

# Water and sanitation interlinkages across **the 2030 Agenda for Sustainable Development**





***“The interlinkages and integrated nature of the Sustainable Development Goals are of crucial importance in ensuring that the purpose of the new Agenda is realized.”***

*Transforming Our World: The 2030 Agenda for Sustainable Development*

*Water is life, instrumental for sustainable, economic and environmental development. Yulong river, China. Photo: Kevin Poh, Creative Commons Attribution.*

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## **Water and sanitation interlinkages across the 2030 Agenda for Sustainable Development**

This UN-Water Analytical Brief analyses the central role of water and sanitation to describe the links and interdependencies between the targets of Sustainable Development Goal 6 on water and sanitation and those of other Goals. It aims to stimulate United Nations Member States' consideration of the water-related linkages within the Goals to facilitate an integrated approach to implementation.

The Brief highlights the importance of mainstreaming water and sanitation in the policies and plans of other sectors, and how the management of interlinkages supports the social, economic and environmental dimensions of the 2030 Agenda for Sustainable Development.

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## Key Messages

- **There is a dynamic, two-way interdependence between Goal 6 targets and every other Goal.** It is vital that the interlinkages are well understood and managed to achieve the social, economic and environmental dimensions of the 2030 Agenda.
- **The majority of interlinkages between the targets under Goal 6 and other targets across the 2030 Agenda are mutually reinforcing.** Harnessing these synergies will facilitate the implementation and achievement of the respective targets.
- **To be truly transformative, the targets under each Goal must be implemented in an integrated fashion.** Integration enables any potential conflict within and between Goals to be managed, thus ensuring the sustainable management of natural resources, and sustainable social and economic development.

## Executive summary

The 2030 Agenda for Sustainable Development (2030 Agenda) acknowledges the integrated and indivisible nature of its 17 Sustainable Development Goals and 169 targets and recognizes the need to address these interlinkages to fully achieve its aims. The water and sanitation Sustainable Development Goal, Goal 6, links across all the other 16 Goals. This UN-Water Analytical Brief provides an overview of the target-level linkages and how they are interdependent; many targets cannot be achieved without also meeting the targets under Goal 6, and vice versa. This Analytical Brief also summarizes the links and interdependencies between the targets under Goal 6 itself.

The 2030 Agenda stresses the importance of "leaving no one behind", and this can only be achieved if the interlinkages between the Goals are understood and actions are undertaken to bring them together for the benefit of all, including addressing socioeconomic and gender inequalities. A human rights-based approach would support these aims.

Understanding the linkages enables countries to implement the Goals and targets effectively by harnessing synergies between them while managing any potential conflicts. The vast majority of target-level linkages across the 2030 Agenda with Goal 6 are positive, because implementing the Goal 6 targets mutually supports a large number of other targets, and vice versa.

Examples of synergies include increasing access to water supply, sanitation and hygiene (WASH) [6.1, 6.2]<sup>1</sup> in homes, healthcare facilities, schools and workplaces, complemented by wastewater treatment [6.3], as a way to reduce risk of water-borne disease [3.1–3.3, 3.9] and malnutrition [2.2]; support education [4.1–4.5] and a productive workforce [8.5, 8.8]; and address poverty [1.1, 1.2, 1.4], gender inequality [5.1, 5.2, 5.4, 5.5] and other inequality [10.1–10.3].<sup>2</sup>

Many of the Sustainable Development Goal targets related to social and economic development both depend on and support a sustainable,

<sup>1</sup> Goal and target numbers are referred to using square brackets [X.X] throughout this Brief.

<sup>2</sup> The complete text of all Goal 6 targets is provided in Box 1 of the Introduction. A summary of relevant linkages between Goal 6 and other water- and sanitation-related targets can be found in the Annex.



*River in Saarland, Germany. Photo: Wolfgang Staudt, Creative Commons Attribution.*

reliable water supply of adequate quality and quantity; therefore, these targets and the targets under Goal 6 are interdependent. Examples include sustainable food production systems [2.4], decoupling economic growth from environmental degradation [8.4], sustainable infrastructure and industry [9.4], reducing the per capita environmental impact of cities [11.6], and sustainable consumption and production [12.1–12.8]. Nonetheless, there are some targets related to development, such as those to double agricultural productivity [2.3], ensure energy for all [7.1], or sustain economic growth – at least 7% gross domestic product growth in least developed countries [8.1], which could potentially lead to negative impacts on water resources and water-related ecosystems unless linkages are understood and managed. It is therefore critical that the targets within each Goal are implemented in an integrated fashion, as they were designed, to ensure they support targets on increasing recycling and safe reuse of water [6.3], increasing efficiency and ensuring sustainable withdrawals [6.4] and protecting water-related ecosystems [6.6].

The links between some targets show there may be aspects of both synergies and potential conflicts that have to be managed in order to

meet the Goals. Integrated Water Resources Management (IWRM) [6.5] provides a framework for addressing many of the linkages by balancing the needs of different sectors and stakeholders.

Combining the three dimensions of sustainable development – social, economic and environmental – is complex and requires an integrated approach that brings together key actors across traditional institutional arrangements and new types of partnerships. Governments will need to establish intersectoral mechanisms and procedures to address these issues, including partnerships, coordinating committees, evaluation criteria and consultation mechanisms.

Policies and institutional arrangements may have to be modified to facilitate the implementation of the 2030 Agenda. This will vary from country to country depending on local circumstances – political, geographic and economic – so there are no universal solutions. Nevertheless, there are broad principles that can help with implementing the 2030 Agenda and UN-Water may prepare some Policy Briefs to guide implementing agencies to take forward some of the aspects discussed in this Analytical Brief.

***“This is an Agenda of unprecedented scope and significance. ... These are universal goals and targets which involve the entire world, developed and developing countries alike. They are integrated and indivisible and balance the three dimensions of sustainable development.» Transforming Our World: The 2030 Agenda for Sustainable Development<sup>3</sup>***

# 1. Introduction

## 1.1. Background

The Sustainable Development Goals are universal, interdependent and mutually reinforcing. It is recognized that achieving the 2030 Agenda for Sustainable Development (referred to as the 2030 Agenda) and its 17 Goals and 169 targets will only be possible through an integrated approach working across sectors, ministries and different administrative levels and geographical scales<sup>4</sup>.

Fully understanding and managing the linkages, that is, maximizing synergies and minimizing trade-offs by working across traditional institutional structures, are key challenges for many governments. Understanding the linkages is a first step towards active management and will help governments establish intersectoral mechanisms and procedures to address these issues, including partnerships, coordinating committees, consultation mechanisms, integrated monitoring, and data management and evaluation criteria for inclusive and sustainable development.

## 1.2. Objectives

Goal 6 – “Ensure availability and sustainable management of water and sanitation for all” – places water and sanitation at the core of sustainable development, cutting across sectors and regions. The primary objective of this Analytical Brief is to highlight the interdependency between the targets under Goal 6 on water and sanitation<sup>5</sup> (introduced in section 1.4) and other Goals and targets in the 2030 Agenda. It is the intention, therefore, to capture the multidirectionality of the interlinkages: incorporating water and sanitation in other Goals is necessary for the achievement of Goal 6, and implementing targets under Goal 6 enables the achievement of a number of other targets across the 2030 Agenda.

Further, this Analytical Brief outlines the implications of some of the main linkages for United Nations Member States, and in particular the



<sup>3</sup> United Nations General Assembly Resolution 70/1, paragraph 5.

<sup>4</sup> International Council for Science and International Social Science Council, 2015: Review of Targets for the Sustainable Development Goals: The Science Perspective. Paris..

<sup>5</sup> Goal 6 includes targets related to water supply [6.1], sanitation and hygiene [6.2], pollution control and reuse [6.3], sustainable use and efficiency [6.4], integrated management [6.5], and water-related ecosystems [6.6]. The term “Sustainable Development Goal 6” (or “Goal 6”) is used throughout the text to cover all these targets – for full target wording see Box 1.



A vegetable garden on the bank of a fish and rice pond being tended to by Benalata Das, Khulna, Bangladesh. Photo: Mike Lusmore/Duckrabbit, Creative Commons Attribution.

key synergies and potential conflicts between Goals and targets. It thus provides a starting point for further discussion and analysis at regional and country levels to facilitate achieving the Goals and targets set in the 2030 Agenda.

### 1.3. Scope

The primary target audiences of this Analytical Brief are governments, ministries and other national partners<sup>6</sup> responsible for implementing the 2030 Agenda and reporting on progress towards and achieving the Sustainable Development Goal targets. The Brief focuses on the most significant links that are likely to have an impact on planning, implementation and decision-making at different administrative levels. It is not a comprehensive analysis of all possible links, and some that are not covered may be of importance in specific circumstances. It is recognized that local conditions with respect to factors such as geographic setting, economic conditions and governance structures vary, and the linkages covered here may have different significance and implications at the local level. Furthermore, national priorities and acceptable trade-offs will vary between countries. All countries are thus encouraged to make national analyses based on this Brief.

This Analytical Brief takes a first step in identifying key interlinkages to support discussions with stakeholders, including Member States, and identifying potential related activities. It is not, however, a Policy Brief, and does not make detailed policy recommendations. One or more Policy Briefs may be developed based on discussions supported by this publication.

<sup>6</sup> All relevant stakeholders including civil society, the private sector and academia, to cover all these targets – for full target wording see Box 1.

