regards to financing risk management, the cost of inaction is a lot bigger than that of the investments required for prevention. A focus on analyzing costs of inaction and on financing preparedness, mitigation and adaptation is a condition for success to ensure the security and resilience of communities and their economies. They are less costly than emergency reaction. Besides, assessments of the costs of post-disasters remediation do not usually include droughts, which can be very expensive.
- Going beyond project level in the assessment and dissemination of results of successful financial models is important to upscale successful initiatives. The performance of transparent evaluation analysis including not only the financial aspects but also the environmental cost is important.
- Developing tools to have quality data and measurements that revert in a valuation of the resource: 'what you treasure you will measure'; and the introduction of some new useful concepts like the TOTEX, which refers to a coherent management of both CAPEX (Capital expenditures) and OPEX (Operating expense).
- Driving the attention to value the economic and environmental costs of water and especially of its reliability is the way to engage stakeholders to reduce water consumption.
- The instruments that make users contribute – such as tariffs and taxes - can be important pillars for achieving a sustainable financial system in the long term.
- Transfers and donor funding (the third T) may be less sustainable. Nevertheless, water projects need a very high upfront investment that has traditionally been covered by transfers. Concessional funding, bonds or loans were identified as possible promising alternatives to perform this bridge function.
- Civil society engagement and participation in inclusive and transparent decision making is essential to ensure the arbitrage and control of governance performance, particularly in the management and allocation of funds; transparency and the public access to information and the fight against discrimination and corruption can involve may require the involvement of women, youth, indigenous and vulnerable people.
- Coaction and nudging among stakeholders in the field of water management might in some circumstances be advisable to achieve sustainability, but incentives and economic and financing solutions to make it an attractive and financially viable possibility need to be developed.
- Economic instruments, meaning mainly incentive prices, subsidies and trading schemes have so far tended to underperform in practice. But experience and learning from failure show their big potential to foster investments, promote innovations and change behaviour towards building a more sustainable and reliable water future.

On the implementation challenge of better governance

- Governance is not just about governments. The highly interconnected nature of water as a global risk means it needs to be addressed from multiple angles.
- Governance is a shared responsibility in coordinating and solving collective action problems.
- Trust is the key ingredient of inclusive and equitable governance of water, and water related development and risk sharing. Pluralism and diversity of civil societies should be seen as an endowment and point of richness.
- Multistakeholder collaboration is essential for the implementation of the SDG on water but difficult due to misaligned incentives and uncertainties.

- Governments and businesses short-termism is a problem for water. Civil society should have long-term objectives, longer than the 3/4 year democratic mandates.
- Poor and indigenous people are often stewards of resources and the most vulnerable. They have a lot to offer. Yet they are vulnerable to economic planning processes.
- The water sector is overly fragmented. And civil societies are segmented and compete with one another.
- Trust is a process, not just between civil society and governments but also between civil society parties. Horizontal and vertical trust building underpins multi-layered and effective governance.
- The human right to water and sanitation cannot be tackled focusing on WASH alone. It should be integrated in water stewardship practices.
- Business working in internal operations should deliver change behaviour into supply chains and local communities for the future.

On transparency, cooperation and sharing information

- Transparency is needed in many areas and efforts to access information must be articulated between multiple areas such as health, education, public budget, etc. so as to end corruption of governments and businesses.
- Informed participation and participatory monitoring is a way to (re)build trust and increase accountability and transparency in political and financial terms such anti-fraud and anti-corruption.
- The governance of communication is key. Big data represents an opportunity to gain greater insight and make more informed decisions.
- A proper culture of sharing among the different stakeholders would be useful to deliver value for all.
- Informed participation and participatory monitoring helps getting from localized solutions in governance to larger societal models and approaches that empower the roles and responsibilities as well as rights and obligations of civil society constituents.

