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What Sustainable Development Goal 6 Means for the Way We Think About and Manage Our Water

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Summary

The world is not on track to achieve Sustainable Development Goal (SDG) 6 on clean water and sanitation by 2030. SDG 6 does not start off from the near achievement of the Millennium Development Goals, but rather from a new – lower – baseline that reflects more comprehensive and ambitious targets related to integrated water resource management, water quality and wastewater, water use efficiency and ecosystems. To achieve the vision of SDG 6, we need to rethink the underlying economics, engineering and management paradigms that guided water policy and investment in the past.

Introduction

The 2030 Agenda for Sustainable Development, adopted by UN member states in 2015, challenges us to change the way we think about and manage water. SDG 6, which is dedicated completely to water, looks beyond targets related to drinking water supply and sanitation, and includes aspects of water quality and wastewater, water use and efficiency, ecosystems and integrated water resources management, among others. The broad spectrum of water-related targets reflects an increasing recognition that, if the world is to achieve sustainable development, then a set of challenges related to water resource management, resilience and governance need to be tackled as well.

SDG 6 includes eight global targets, covering the entire water cycle. Targets 6.1 and 6.2 relate to the provision of drinking water and sanitation and hygiene services respectively. Target 6.3 covers treatment and reuse of wastewater and water quality and Target 6.4 water-use efficiency and scarcity. Integrated Water Resources Management including of transboundary waters is at the centre of Target 6.5, while protection and restoration of water-related ecosystems are covered in Target 6.6. Two additional targets for international cooperation and capacity-building (6.a) and participation (6.b) have also been set.

From water access to water management

Before SDG 6, internationally agreed global targets on water mostly focused on drinking water supply and sanitation. These include the efforts of the International Drinking Water Supply and Sanitation Decade (1981-1990), the New Delhi Statement (1991-2000), and the Millennium Development Goals (MDG) (2001-2015). Within the MDG framework, water issues were viewed only in terms of extending access to drinking water supply and sanitation. Target C of MDG 7 on '*ensuring environmental sustainability*' aimed to halve by 2015 the share of the world's population without access to safe drinking water and basic sanitation. The MDG target for drinking water was met, while the one for sanitation was missed[1]. The MDG monitoring approach, however, only measured access to improved water sources, without actually measuring whether or not these sources were 'safe' (i.e., free from contamination), as specified in the target. Improved sources are not always safe, meaning that if drinking water safety had been monitored alongside improved access, the MDG's drinking water target would have not been met[2].

The MDGs' experience had implications for the SDGs. First, the critiques related to some of the indicator definitions and monitoring approaches helped formulate the more ambitious SDG drinking water supply and sanitation targets. The MDGs' focus on coverage masked other aspects of service delivery, such as reliability, quality and affordability, which effectively impact water access. In order to account for these aspects, SDG 6.1 and 6.2 set targets and related indicators to provide universal and equitable access to safe and affordable drinking water, sanitation and hygiene.

Second, and more importantly, the MDG experience demonstrated the limitations of separating access to water and sanitation from water and wastewater management and governance. The MDGs' focus on water access reflected a world where the limiting factors to delivering water services were related to infrastructure, capital or management, not governance and the scarcity (both in terms of quality and quantity) and variability of the water resource. Although aspects related to water scarcity and wastewater were included in Agenda 21 adopted at the 1992 Rio Earth Summit, they were not captured in the subsequent MDGs. This reflected a narrow view of water and sanitation, which viewed only its access aspects, without paying due attention to the equitable, sustainable and efficient use of freshwater resources and the proper treatment and re-use of wastewater.

Today's reality of inequality, fragmented institutions, climate change, and environmental degradation means that now governance and water resource constraints are key determinants of our ability to extend and maintain access to drinking water and sanitation services and achieve sustainable development. This becomes even more pertinent as we need to consider the multiple demands for water, including environmental flows. This is why SDG 6 adopts a much broader set of water-related targets which extend well beyond improving access to drinking water supply and sanitation.