## Box 1. Sustainable Development 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 substantially increasing recycling and safe reuse 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

As discussed in section 1.3, targets 6.a and 6.b are not considered in this Analytical Brief.



Each Goal contains several targets, and it is understood that the targets within each Goal will also be linked and may include synergies and trade-offs. However, this Brief focuses on the target-level links between Goal 6 and all the other Goals of the 2030 Agenda, not on the links within each Goal. Nevertheless, the targets within Goal 6 and their key interdependencies are introduced in section 1.4, as they are relevant for the entire Brief.

The "means-of-implementation" targets, which encompass the 19 targets within Goal 17 and 43 targets within Goals 1–16 (targets designated a, b, c, and so forth), including 6.a and 6.b<sup>7</sup>, are not considered within the scope of this Brief as they are discussed in greater detail in a separate UN-Water publication<sup>8</sup>. The targets in Goal 17 on the means of implementation and partnerships focus on the creation of an enabling environment, which would support the achievement of all the other Goals.

While this Analytical Brief focuses on the target-level linkages, it is also acknowledged that more than 230 indicators have been defined to track progress towards achieving the targets.<sup>9</sup>



A child from the Zaatari Refugee Camp raised a flag to represent Goal 6, Clean Water and Sanitation, in Jordan, to support the UN Global Goals for Sustainable Development. Credit:unicefjordan/badran

However, at the time of drafting this Brief, many of the indicators had not been finalized. Understanding the target-level linkages also supports the design of efficient monitoring and reporting systems for the Sustainable Development Goals.

## 1.4. Target-level Linkages within Sustainable Development Goal 6

Reflecting the entire water cycle, the targets within Goal 6 are

<sup>7</sup> Target 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"; target 6.b: "Support and strengthen the participation of local communities in improving water and sanitation management".

<sup>8</sup> UN-Water, 2015: *Means of Implementation: A focus on Sustainable Development Goals 6 and 17. Executive summary*. Geneva, <http://www.unwater.org/publications/publications-detail/en/c/298792/>.

<sup>9</sup> See <http://unstats.un.org/sdgs/iaeg-sdgs/metadata-compile/>. Many of these indicators were not finalized at the time of drafting this Analytical Brief.



*Water in the Swiss Alps. Photo: Wendelin Jacober, Creative Commons Attribution*

interlinked with all other Goals and across sectors, including poverty reduction, equality and governance [1, 10, 16],<sup>10</sup> agriculture [2], health [3], education [4], gender [5], energy [7], the economy and infrastructure [8–12], climate change and resilience [13] and the environment [14, 15]. Accordingly, they also support the three dimensions of sustainable development.

Goal 6 cannot be achieved if each target is treated in isolation. A paradigm shift is needed from the focus of the Millennium Development Goals on drinking water and sanitation to recognize that Goal 6 targets are wider in scope, highly interdependent and will require considerably more effort to achieve.<sup>11</sup> To realize “availability and sustainable management of water and sanitation for all”, it is essential to manage competing demands for water resources and to exploit synergies between water uses, reuse and recycling, and ecosystem protection and ambient water quality.

Increased access to sanitation [6.2] must be matched by increased wastewater treatment [6.3] if good ambient water quality [6.3] and healthy water-related ecosystems [6.6] are to be sustained. Good

ambient water quality [6.3] greatly facilitates the provision of safe drinking water [6.1], which in turn must be provided sustainably [6.4], without negative consequences for water-related ecosystems [6.6]. Increasing recycling and safe reuse [6.3] and water-use efficiency [6.4], under the right governance structures [6.5], makes more water available for drinking [6.1] and other uses [6.4], and can reduce impacts on water-related ecosystems [6.6]. Thus, sustainable water supply and use [6.4], good ambient water quality [6.3] and healthy water-related ecosystems [6.6] are interdependent.

Implementing Integrated Water Resources Management (IWRM)<sup>12</sup> at all levels [6.5] provides the framework for addressing the synergies and potential conflicts between the targets within Goal 6. It does this by balancing the demands from various sectors on water resources, as well as the potential impacts of different targets on each other, to form a coordinated planning and management framework. This is achieved by considering all levels of management, including transboundary cooperation and upstream–downstream uses as appropriate.

<sup>10</sup> Goal and target numbers are referred to using square brackets [X.X] throughout this Brief.

<sup>11</sup> See the UN-Water technical publication that provided input to the drafting process of Goal 6 – *Un-Water, 2014: A Post-2015 Global Goal for Water: Synthesis of Key Findings and Recommendations from UN-Water*. Geneva, [http://www.unwater.org/fileadmin/user\\_upload/unwater\\_new/docs/Topics/UN-Water\\_paper\\_on\\_a\\_Post-2015\\_Global\\_Goal\\_for\\_Water.pdf](http://www.unwater.org/fileadmin/user_upload/unwater_new/docs/Topics/UN-Water_paper_on_a_Post-2015_Global_Goal_for_Water.pdf).

<sup>12</sup> Established as a management paradigm in 1992, IWRM is defined by the Global Water Partnership as «a process which promotes the coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems» (<http://www.gwp.org/en/ToolBox/ABOUT/IWRM-Plans/>). Other similar paradigms include *Integrated River Basin Management* and *Integrated Watershed Management*.



A man with an elephant. Pai, Thailand. Photo: Riccardo Romano, Creative Commons Attribution.

## 2. Assessment approach

### 2.1. Assessment framework and chapter structure

Goals 1–16 comprise 107<sup>13</sup> outcome targets, and the interlinkages between these targets are extensive and complex. Various ministries, institutions and other actors will be responsible for implementing different Goals and targets in the 2030 Agenda. A common understanding of the interlinkages between targets is a first step to stimulating the intersectoral and inter-institutional collaboration that is indispensable to meeting the 2030 Agenda.

<sup>13</sup> Not including the 43 targets related to the means of implementation (designated a, b, and so forth), nor the 19 targets under Goal 17 on partnerships and means of implementation.



Villagers in Shaatkhira, Bangladesh. Photo by Felix Clay/Duckrabbit, Creative Commons Attribution.

The 2030 Agenda states that its Goals and targets balance the three dimensions of sustainable development (social, economic and environmental). Different groups of ministries and institutions can be broadly categorized by, and expected to address, the different sustainable development dimensions, with varying demands and pressures on water (energy, agriculture, health, and the like) often leading to fragmentation of water issues at the national level. However, it has been pointed out that water has a unique ability to cut across and integrate the dimensions of sustainable development<sup>14</sup>. This analysis is therefore framed around those dimensions, highlighting the links within and between them as well as the need for integration across them.<sup>15</sup>

The linkages within the 2030 Agenda can be viewed through many lenses and analysed using many frameworks. This approach provides a pragmatic starting point for the analysis of key policy concerns that relate to water, particularly for the most disadvantaged countries and populations.

The 2030 Agenda recognizes the complexity of sustainable development in that each Goal encompasses each of the dimensions and the linkages cannot be neatly categorized. Therefore, some repetition of Goals and targets in each dimension is unavoidable and cross-referencing is to be expected in the following chapters. Similarly, certain linkages may fit in two or more chapters, but are only addressed in one place to avoid repetition.

- **Chapter 3** – Social dimension (people): Links between Goal 6 and, inter alia, the Goals on poverty [1], food and agriculture [2], health [3], education [4], gender [5], energy [7], work [8], equality [10], cities and communities [11] and peace and security [16];
- **Chapter 4** – Economic dimension (prosperity): Links between Goal 6 and, inter alia, the Goals on agriculture [2], energy [7], growth and employment [8], infrastructure, industrialization and innovation [9], equality [10], cities and communities [11] and consumption and production [12];

<sup>14</sup> Economic and Social Council, 2016: *Mainstreaming of the three dimensions of sustainable development throughout the United Nations system. Report of the Secretary-General*. A/71/76–E/2016/55, [http://www.un.org/ga/search/view\\_doc.asp?symbol=A/71/76&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/71/76&Lang=E).

<sup>15</sup> This approach also supports the categories of people, planet and prosperity, as referred to in the preamble to the 2030 Agenda.



Nutrition education seminar in Bandarkharka, Nepal.  
 Photo: Laura Elizabeth Pohl/Bread for the World, Creative Commons Attribution

- **Chapter 5** – Environmental dimension (planet): Links between Goal 6 and, inter alia, the Goals on food [2], energy [7], growth [8], sustainable cities [11], consumption and production [12], climate change [13], marine areas [14] and terrestrial ecosystems [15];
- **Chapter 6** – Integrating the three dimensions: Demonstrates the interdependence of the three dimensions of sustainable development addressed in the Sustainable Development Goals. For example, sustainable and inclusive economic development that is key to implementing the social dimension of the 2030 Agenda, by providing the means to investment in public health and education and full and productive employment and decent work for all [8], would go a long way towards ending poverty [1] and reducing inequality within and across countries [10].

In addition to the three dimensions of sustainable development, it is critical that the achievements of the 2030 Agenda lead to more resilient societies and economies to provide long-term benefits that continue after 2030. Resilience is discussed within each of the above chapters as appropriate. This includes links to the target on reducing the impacts of water-related disasters [11.5], as well as the Goals on climate change [13] and peace and institutions [16].

- **Chapter 7:** Summarizes the key synergies, potential conflicts and the need for integration and partnerships to achieve the 2030 Agenda.