On governance and integrated approaches

- Improved water governance depends on the government ability to make water quality and water management in general an integral part of the development strategy of the country.
- A systemic approach is needed to better cope with risks and ensure a water secure world. Water risks are often interlinked and spill over other policy sectors (drought in agriculture, flood in land planning, modified freshwater systems for hydropower, etc.). More holistic decision-making processes and integration of a wide variety of actors in water governance can help in achieving win-win outcomes across various sectors.
- A post-2015 disaster risk reduction framework represents an opportunity to adopt new implementation pathways, including greater stakeholder participation, particularly of the poor, indigenous peoples, youth and women.
- Consumers are a driving force of change in water governance as especially young consumers are increasingly informed and involved in water and land footprinting, slow food and wanting to know the origin of their food. Branding is key. However, mainstream governance looks more at the input and production or management side of water rather than use and increasing the efficiencies in the field to fork value chains where considerable water quality and quantity issues are locked.
- New trade arrangements will affect governance and the implementation of SDGs and COP decisions.
- An appropriate regulatory framework and pressure from international buyers requiring sustainable certified products are examples of the right type of incentives for sustainable investments. Cases of reverse incentives however do also exist, where for example sustainable development projects are missing deadlines for investment decisions due to stricter and more time-consuming review and compliance rules compared to traditional projects.

On building capacity development and developing social instruments-related tools

- The different and sometimes isolated capacities, perceptions and approaches of the different stakeholders to water problems have led to fragmented, uncoordinated responses. The lack of integration is one of the main obstacles.
- The timeframe of project funding is an issue. Capacity strengthening takes time and effort over a prolonged period of time, and is an ongoing process since the roles and responsibilities of stakeholders change.
- Many sectors are struggling with negative legacies and the mistrust that has been allowed to fester. Social instruments and capacity development have an important role in this regard
- Mis-conceptions and mis-communications are leading to missed opportunities. For example, an overriding concern amongst many businesses is that adopting the commitment to respecting the human right to water and sanitation may in some way harm their business by exposing them to greater liabilities, instead of seeing that it will improve their resilience.

On facilitating capacity building

- Capacity building is cross cutting. It involves building abilities to apply, adapt existing technologies and innovate, financial capacity building, and developing institutional/governance capacities, not only for water but in almost all the other sectors, including the environment, agriculture, energy and trade.
- Capacity development is only possible within a shared effort to improve information systems, accountability frameworks, communication tools and public participation. All this enables adapting knowledge, collective action, transferring technology and skills and improving trust between actors.
- Promoting transparency, water stewardship and collective action, learning by doing and monitoring systems, and many of the means of water management are the focus of many CD activities but they are also means in themselves to enhance capacities of all kinds.
- A mind-set change from management in silos to integral, coordinated and planned responses is a priority. Capacity development to facilitate a proper culture of sharing within and between various stakeholders in the water community will be an important step in building trust, enhancing confidence and delivering value for all.
- Investment often comes before revenue. Political will is necessary to allocate appropriate budgets to capacity development, without necessarily increasing the budget.

On stakeholders' roles in capacity development

- Given the right tools and frameworks, businesses can deliver solutions at scale. Business and industry can provide the adequate tools to enhance the capacity to address risks in supply chains to contribute to resilience of supply, find opportunities and contribute to the achievement of the SDGs.
- The media in general, and social media in particular, is a critical partner in dissemination about water and sustainable development. These kind of web-based tools, such as blogs with simple language, are being used by civil society for sharing information in every country.
- Local ownership is central. Driving local action through the involvement of civil society and academia is a great opportunity. An essential part of capacitating local action is to build the network and connections to reinforce and support them.
- Working in true horizontal and vertical partnerships is the most effective and sustainable way to capacitate the different actors towards overcoming the implementation obstacles to scale up successful pilots, and will contribute substantially to achieving the human right to water and sanitation.
- International cooperation, and particularly South-South cooperation, offers viable opportunities for developing countries and countries with economies in transition in the development of appropriate river basin governance capacity.

Selected messages for implementation on the key themes

On water scarcity

- In most cases what makes physical water scarcity a sustainable development challenge is not just the lack of water but of governance. There is then a need to invest more in strengthening governance structures and mechanisms.
- There are no 'silver bullets'; a combination of actions is needed to deal with scarcity. Beyond enhancing water management in agriculture, Technology and Information and Communications Technology (ICT) can help stretch to the limit on how to manage water.
- 'Social technology' is required to deal with social and environmental impact of major infrastructures. This is required because different groups and stakeholders speak completely different languages requiring coordinated solutions.
- In the real world, part of the solution also lies in addressing trust and mistrust, which is known to be difficult and time consuming. This is the case, for example, with multi-layered governance and new instruments such as Green Bonds.