Transitioning from the MDGs' focus on supply and sanitation at the turn of the millennium to the much broader framing of '*sustainable water and sanitation for all*' of the SDGs poses numerous challenges. These include definitional and monitoring issues, which involve identifying indicators and measurement methods appropriate for different contexts, but also barriers to implementation arising from financing, capacity and governance issues[3]. Moreover, the SDGs' broader ambitions to leave no one behind and achieve transformative change mean that water policy efforts towards SDG 6 need to fast-track progress for the most vulnerable and disadvantaged[4] and to be integrated with a systemic action agenda[5]. Finally, the transition from the MDG to the SDG world implies a retreat from the near achievement of the water MDGs – noting that still about 2 billion people lack access to basic sanitation services such as latrines and, of these 2 billion, at least 673 million still practice open defecation. The SDGs start off from a lower baseline compared to the MDGs, encompassing more comprehensive and ambitious targets of water supply and sanitation and new targets related to integrated resource management, resilience, and governance.

Transitioning from the MDGs to the SDGs also requires recognizing their importance for governance. Compared to the MDGs, the SDGs frame a universal sustainable development aspiration that was developed through an inclusive participatory process, rather than a narrow set of goals for meeting basic needs in low-income countries. In doing so, they posit '*clean water and sanitation for all*' not just as an issue of the 'developing world' but as a global priority. This is important for governance, as it causes a normative shift[6]: from water policy and investments to meet basic needs towards a global aspiration for sustainable water management for everyone, everywhere. In addition, the SDG's ambitions are engrained in a wide set of quantitative indicators that try to encompass all aspects of sustainable development, and not just a selected few as in the MDGs. This focus on numbers and benchmarking is important for governance because it contributes to more effective communication, setting of priorities and mobilization of attention and participation of stakeholders. Yet, governance by numbers can also create perverse incentives to over-focus on target achievement, while not all aspects can be measured numerically, and at the expense of other policy objectives as well as a host of practical measurement challenges[7].

The way forward: ambitious targets require ambitious solutions

[89]The world's progress so far has not matched this substantive increase in the ambition and scope of the global water policy agenda. In 2018, the UN published the report: "Sustainable Development Goal 6 Synthesis Report on Water and Sanitation 2018" which reviewed progress towards SDG 6 at global and regional levels. The report found that, although progress has been made, the world is not on track to meet SDG 6 by 2030. Beyond this headline finding, the report also highlighted indicator issues, both in relation to their value in supporting the targets and the availability of data to measure and monitor them, and the importance of capacity development and of taking research into policy and practice to enable progress

Unless the ambition of SDG 6 is matched by an equally ambitious set of actions and solutions, we won't be able to achieve clean water and sanitation for all in the next decade. Technological, information and data science advances offer tremendous opportunities to speed progress towards SDG 6. New membranes and materials enhance the potential for water recycling water accounting using earth observation, ground monitoring and models provides detailed information on evolving water status and use to underpin water allocation decisions, and data storage and processing improve humanitarian efforts in water-related disaster relief.

However, technology alone won't solve the world's water issues and rise to the challenge posed by SDG 6. The potential for these disruptive technologies to 'solve water' can only be fully captured by changing some of the underlying paradigms that have guided global water policy in the past. Here we outline three water policy paradigms – water economics, water engineering and water management – and describe how they need to be revised to achieve SDG 6.