## 2.2. Types of links

Different types of links exist. Some targets are interdependent – one target must be realized for another to be viable. For example, achieving access to water supply and sanitation for all [6.1, 6.2] is a prerequisite



*Industry in Romania. Photo: Lorena, Creative Commons Attribution.*

for reducing the proportion of people living in poverty in all its dimensions [1.2]. Others impose constraints – one target may restrict the ways in which another target can be achieved. For example, sustaining economic growth [8.1] needs to be achieved in such a way as to not jeopardize water quality [6.3] or the sustainable supply of freshwater [6.4].

Some targets reinforce each other – achieving one target will also support the achievement of another. For example, implementing IWRM [6.5] and promoting the social, economic and political inclusion of all [10.3], particularly women and girls [5.5], are mutually reinforcing. If linkages are not understood and managed, conflicts may arise if achieving one target has a negative impact on another. For example, ensuring universal access to modern energy services [7.1] could have either positive or negative impacts on water-related ecosystems [6.6], depending on how policies are designed and implemented.

Some targets may have more than one of the above characteristics depending on the direction of the link and local circumstances, so a target that is reinforcing in one situation may be constraining in another. While improving water quality [6.3] can support the reduction of poverty [1.1, 1.2, 1.4], infrastructure development aimed at reducing poverty could have a negative impact on water quality if proper provisions are not set in place. This Brief addresses links in both directions, that is, it considers what impacts Goal 6 targets have on other targets, and what impacts other targets have on those of Goal 6.

Further, the targets under each Goal may address different dimensions of sustainable development and have been designed to be implemented in an integrated manner. Therefore, while this Brief focuses on target-level linkages, it must be remembered that no Goal can be achieved unless all the targets within it are, and consequently the targets under each Goal cannot be implemented in isolation.

For simplicity, the types of links described above are reduced to two main categories:

- **Main synergies:** Links that are likely to be mainly positive, in that they may be mutually reinforcing or have positive interdependencies. Understanding linkages enables the full exploitation of synergies, and integrated planning and management can support advocacy and decision-making, reduce investment costs and facilitate implementation.
- **Potential conflict:** Links that may still have positive aspects, but for which there is a potential conflict, in one or both directions, unless policies and plans for implementation deliberately address the constraints and trade-offs.

Understanding linkages enables trade-off optimization, and integrated planning and management can allow for the harmonious achievement of potentially conflicting targets.

In this Brief, the terms “interlinkages”, “links” and “linkages” capture all of the above relationships between targets, unless otherwise specified.

In Chapters 3–5, tables summarize key linkages between targets using the above categories. Some targets contain several components, each of which is taken into account. The selected wording of targets given in the tables is intended to capture these components.

A complete summary table of all linkages between Goal 6 targets and other targets is provided in the Annex

## Key Messages

- There are strong synergies between the targets on universal access to water supply, sanitation and hygiene (WASH) services [6.1, 6.2] and wastewater treatment [6.3], and reducing multidimensional poverty [1], improving nutrition [2], and achieving universal access to health [3] and education services [4].
- There are strong synergies between the WASH and water-quality targets [6.1, 6.2, 6.3] and decent work [8] and achieving gender equality through supporting access to education women's economic empowerment [5, 10]. These Goal 6 targets also reduce inequalities by ensuring essential services are available to all, including marginal groups and vulnerable people [1, 10].
- There are strong synergies between targets for improving water quality and wastewater treatment [6.3], sustainable and efficient water use [6.4] and IWRM [6.5], and meeting the Goals on food [2], energy [7], sustainable cities and communities [11] and peace and security [16]. Adequate and reliable water resources [6.4] are a prerequisite to the sustainable production of food and energy for human well-being as well as mitigating potential conflicts between increasing food and energy production and Goal 6 targets 6.3 and 6.6.

## 3. Social dimension: Interlinkages within the 2030 Agenda with Sustainable Development Goal 6

There are strong linkages between Goal 6 and the social dimensions of sustainable development, as articulated in the Goals on poverty [1], food [2], health [3], education [4], gender [5], energy [7], work [8], inequality [10], communities [11] and peace and security [16]. Many of the targets under these Goals are dependent on achieving Goal 6. A human rights-based approach, including addressing the human right to safe drinking water and sanitation<sup>16</sup>, would underpin the 2030 Agenda aim of "leaving no one behind", and also requires the implementation of Goal 6.

### Main interlinkages

The Goal on poverty calls for universal access to basic services [1.4], which include food [2.1], water and sanitation [6.1, 6.2], energy [7.1] and housing [11.1]. The targets related to these basic services are linked through human rights, are mutually supportive and should be implemented in a coordinated fashion. However, increases in demand for drinking water supply, agricultural or industrial production, and electricity generation can all put pressure on water availability, water quality and freshwater ecosystems. Therefore, implementing these

<sup>16</sup> The human right to water and sanitation was adopted by the United Nations General Assembly Resolution 64/292 (3 August 2010).



**"... eradicating poverty ... is the greatest global challenge and an indispensable requirement for sustainable development."**  
**"We are determined to end poverty and hunger, in all their forms and dimensions, and to ensure that all human beings can fulfil their potential in dignity and equality and in a healthy environment."**  
*Transforming Our World: The 2030 Agenda for Sustainable Development*

A Haitian girl eats her lunch. Photo: FMSC, Creative Commons Attribution.



targets must be done in an integrated way that uses water sustainably and efficiently [2.4, 6.4, 7.3, 8.4, 9.4, 12.2, 15.1], builds resilience [1.5, 2.4, 7.2, 11.5], controls pollution [6.3], balances the competing needs of different users in an equitable way [6.5] and includes protection of the environment [6.6, 15.1].

Achieving universal access to safe WASH services [6.1, 6.2] in homes, healthcare facilities, schools and workplaces directly supports a number of targets on nutrition and health [2.2, 3.1, 3.2, 3.3, 3.9], education [4.1, 4.2, 4.3], gender equality [4.5, 5.1, 5.2, 5.5, 10.2, 10.3], decent work [8.5] and equality [10.1].

Ensuring WASH services are combined with safe treatment and disposal or use of wastewater [6.3] amplifies health gains [3.3, 3.9, 12.4] by reducing the burden of disease<sup>17</sup> and associated loss of productivity and healthcare costs, particularly among vulnerable members of society, thus contributing to the alleviation of poverty [1.1, 1.2]. Implementing WASH [6.1, 6.2] alleviates diarrhoea and malnutrition [2.2], which are leading causes of death among children under five [3.2].<sup>18</sup>

<sup>17</sup> World Health Organization, 2014: Preventing Diarrhoea through Better Water, Sanitation and Hygiene: Exposures and Impacts in Low- and Middle-income Countries. Geneva, [http://www.who.int/water\\_sanitation\\_health/gbd\\_poor\\_water/en/](http://www.who.int/water_sanitation_health/gbd_poor_water/en/).

<sup>18</sup> See <http://www.who.int/mediacentre/factsheets/fs178/en/>.

## **Box 2. Water [6], education [4] and gender [5]**

*A case study in Ghana found that a 15-minute reduction in water collection time increased girls' school attendance by 8%–12%. This is an example of how improving access to water supply [6.1] increases girls' participation in education [4.1, 4.2, 4.5] and addresses gender inequalities [5.1] and, consequently, supports sustainable development.*

*Source: United Nations World Water Assessment Programme, 2015: The United Nations World Water Development Report 2015: Water for a Sustainable World. Paris, United Nations Educational, Scientific and Cultural Organization (UNESCO).*

Providing access to WASH (with or without subsidy) can reduce monetary and non-monetary poverty [1.1, 1.2] and reduce the vulnerability of poor and marginal groups to economic shocks [1.5]. Water supply, sanitation and hygiene services are also key factors in improving student health and thus educational outcomes [4.1–4.3].

The lives of women and girls<sup>19</sup> are especially improved by good WASH



*Girls attending school in Guinea. Photo: UNMEER/Martine Perret.*

services, since they reduce the time spent collecting water from distant sources, thus reducing the time spent on unpaid household labour [5.4] and on caring for sick family members, which in turn leaves more time to attend school and take on paid employment (see Box 2). Having WASH facilities at home (in comparison to shared and public facilities) can also reduce the risk of violence against women and girls [5.2]. Implementing WASH facilities in the public sphere, including facilities for menstrual hygiene management [6.2], supports effective participation of women and girls at all levels in educational, political, economic and public life [4.5, 5.1, 5.2, 5.4, 5.5, 8.5, 8.8, 10.2, 10.3].

An IWRM [6.5] approach both promotes and is reinforced by coherent policies and the rule of law [16.3], public access to information [16.10], institutional capacity [16.6] and inclusive, participatory and

<sup>19</sup> The 2010 update provided by the World Health Organization/United Nations Children's Fund Joint Monitoring Programme on Water Supply and Sanitation, which monitored water and sanitation access within the framework of the Millennium Development Goals, showed that the physical and time burden of water hauling falls primarily on women and girls ([http://www.wssinfo.org/fileadmin/user\\_upload/resources/1278061137-JMP\\_report\\_2010\\_en.pdf](http://www.wssinfo.org/fileadmin/user_upload/resources/1278061137-JMP_report_2010_en.pdf)).



representative decision-making at all levels [16.7]. It also promotes effective governance and institutions that break down barriers to social mobility and gender equality [5.5].