On risks

- The benefits of risk reduction, prevention, preparation and adaptation are still underappreciated. Sensible investments can deliver substantial benefits in terms of reduced loss of life, avoiding damage, and long-term economic growth and stability.
- Countries should increase the resilience, but also the robustness, resistance and responsiveness and redundancy – while mitigating the vulnerability and exposure – of water systems and people. Empowering and improving preparedness of citizens, including youth and women, in terms of risk awareness and emergency planning, is essential.
- Risk prevention alone is not enough, and risk management and preparation should be integrated with strategic sectoral long-term planning and create opportunities for synergies with planned investments, including plans for adaptation to climate change.
- Disaster risk reduction, water resources management and climate adaptation should no longer be treated as separate topics. There is a need for coherence as regards how the different stakeholder groups manage climate change adaptation.
- Managing risks is an effective way to manage climate change. And water is one of the most important areas related to risks.
- Climate change adaptation might provide a unique opportunity for doing things differently. For instance, in the case of assets in risk areas, which are leading to increased exposure to adverse natural events. The use of new data, tools, and appropriate monitoring systems for risk assessment may help identify and prioritize actions.
- Water stewardship risks cannot be managed by one sector alone. It implies managing the risks of disasters across different river basins along supply chains. In many cases the largest risks in terms of water quantity and quality are embedded in supply networks.
- Multilevel and integrated risk governance approaches are required to deal with this interconnectedness, where dialogue and coordination are key.
- Making the business case in the context of uncertainty is an added complexity. However, uncertainties are no excuse for inaction: Adaptive and flexible risk assessment and management are needed.

On WASH

- It is widely recognised that commitment and political will is essential to achieve universal access to basic drinking water, sanitation and hygiene (WASH). Especially now that with the human right to water and sanitation, governments must respect, fulfil, comply, and prioritize actions to ensure this basic right is being fulfilled.
- Equality should be highlighted as a guiding principle to tackle WASH, (between urban and rural and north and south). WASH should be applied beyond households to schools and health centres.

- Sustainability of services needs to tackle issues of financing. The private sector can play a role in supporting its implementation, but public financing is absolutely necessary to reach universal access. The human right requires about USD 20 billion annually to achieve universal access to water and sanitation.
- Besides raising and mobilizing enough financial resources for WASH, budget allocation may need to be refocused to the populations most in need. Defecation in the open still happens in middle-income countries, where budgets are not fully spent.
- Academia and civil society can play a key role on the implementation of the WASH Development Goals by adapting technology to the local reality, empowering people and providing independent information. For instance through training of trainers. Both academia and civil society deserve to be trusted, especially those of the South.

On water quality and ecosystems

- Experience has shown that the targets for water quality and ecosystems **can be achieved** within the SDG framework time. We are not starting from scratch. There are good examples of tools at various levels.
- **Direct investments** in technical assistance and pollution management have the highest impacts. In cases where the tools are not fit for purpose, adjustments are needed and innovation is crucial.
- Managing water quality is a shared responsibility. Governments' commitment and will is essential to ensure water quality and ecosystem health.
- **It is widely recognized that strong regulations and enforcement drives innovation in water quality.**
- There are important opportunities for the private sector. Businesses can be technology providers. Given the right frameworks, business can provide the adequate tools to **enhance the capacity in supply chains** to address water quality risks.
- Through applied and fundamental research, innovation and science, academia has a role to play in developing locally specific **innovative solutions** and local assessments relevant for water quality.
- For strengthening science-policy, and more generally science-society, interface is key. For instance, remote sensing tools provide high-resolution data that could be used for developing applications.
- Civil society can play a role in **providing local knowledge** and overtaking the technologies and tools, including the identification of hotspots.

International Decade for Action 'Water for Life' 2005-2015

A Decade for Water, a Decade for Life

Towards the primary goal of the Water for Life Decade, Spain has agreed to provide resources to the United Nations to establish an Office to support the International Decade for Action. Located in Zaragoza, Spain, and led by the United Nations Department of Economic and Social Affairs (UNDESA), the Office implements the UN-Water Decade Programme on Advocacy and Communication (UNW-DPAC) aiming at sustaining the global attention and political momentum in favour of the water and sanitation agenda at all levels during the Decade.

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