The *water economics* paradigm of the 20th century treated water as an abundant resource, paying little attention to its scarcity value, its opportunity costs and the costs of pollution (i.e., economic externalities). The focus was on minimizing the financial costs of delivering water (treating capital as the key scarce resource) rather than on the value of the water itself (recognizing it as a scarce resource). Water is an increasingly scarce resource and needs to be treated accordingly. Yet most countries today still significantly subsidize water, which encourages overuse and disproportionately benefits upper-income groups in developing countries where the poor have more limited access to water[10]. Economic and regulatory policies that signal water scarcity are therefore an important part – but not all – of the solution. The human right to water and sanitation, the critical water needs of the environment and unique cultural characteristics of water make it imperative to identify and navigate potential non-economic trade-offs between equity and efficiency. This will ensure access to all households including the poor and the more vulnerable, and sustain aquatic ecosystems and their environmental services and, increasingly, their rights[11]. In order to sustainably maintain the resource and halt unsustainable use, more attention needs to be devoted to the incentives, behaviors and political economy of water resource allocation and management[12]. This will be particularly crucial for achieving SDG 6 in rural areas, where poverty is most prevalent and where progress towards global water targets has been slower[13].

Changing the water economics paradigm also means extending the traditional approach to the evaluation of water investments. Economic valuation based on cost-benefit analysis needs to consider the multiple values attached to water (e.g., environmental and socio-cultural values), better account for natural capital (e.g., wealth lost through groundwater depletion and degradation), and to broaden the notion of benefits to include potential and indirect benefits of water investments (e.g., enhancement of ecosystem services through resource recovery from sanitation). Moreover, water investments need to be evaluated over longer time periods to avoid optimizing for short-term needs and discounting uncertainty about resource availability, climate risks and the costs of learning (i.e., maintaining additional options until more information is available)[14]. A renewed and broader view of the costs and benefits of water investments is aligned to the broader scope of SDG 6 compared to the MDGs, when investments were typically appraised using a few metrics of direct benefits to certain users.

The traditional approach to *water engineering* also needs to be revisited. In the 20th century, water systems were designed to often transfer water over long distances, for it to be used and then discharged back to the environment in most cases without proper treatment. This linear and often centralized approach to water engineering has served society well with, for instance, major achievements related to public health, food production or flood protection. However, its shortcomings are well-know: it is typically energy intensive, ecologically damaging, excessively reliant on capital intensive projects and often not inclusive. Research and practicehave shown that this approach misses the opportunities linked to better demand management, decentralized solutions, nature-based solutions and circularity (e.g., resource reuse and recovery).

Water engineering in the Anthropocene means designing systems that recycle wastewater and differentiate between ‘waters’ of different sources, costs, qualities, and reliabilities, each utilized for specific needs and purposes. It also entails diversifying supply sources and capturing the opportunities offered by nature-based solutions that use, or mimic, natural processes to cost-effectively deliver water security for all. [15]Traditional water engineering is based on the concept of stationarity, which assumes that the long-term probability distributions of relevant hydrological variables are time-invariant and plans water resources systems to be reliable up to a given probability. Under a changing climate and other environmental and societal changes, however, this assumption is no longer valid. This requires moving beyond the concepts of reliability and optimality, which evaluate engineering designs over a narrow set of objectives and possible future conditions, to focus on robustness and flexibility in the face of uncertainty and change.

Finally, *water management* needs to become better capable of dealing with trade-offs and uncertainty. In an uncertain world, adaptive and integrated water management needs to substitute approaches that do not consider interconnections, complexity and change. Integrated approaches help to identify and minimize trade-offs, unraveling unexpected impacts of water policies on other sectors and SDGs. They also promote inclusive water management, by bringing together different sectors and stakeholders at all scales from local to transboundary. Although the adaptive and integrated water management paradigm has been promoted with mixed success for decades, the advent of new data sources, tools and frameworks means that water managers are now able to implement these approaches to systematically consider interactions across scales and among sectors and stakeholders[16].

To achieve SDG 6, we will need to revisit these paradigms and reconsider the way we think about and manage our water. We can no longer treat clean water as an overly abundant resource available for the taking. We will need to bring tremendous ingenuity, research and innovation to develop solutions that safeguard and develop water resources sustainably and to use water wisely and equitably. Unfortunately, we are ‘off-track’ to achieve this. We must all redouble our efforts for a sustainable water future.

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