All Goal 6 targets have positive implications for business (for example, industry [9.2, 9.3] and tourism [8.9]), hence supporting employment opportunities [1, 8.5]. An adequate and reliable water resource is a prerequisite for the production of food [2.1] and energy [7.1], as well as industry [9.1, 9.2], which in turn provide jobs [8.5] and sustain cities and communities [11.1]. This has to be managed effectively to avoid overuse or pollution of water resources and degradation of ecosystems. Sustainable farming [2.4], sustainable infrastructure and industrialization [9.1, 9.2, 9.4], decoupling economic growth from unsustainable resource use [8.4], reducing food waste [12.3] and safe reuse of wastewater [6.3], if well managed, can significantly reduce

water demands, thus contributing to sustainable water use [6.4, 6.6].

Building resilience to climate change and variability [11.5, 13.1] are vital to ensuring that basic services are stable and that people remain out of poverty [1.5]. With floods, droughts and windstorms accounting for almost 90% of the 1 000 most disastrous events since 1990<sup>20</sup>, disaster risk reduction strategies are an important tool to ensure resilience. Appropriate land and water management support resilient agriculture [2.4]. Designing, building and retrofitting resilient infrastructure [9.1] is central to the provision of basic services such as water, sanitation and wastewater treatment [1.4, 6.1–6.3, 11.1], and long-term eradication of poverty [1].<sup>21</sup>

Table 1 summarizes, for the social dimension, target-level linkages across the 2030 Agenda with Goal 6.

<sup>20</sup> United Nations, 2014: *Water and Disaster Risk: A Contribution by the United Nations to the Consultation Leading to the Third UN World Conference on Disaster Risk Reduction*, [http://www.preventionweb.net/files/38763\\_water.pdf](http://www.preventionweb.net/files/38763_water.pdf).

<sup>21</sup> For more information, see United Nations, 2016: *Global Sustainable Development Report: 2016 Edition*. Department of Economic and Social Affairs. New York; particularly Chapter 2 on the infrastructure–inequality–resilience nexus.



**Table 1**

Social dimension: Target-level linkages across the 2030 Agenda with Goal 6

SOCIAL DIMENSION TARGETS INTERLINKED WITH GOAL 6

1.1 ... eradicate extreme poverty ...  
 1.2 ... reduce ... the proportion ... living in poverty in all its dimensions ...  
 1.4 ... all ... have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, ... natural resources, appropriate new technology ...  
 1.5 ... build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to ... shocks and disasters  
 2.1 ... end hunger and ensure access by all people ... to safe, nutritious and sufficient food all year round  
 2.2 ... end all forms of malnutrition ...  
 2.3 ... double the agricultural productivity and incomes of small-scale food producers ...  
 2.4 ... ensure sustainable food production systems and implement resilient agricultural practices ...  
 3.1 ... reduce the global maternal mortality ratio ...  
 3.2 ... end preventable deaths of newborns and children under 5 years of age ...  
 3.3 ... combat ... water-borne diseases ...  
 3.8 ... access to quality ... health-care services ...  
 3.9 ... reduce the number of deaths and illnesses from ... water and soil pollution ...  
 4.1 ... all ... complete ... primary ... secondary education ...  
 4.2 ... all ... have access to ... early childhood development, care and pre-primary education ...  
 4.3 ... equal access for all ... to ... technical, vocational and tertiary education ...

10.1 ... progressively achieve and sustain income growth of the bottom 40 per cent of the population ...  
 11.1 ... ensure access for all to adequate, safe and affordable housing and basic services ...  
 11.3 ... inclusive and sustainable urbanization ... human settlement planning and management ...  
 11.5 ... reduce [the impacts of] ... water-related disasters, with a focus on protecting the poor and ... vulnerable ...  
 11.6 ... reduce ... environmental impact of cities ... attention to ... municipal and other waste management  
 11.7 ... universal access to ... green and public spaces ...  
 12.1 ... Sustainable Consumption and Production ...  
 12.2 ... sustainable management and efficient use of natural resources  
 12.3 ... halve ... global food waste at retail and consumer levels ... along production and supply chains ...  
 12.4 ... environmentally sound management of chemicals and ... wastes throughout their life cycle ... reduce their release to air, water and soil ...  
 12.5 ... substantially reduce waste generation through prevention, reduction, recycling and reuse  
 12.6 Encourage companies ... to adopt sustainable practices ...  
 12.7 Promote [sustainable] public procurement ...  
 12.8 ... people everywhere have ... information and awareness for sustainable development and lifestyles ...



A new irrigation scheme in Isiolo, Kenya. Photo: EU/ECHO/Martin Karimi, Creative Commons Attribution.

#### MAIN SYNERGIES WITH GOAL 6 IN THE SOCIAL DIMENSION

- Wastewater treatment [6.3] and WASH [6.1, 6.2] are basic services that are mutually interlinked with poverty reduction [1.1, 1.2, 1.4] in two main ways: by reducing the risk of water-borne diseases [3.2, 3.3, 3.9] and malnutrition [2.2], and by supporting all, particularly girls and women, to participate at all levels in education, economic activities and politics [4.1, 4.2, 4.3, 4.5, 5.1, 5.2, 5.4, 5.5, 8.5, 8.8, 10.2, 10.3]; WASH is also a prerequisite to improved healthcare [3.1, 3.8].
- Substantially increasing recycling and safe reuse [6.3], sustainable and efficient water use [6.4], implementing IWRM [6.5] and protecting water-related ecosystems [6.6] are interlinked with agricultural productivity [2.3], sustainable and resilient agricultural practices [2.4] and ending hunger [2.1].
- Using water sustainably and efficiently and reducing water scarcity [6.4] and implementing IWRM [6.5] are interlinked with reducing the impacts of water-related disasters [11.5] and helping build the resilience of the poor [1.5].
- Healthy ecosystems [6.6] can provide ecosystem services to the poor and vulnerable, supporting poverty reduction.

#### POTENTIAL CONFLICTS WITH GOAL 6 IN THE SOCIAL DIMENSION

Increasing access to basic services [1.4] such as food [2.1, 2.3] and electricity [7.1] and development for poverty reduction [1.1, 1.2, 10.1] can have negative impacts on ambient water quality [6.3], water availability [6.4] and ecosystems [6.6] if care is not taken to reduce pollution, use water sustainably and protect ecosystems.

***“Sustainable development recognizes that eradicating poverty in all its forms and dimensions, combatting inequality within and among countries, preserving the planet, creating sustained, inclusive and sustainable economic growth and fostering social inclusion are linked to each other and are interdependent.”***

***“We are determined to ensure that all human beings can enjoy prosperous and fulfilling lives and that economic, social and technological progress occurs in harmony with nature.”*** *Transforming Our World: The 2030 Agenda for Sustainable Development*

## 4. Economic dimension: Interlinkages within the 2030 Agenda with Sustainable Development Goal 6



There are strong linkages between Goal 6 and the economic dimensions of sustainable development as articulated in the Goals on work and growth [8], infrastructure and industry [9], food [2] and energy production [7], inequality [10], communities [11] and consumption and production [12]. A major challenge under the 2030 Agenda is to ensure that growth and consumption are sustainable and non-polluting [6.3, 6.4] and to minimize impacts on ecosystem services [6.6]. Integrated Water Resources Management [6.5] balances the demands and impacts of different sectors.

### Main interlinkages

Water is an essential component of national and local economies. Nearly 80% of all jobs globally are dependent (42% heavily dependent, 36% moderately dependent) on sustainably managed water resources and water-related services, including sanitation and wastewater services.<sup>22</sup> As such, jobs in the water sectors themselves (including building and

<sup>22</sup> United Nations World Water Assessment Programme, 2016: *The United Nations World Water Development Report 2016: Water and Jobs*. Paris, UNESCO.



Logging trucks in Gabon. Photo: jbdodane, Creative Commons Attribution.

managing water infrastructure [6.1–6.4]; the provision of water-related services, such as water supply, sewerage and waste management [6.1–6.3]; ecosystem restoration [6.6] and IWRM [6.5]) support an enabling environment for the creation and maintenance of decent jobs [8.5, 8.6] across most other sectors of the global economy (see Box 3).

Investments in water and sanitation provide significant economic and social returns, as well as generate employment [1, 8]. For example, there is a positive linkage between using more efficient water technologies [6.3, 6.4] and support to poor farmers [2.3, 8.5, 10.1].<sup>23</sup>

As discussed in Chapter 3, access to WASH and wastewater treatment supports a healthy, well-educated workforce [3, 4, 8]. Access to WASH in the workplace is a component of decent work [8.5], with a strong positive impact on workers' health and thus their productivity [8.8], as well as women's participation [5.5].<sup>24, 25</sup>

<sup>23</sup> Ibid.

<sup>24</sup> Committee on Economic, Social and Cultural Rights, 2016: General comment No. 23 (2016) on the right to just and favourable conditions of work (Article 7 of the International Covenant on Economic, Social and Cultural Rights). E/C.12/GC/23. Advance unedited version, 8 March 2016.

<sup>25</sup> In a factory in Bangladesh, poor menstrual hygiene conditions resulted in 73% of women missing work for an average of six days a month. Addressing this saw absenteeism drop to 3%. See United Nations World Water Assessment Programme, 2016: *The United Nations World Water Development Report 2016: Water and Jobs*. Paris, UNESCO.

## Key Messages

- Given their focus on sustainability, there are strong interdependencies between the economic dimensions of the 2030 Agenda and Goal 6. An adequate and reliable supply of water [6.1, 6.4] is essential for many economic activities [8], infrastructure and industrial development [9], cities and communities [11] and sustainable consumption and production [12]. Access to WASH services [6.1, 6.2] and wastewater treatment [6.3] support a healthy, educated and productive workforce.

- Achieving Goal 6 and meeting the economic Goals [7, 8, 9, 12] are interdependent. To ensure economic growth is sustainable over the long term, the targets set out in these Goals must take account of water and sanitation services and water resource constraints, for example, to avoid increased pollution [6.3], excessive use of resources [6.4] and the degradation of ecosystems [6.6]. Such potential conflicts need to be carefully managed across sectors and regions by mainstreaming water considerations in economic development, planning and financial institutions, implementing IWRM at all levels [6.5] and employing smart technological solutions.

- Priorities need to be set when water resources are scarce [6.4] and trade-offs with economic development objectives exist, taking a pro-poor approach to development to meet the needs of the most vulnerable [10]. Water-related disasters [11.5] are a threat to economic development and must be considered when implementing the economic Goals [7, 8, 9, 12].



The majority of the targets related to economic development call for this to be done in a sustainable way, aiming to decouple economic growth from environmental degradation [8.4, 8.9, 9.2, 11.3, 12.6, 12.7]. Some examples include: sustainable and efficient use of natural resources (including water) and adoption of clean and environmentally sound technology [2.4, 7.3, 8.4, 9.1, 9.4, 12.2]; safe management of chemicals and wastes throughout their life cycle; and the reduction of waste through prevention, reduction, recycling and reuse [3.9, 11.6, 12.3–12.5]. These targets have strong interdependencies (are mutually supportive) with those under Goal 6 that relate to reducing pollution and increasing reuse [6.3], sustainable and efficient use [6.4], IWRM [6.5] and protecting freshwater ecosystems [6.6].

Each of the Sustainable Development Goals was designed to be implemented in an integrated fashion, with many of them including targets that address the three dimensions of sustainable development. Therefore, any targets related to economic development that do not explicitly mention the sustainable management of natural resources [2.3, 7.1, 8.1, 8.3, 10.1, 11.1] are balanced by targets within the same Goals, as mentioned above. This highlights the critical need for targets within each Goal to be implemented in an integrated fashion to avoid any potential conflict with Goal 6 and other targets related to sustainable management of natural resources. Implementing IWRM [6.5] can support this process by bringing together different sectors and stakeholders at all levels.

### **Box 3. Community-based provision of water [6] creating labour opportunities [8] and monitoring the environment [15]**

*The International Labour Organization Employment-intensive Investment Programme in Panama harnessed opportunities for water provision [6.1, 9.1, 11.1] to generate labour opportunities and entrepreneurship in the local population [8.3, 8.5]. This also reduced the time spent on fetching water, especially for women and girls [5.4, 5.5], freeing up time and labour that could be mobilized for education [4.1–4.3], food production [2.3] and income-generating activities [1, 8]. The Programme involved all stakeholders [6.5] and supported the development of expertise, skills and knowledge – not only for the provision of basic water services, but also for monitoring the ecological status of water resources [6.6, 15.1, 15.9] and the promotion of good sanitation and hygiene practices [6.2].*

*Source: UN-Water, 2011: Conference Summary: Water in the Green Economy in Practice. Chapter 4 in: Proceedings of the International UN-Water Conference: Water in the Green Economy in Practice: Towards Rio+20, Zaragoza, Spain, 3–5 October 2011, p. 30, [http://www.un.org/waterforlifedecade/green\\_economy\\_2011/pdf/watergreenconf\\_chap\\_4\\_conference\\_summary\\_water\\_in\\_ge.pdf](http://www.un.org/waterforlifedecade/green_economy_2011/pdf/watergreenconf_chap_4_conference_summary_water_in_ge.pdf)*



City skyline. Photo: Mauro Erazo, Creative Commons Attribution.

Energy [7] is critical for economic development, yet the targets on energy do not explicitly mention sustainable use of water. Increasing fossil fuel-based energy generation can increase demands on water [6.4], particularly for cooling of thermoelectric power plants. Some renewable energy sources, including hydropower and bioenergy [7.2], can also have significant impacts on land and water resources and ecosystems [6.3, 6.4, 6.6], and care should be taken to minimize these impacts. On the positive side, energy efficiency [7.3] usually contributes to water efficiency [6.4], and vice versa. For example, efficiency measures, from the network level to the household level, reduce the need to pump, treat, distribute and heat water. If the topography allows for it, water distribution systems can be designed to generate electricity, and wastewater treatment plants can be designed to produce heat, gas and fuel.

Consumers and producers can have huge impacts on both water quantity and quality. Far more water is embedded in the food we eat and products we buy than that which we obtain from the tap<sup>26</sup>. Furthermore, water is often used to grow food or make products in one country that are then exported for consumption elsewhere. There is, therefore, high interdependency between targets on sustainable consumption and production [12.1–12.8] and targets on water quality, sustainable water use and ecosystem protection [6.3, 6.4, 6.6]. The “water footprint” concept is a useful tool to analyse water-related impacts of consumption and production both within and between countries. More direct impacts of economic development, mainly from water use and pollution, can cross jurisdictional borders, so it is important that water is managed following hydrological boundaries [6.5]. This is particularly important when such

impacts cross national borders in international surface or groundwater systems [6.5].

Cities [11] are dependent on peri-urban and rural areas to produce food for growing populations, for which increased agricultural productivity is essential, including among small-scale producers [2.3]. To enable a safe and sustainable increase in productivity, best practices in terms of soil, water and waste management must be universally adopted [2.4, 6.3, 6.4]. Technologies and management approaches that allow, for example, the safe use of wastewater as a water and nutrient source for irrigation [6.3] have the potential to contribute to the realization of these targets. The principles of a circular economy for sustainable resource use can guide this type of transformation.<sup>27</sup> There is also a need to invest in Climate-smart Agriculture,<sup>28</sup> which pursues the triple objectives of sustainably increasing agricultural productivity and incomes [2.3, 2.4]; adapting and building resilience to climate change [1.5, 2.4, 9.1, 13.1]; and reducing and/or removing greenhouse gas emissions where possible [13.3].

Economies are sensitive to water-related disasters such as floods and droughts, so reducing the impacts of these disasters [11.5] is critical to sustaining development benefits [8.1] across a number of targets including food and energy production [2.1, 7.1]. Protecting water-related ecosystems [6.6, 15.1] supports resilient economies. Other interlinkages have been discussed previously in this Chapter and at the end of Chapter 3.

Table 2 summarizes, for the economic dimension, target-level linkages across the 2030 Agenda with Goal 6.

<sup>26</sup> See *Water Footprint Network*, <http://waterfootprint.org/en/water-footprint/>.

<sup>27</sup> Principles: (a) preserve and enhance natural capital; (b) optimize resource yields; (c) foster system effectiveness, <https://www.ellenmacarthurfoundation.org/circular-economy/overview/principles>.

<sup>28</sup> See *Food and Agriculture Organization of the United Nations*, <http://www.fao.org/climate-smart-agriculture/en/>.



**Table 2**

Economic dimension: Target-level linkages across the 2030 Agenda with Goal 6

ECONOMIC DIMENSION TARGETS INTERLINKED WITH GOAL 6

2.3 ... double the agricultural productivity and incomes of small-scale food producers ...

2.4 ... ensure sustainable food production systems and implement resilient agricultural practices ...

7.1 ... universal access to ... modern energy services

7.2 ... increase ... share of renewable energy ...

7.3 ... double ... improvement in energy efficiency

8.1 Sustain per capita economic growth ...

8.2 Achieve higher levels of economic productivity ...

8.3 Promote development-oriented ... activities, decent job creation ... encourage the ... growth of ... small- and medium-sized enterprises ...

8.4 ... global resource efficiency in consumption and production ... decouple economic growth from environmental degradation ...

8.5 ... productive employment and decent work for all ...

8.9 ... promote sustainable tourism that creates jobs and promotes local culture and products

9.1 ... resilient infrastructure, including regional and transborder infrastructure ...

9.2 Promote ... sustainable industrialization ... raise industry's share of employment and gross domestic product ...

9.4 ... upgrade infrastructure and retrofit industries to make them sustainable ... increased resource-use efficiency ... environmentally sound ... processes ...

9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors ...

10.1 ... progressively achieve and sustain income growth of the bottom 40 per cent of the population ...

11.1 ... ensure access for all to adequate, safe and affordable housing and basic services ...

11.3 ... inclusive and sustainable urbanization ... human settlement planning and management ...

11.5 ... reduce [the impacts of] ... water-related disasters, with a focus on protecting the poor and ... vulnerable ...

11.6 ... reduce ... environmental impact of cities ... attention to ... municipal and other waste management

11.7 ... universal access to ... green and public spaces ...

12.1 ... Sustainable Consumption and Production ...

12.2 ... sustainable management and efficient use of natural resources

12.3 ... halve ... global food waste at retail and consumer levels ... along production and supply chains ...

12.4 ... environmentally sound management of chemicals and ... wastes throughout their life cycle ... reduce their release to air, water and soil ...

12.5 ... substantially reduce waste generation through prevention, reduction, recycling and reuse

12.6 Encourage companies ... to adopt sustainable practices ...

12.7 Promote [sustainable] public procurement ...

12.8 ... people everywhere have ... information and awareness for sustainable development and lifestyles ...



Farmers at work. Photo: Justin Kernaghan, Creative Commons Attribution.

#### MAIN SYNERGIES WITH GOAL 6 IN THE ECONOMIC DIMENSION

- Targets 6.1–6.6 are fundamental for all economic activity and industry [2, 7, 8, 9, 11, 12]. Whatever the sector, from agriculture to IT, adequate and reliable water supplies of the right water quality are needed.
- Implementing targets on reducing pollution, wastewater treatment and reuse [6.3], sustainable and efficient use of water resources [6.4], IWRM [6.5] and protection of freshwater ecosystems [6.6] are all mutually supportive of targets related to sustainable economic development, including sustainable management and efficient use of natural resources [2.4, 7.3, 8.4, 9.2, 12.2, 12.3], adoption of environmentally sound technology [9.4], safe management of chemicals and wastes throughout their life cycle [12.4], reduction of waste through prevention, reduction, recycling and reuse [11.6, 12.5] and other aspects of sustainable development related to work, industrialization, urbanization and production [8.9, 9.2, 11.3, 12.6, 12.7]
- The implementation of Goal 6, particularly protecting water-related ecosystems [6.6, 15.1] and reducing the impacts of water-related disasters [11.5], is mutually reinforcing to build resilient economies [8.1, 9.1].

#### POTENTIAL CONFLICT WITH GOAL 6 IN THE ECONOMIC DIMENSION

- Increasing access to modern energy services [7.1] can have negative impacts on water quality [6.3], sustainable water use [6.4] and ecosystems [6.6] if measures are not taken to avoid, minimize and mitigate impacts. Negative impacts on water resources may be greater with some forms of renewable energy, notably certain forms of hydropower and biofuels [7.2].
- Targets related to economic productivity, growth, industrialization and urbanization that do not explicitly mention sustainable management of natural resources [2.3, 7.1, 8.1, 8.2, 8.3, 10.1, 11.1] must be implemented in an integrated manner with the other targets in the same Goals (listed above under “Main synergies”), as well as across sectors [6.5], to avoid any potential conflict with targets on water quality, water use and freshwater ecosystems [6.3, 6.4, 6.6].

***“We recognize that social and economic development depends on the sustainable management of our planet’s natural resources. We are therefore determined to conserve and sustainably use oceans and seas, freshwater resources, as well as forests, mountains and drylands and to protect biodiversity, ecosystems and wildlife.” “We are determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations.”***

*Transforming Our World: The 2030 Agenda for Sustainable Development*

## 5. Environmental dimension: Interlinkages within the 2030 Agenda with Sustainable Development Goal 6

Water is a prerequisite to all life on Earth and the foundation of all of its ecosystems. Healthy and resilient ecosystems provide services that are vital for addressing the social and economic dimensions of the 2030 Agenda. Goal 6 targets provide protection from overuse, pollution and other pressures, to safeguard the health of ecosystems. Interlinkages between Goal 6 and the environmental dimension of the 2030 Agenda are particularly strong in the Goals on food [2], energy [7], economic development [8], sustainable cities and communities [11], sustainable consumption and production [12], climate [13], oceans [14] and terrestrial ecosystems [15].

This Chapter focuses on water quality and resilience, but other impacts of social and economic development related to the environment, including overuse, as well as governance issues [16] have been discussed in Chapters 3 and 4. Dams are discussed in Chapter 6.

### Main interlinkages

Although many targets support the protection of water-related ecosystems [6.6, 15.1], some, such as increased agricultural production [2.3], economic growth [8.1], industrialization [9.2], urbanization [11.1] and access to WASH [6.1, 6.2] may increase total wastewater generation





A girl stands surrounded by water after the flooding of Raboto, a slum area of Gonaives, Haiti. Photo: UNICEF/Marco Dormino, Creative Commons Attribution.

and the risk of pollution [3.9, 6.3]<sup>29</sup>. Domestic and industrial wastewater, together with runoff water from urban areas and agricultural land, is a key ecosystem-health concern for receiving waters: nutrient, bacterial, chemical and thermal pollution can severely impair the ambient water quality and biodiversity. When the polluted water (from land-based activities) reaches the marine environment, the pollution enters the marine ecosystem and food chain, which enables further accumulation and transfer of the pollutants [14.1, 14.2]. Conversely, improved water quality and wastewater management [3.9, 6.3, 11.6, 12.5] are mutually supportive of ecosystem and biodiversity protection, restoration and sustainable use of ecosystem goods and services [6.6, 15.1, 15.3, 15.5].

Wastewater generation must be mitigated with strategies for prevention (product replacement or use of less harmful chemicals in industrial processes), reduction (wastewater treatment, agricultural best practices) [2.4, 12.4], recycling (closed-loop industrial processes) and reuse (safe wastewater use in agriculture and aquaculture) [12.5] (see Box 4). This is in line with the ambition of the targets related to sustainable economic growth [8.4], industry [9.2, 9.4], cities and communities [11.6], and consumption and production [12.2] to reduce the environmental impact of development by promoting clean and environmentally sound technologies and industrial processes [9.4, 15.9],

<sup>29</sup> UN-Water, 2015: *Wastewater Management – A UN-Water Analytical Brief*. Geneva, [http://www.unwater.org/fileadmin/user\\_upload/unwater\\_new/docs/UN-Water\\_Analytical\\_Brief\\_Wastewater\\_Management.pdf](http://www.unwater.org/fileadmin/user_upload/unwater_new/docs/UN-Water_Analytical_Brief_Wastewater_Management.pdf).

## Key Messages

- There are strong synergies between the Goals on consumption and production [12], oceans [14] and ecosystems [15], and Goal 6, especially in regard to water quality and wastewater management (reduction, reuse and recycling) [6.3] and improving aquatic, marine and terrestrial ecosystem health by reducing the pollution load. Sustainable water withdrawals [6.4], ensuring sufficient water to cover the needs of ecosystems, support the conservation and restoration of water-related ecosystems [6.6, 15.1].
- Some of the social and economic Goals and targets of the 2030 Agenda, including food [2] and energy security [7], may impose an increased use of ecosystem resources and generation of pollution, which may have negative impacts on water quantity and quality [6.3, 6.4, 6.6]. However, recycling and safe use of wastewater [6.3] can greatly increase food production in water-scarce areas while reducing pollution and demand on freshwater resources [6.4, 6.6].
- Implementing the Goal on climate [13] and Goal 6 are mutually supportive. Addressing climate change supports the targets on water scarcity [6.4], water quality [6.3] and ecosystems [6.6, 15.1]. Implementing IWRM [6.5] mutually reinforces targets on awareness-raising on climate change [13.3], and integrating climate change and ecosystem values into development processes [13.2, 15.9].



*Algae Bloom in Lake Erie, US.*

focusing on the reduction and safe management of wastes throughout a closed-loop life cycle [11.6, 12.4, 12.5]. For all of these steps to be achieved, wastewater and surface water runoff, particularly in urban and peri-urban areas, needs to be collected and transported for treatment, safe disposal or reuse. The planning, installation and operation of such infrastructure require careful integration with that of other services [9.1, 11.1, 15.9].

Wastewater treatment levels should be matched with the quality of water needed for its next use (for example, for ecosystems [14.1, 15.1], agriculture, managed aquifer recharge [6.4], greening of public spaces [11.7] or drinking-water). Safely treated faecal sludge and wastewater [6.2, 6.3] can be a useful supply of nutrients and water for agriculture and energy security (for example, to produce nutrient-rich organic compost or energy in the form of heat, biogas and biofuels) [2.1, 2.3, 2.4, 7.1–7.3] and for reducing the impact on the adjacent environments [6.6, 14.1, 15.1, 15.5, 15.8].

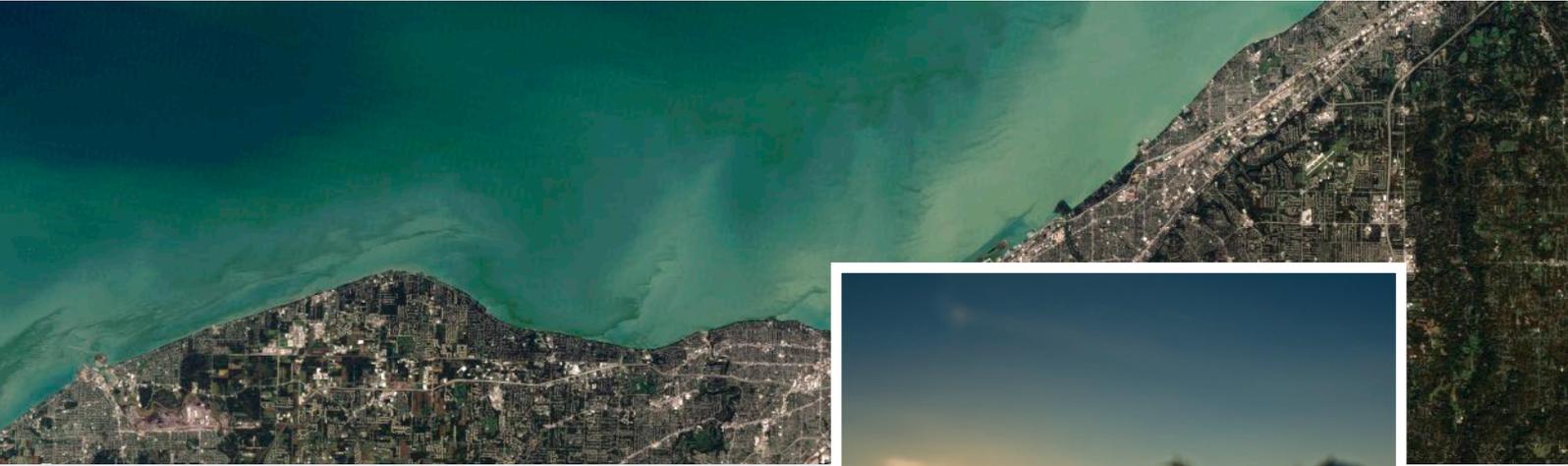
### **Box 4. Links between sustainable cities [11.3, 11.6], pollution management and wastewater reuse [6.3], and agricultural production [2]**

***More than 100 years of irrigation with Mexico City's wastewater in the Mezquital valley.***

*Mexico City provides a unique example of wastewater reuse [6.3] in agriculture [2.1, 2.4] in terms of size (hectares (ha)), timescale and data series recorded, particularly in semi-arid areas.*

*This activity started as flood-risk prevention [11.5] for the city. For years, untreated wastewater has been reused to irrigate 90 000 ha of agricultural land, achieving mean maize yields of 10 tons/ha, well above the national averages under rainfed (2 tons/ha) and well water-irrigated agriculture (8.6 tons/ha) [2.1, 2.3]. Consequences have been positive on groundwater recharge [6.4] and although heavy metal accumulation has occurred in soils [15.5] its effect is minor on plants due to the alkaline pH values and the medium-to-large soil organic matter contents. The larger prevalence of helminth infections among children [3.3, 3.9] in the irrigated area compared with a nearby area under rainfed agriculture led to the use of treated wastewater, which started in early 2016 following the establishment of a new wastewater treatment plant [6.2, 6.3] in the Mexico City basin. This has supported economic development decoupled from environmental degradation [8.4].*

*Source: Hettiarachchi H. and R. Ardakanian, eds., 2016: Safe Use of Wastewater in Agriculture: Good Practice Examples. Dresden, UNU-FLORES.*



Implementation of the Goal on climate [13] and Goal 6 will be mutually supportive. Water-related ecosystems [6.6, 15.1], including natural and artificial wetlands, coastal marshes and mangrove forests [14.2] provide resilience to droughts, floods and storms [11.5, 13.1, 15.3]. This is of particular importance to improve the health and resilience of coastal areas [14.1, 14.2] vulnerable to sea-level rise and climatic variations and changes [13.1]. Natural and artificial wetlands can also help to treat wastewater and polluted runoff [3.9, 6.3, 12.5, 11.6]. Implementing IWRM [6.5] mutually reinforces targets on awareness-raising and education on climate change [13.3], sustainable lifestyles [4.7, 12.8] and integrating climate change and ecosystem values into development processes [13.2, 15.9].

Table 3 summarizes, for the environmental dimension, target-level linkages across the 2030 Agenda with Goal 6.



*Cotton field in the sunset. Photo: Kyle Spradley, Creative Commons Attribution*



**Table 3**

Environmental dimension: Target-level linkages across the 2030 Agenda with Goal 6

ENVIRONMENTAL DIMENSION TARGETS INTERLINKED WITH GOAL 6

2.1 ... end hunger and ensure access by all ... to safe ... sufficient food all year round  
 2.3 ... double the agricultural productivity and incomes of small-scale food producers ...  
 2.4 ... sustainable food production systems and ... resilient agricultural practices ...  
 4.7 ... all learners acquire the knowledge and skills needed to promote sustainable development ...  
 7.1 ... universal access to ... energy services  
 7.2 ... increase ... share of renewable energy ...  
 7.3 ... double ... energy efficiency  
 8.1 Sustain per capita economic growth ...  
 8.2 ... higher levels of economic productivity ...  
 8.3 Promote development-oriented ... activities, decent job creation ... encourage the ... growth of ... small- and medium-sized enterprises ...  
 9.4 ... upgrade infrastructure and retrofit industries to make them sustainable ... increased resource-use efficiency ... environmentally sound ... processes ...  
 10.1 ... achieve and sustain income growth of the bottom 40 per cent of the population ...  
 11.1 ... ensure access for all to adequate, safe and affordable housing and basic services ...  
 11.5 ... reduce [the impacts of] ... water-related disasters with a focus on protecting the poor and people in vulnerable situations ...  
 11.6 ... reduce ... environmental impact of cities ... paying special attention to ... municipal and other waste management  
 12.4 ... achieve environmentally sound management of chemicals and all wastes throughout their life cycle ... reduce their release to air, water and soil ...

12.5 ... reduce waste generation through prevention, reduction, recycling and reuse  
 12.8 ... people everywhere have the relevant information and awareness for sustainable development and lifestyles ...  
 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters ...  
 13.2 Integrate climate change measures into national policies, strategies and planning  
 13.3 Improve education ... capacity on climate change mitigation, adaptation, impact reduction and early warning  
 14.1 ... prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including ... nutrient pollution  
 14.2 ... sustainably manage and protect marine and coastal ecosystems ... including by strengthening their resilience ...  
 14.5 ... conserve at least 10 per cent of coastal and marine areas ...  
 15.1 ... ensure the conservation, restoration and sustainable use of ... freshwater ecosystems and their services ...  
 15.3 ... combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods ...  
 15.5 ... reduce the degradation of natural habitats, halt the loss of biodiversity ...  
 15.8 ... reduce the impact of invasive alien species on ... water ecosystems ...  
 15.9 ... integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction ...



Wetlands safeguard human and environmental resilience. Photo: Patrick Emerson, Creative Commons Attribution.

#### MAIN SYNERGIES WITH GOAL 6 IN THE ENVIRONMENTAL DIMENSION

- Healthy water-related ecosystems [6.6, 15.1], including natural and constructed wetlands, can provide pollution control (from wastewater and runoff) [3.9, 6.3, 11.6], support resilience through flood and drought protection [11.5, 13.1] and support agricultural productivity [2.1, 2.3].
- Achieving targets related to reducing the environmental impact of economic growth and cities [8.4, 11.6], infrastructure and industry [9.4], agricultural production [2.4] and consumption and production [12.4, 12.5] are interdependent on implementing targets on pollution control, wastewater treatment and safe reuse [6.3], protection of freshwater ecosystems [6.6] and implementing IWRM [6.5].
- Implementing targets 6.3, 6.5 and 6.6 mutually reinforce targets on marine pollution (from land-based activities), protecting and conserving marine and coastal ecosystems [14.1, 14.2, 14.5] and targets on terrestrial ecosystems [15.1, 15.3, 15.5].
- Implementing IWRM mutually reinforces targets on awareness-raising on consumer choices and climate change [12.8, 13.3] and integrating climate change and ecosystem values into development processes [13.2, 15.9].

#### POTENTIAL CONFLICTS WITH GOAL 6 IN THE ENVIRONMENTAL DIMENSION

It is important that targets related to economic growth, industrialization and urbanization [8.1, 8.2, 8.3, 10.1, 11.1] are implemented in an integrated manner with the other targets in these Goals and in consideration of Goal 6 to avoid potential negative impacts on water quality, quantity and ecosystems [6.3, 6.4, 6.6].

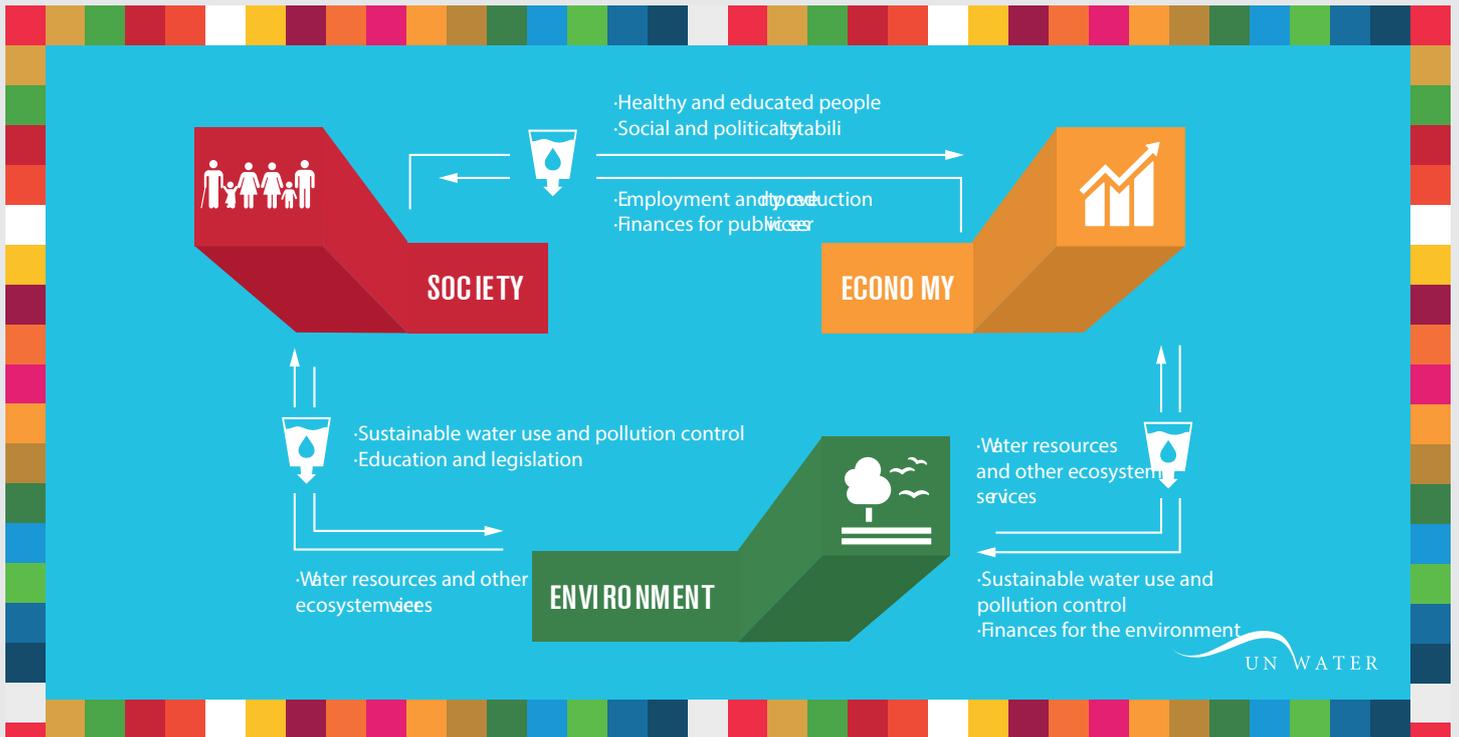


City farming. Photo: La Cltta Vita, Creative Commons Attribution.

## 6. Integrating the three dimensions of sustainable development

As discussed above, the three dimensions of sustainable development – social, economic and environmental – are inherently interdependent and must be treated as such if the 2030 Agenda is to be achieved. While consideration of the three dimensions is a useful way to structure this analysis, it is critical to avoid silos and sectoral thinking when implementing the Sustainable Development Goals.

Sustainable and inclusive economic growth (Chapter 4) is key to implementing the social dimension of the 2030 Agenda (Chapter 3), and ensuring full and productive employment and decent work for all [8] would go a long way towards ending poverty [1] and reducing inequality within and across countries [10]. However, a major challenge under the 2030 Agenda is to ensure that economic growth is sustainable, with a minimized impact on the environment (Chapter 5). Healthy and resilient ecosystems, including freshwater resources, are vital for the social and economic dimensions of sustainable development (Chapters 3 and 4, respectively) (see figure).



Goal 6 interlinks the three dimensions of sustainable development.

The integration of Goal 6 across the 2030 Agenda is essential to meet all three dimensions of sustainable development. Two examples may be given: (a) balancing resource demands of the food–water–energy–ecosystems nexus;<sup>30</sup> and (b) the case of dams, including aspects of resilience. This Chapter highlights the way the linkages cut across the three dimensions of the 2030 Agenda. These are by no means the only examples of such integration and other examples have been given in Chapters 3–5.

## 6.1. Balancing resource demands of the food–water–energy–ecosystems nexus

Improving food, water and energy security [2, 6, 7] to meet the needs of growing populations and economies [1, 8] is vital to both the social and economic dimensions of the 2030 Agenda. The Goals are so strongly

interlinked that actions in one of these dimensions are likely to affect one or both of the other dimensions. Furthermore, actions taken to implement these Goals can result in an increase in land and water use and wastewater generation, with potentially detrimental impacts on ecosystems [15].<sup>31</sup> Goals on climate [13] and land [15] are also important drivers in this nexus. As the use of land has impacts upon both water quantity and quality and vice versa, land-use planning and water management should be integrated to enable the sharing of information between management authorities in the two sectors.

The food–water–energy–ecosystems nexus<sup>32</sup> provides a framework to analyse the strong links between achieving food, water and energy security and the direct and immediate impacts these activities can have on ecosystems, aiming towards an efficient and fair balance of sector needs.<sup>33</sup> Here, linkages between sectors, their underlying resources such

<sup>30</sup> The term “nexus” refers to connections or interdependencies between the different elements and is thus inherently about specific linkages. The example given is one of many nexus that can be used to manage the different linkages across the 2030 Agenda.

<sup>31</sup> Many of the linkages are described in Chapters 3–5.

<sup>32</sup> See Nexus: Water, Energy and Food Security Resource Platform, <http://www.water-energy-food.org/start/>.

<sup>33</sup> A tested approach to assessing the nexus – the intersectoral impacts, trade-offs and benefits – in a river basin context together with examples is described in: Economic Commission for Europe, 2015: Reconciling Resource Uses in Transboundary Basins: Assessment of the Water–Food–Energy–Ecosystems Nexus. New York and Geneva, United Nations, <http://www.unece.org/index.php?id=41427>.



Flooding after hurricane Tomas in Haiti. Photo: UNICEF/Marco Dormino.

as soil, water and waste, across spatial scales and, in the context of climate change, between short-term and long-term planning, need to be considered.<sup>34</sup>

Implementing IWRM [6.5] supports the nexus approach in practice by involving the different sectors in planning and decision-making.<sup>35</sup> This ensures fair, efficient and sustainable allocation of water resources across sectors, including ecosystems, thus minimizing potential conflicts. Integrated Water Resources Management also promotes the participation of different stakeholders and interests, hence there are synergies with efforts to ensure responsive, inclusive, participatory and representative decision-making [16.7] (see Box 5). As the effects of measures propagate across shared basins, implementing IWRM, including through transboundary cooperation, enhances coordinated action.

### **Box 5. River contracts for sustainable development – the case of the Serchio River, Italy**

A river contract is a participatory management tool [6.5, 16.7] for the protection of rivers, restoration of the environment and better planning of land use [6.4, 6.6, 11.3]. It involves the active participation of basin, regional, provincial and municipal authorities as well as other stakeholders. Projects under these contracts support the decoupling of economic growth from environmental degradation [8.4]. The Serchio River contract involved more than 270 stakeholders in its planning phase and has a number of notable achievements, such as redefining rules for urban development in harmony with the river [11.6], boosting sustainable tourism [8.9] and empowering farmers as “guardians of the river” [2.4, 6.6, 15.1].

Source: United Nations World Water Assessment Programme, 2015: *Facing the Challenges. Case Studies and Indicators*. Paris, UNESCO.

<sup>34</sup> The United Nations University Institute for Integrated Management of Material Fluxes and of Resources (UNU-FLORES) acts at the forefront of initiatives promoting a nexus approach to the sustainable management of water, soil and waste. More in-depth knowledge can be found in UNU-FLORES, 2014: *Advancing a Nexus Approach to the Sustainable Management of Water, Soil and Waste: Draft White Book. Reference material for the International Kick-off Workshop in Dresden, Germany, 11–12 November 2013*.

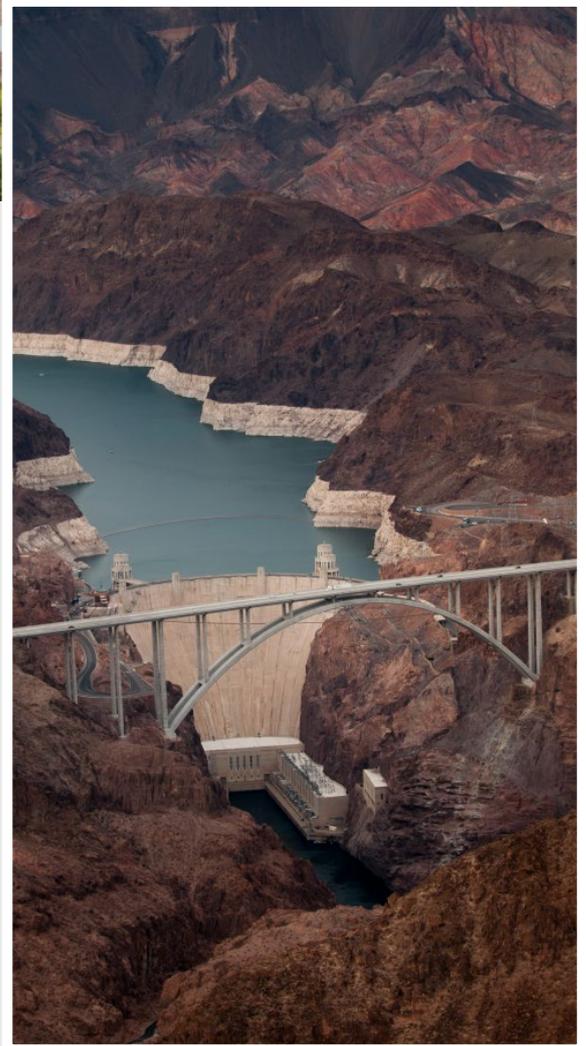
<sup>35</sup> Similar integrated management approaches exist with roots in other sectors, such as integrated land management and integrated energy planning, which complement IWRM.



## 6.2. Dams across the three dimensions: Drivers and impacts

Dams are often needed to achieve the social and economic dimensions of sustainable development, ideally serving multiple purposes including water supply [6.1, 6.4] for agriculture [2], jobs and industry [8, 9] and domestic use [1, 3, 5, 11]; energy generation [7]; and flood and drought protection [11.5]. Effective reservoir operation for multiple purposes requires the involvement of all sectors and stakeholders, which is supported by IWRM [6.5].

However, the construction and operation of dams can lead to potential conflict with ecosystems [6.6, 15], different sectors of water use, and between communities [11]. Further, impacts are often felt in downstream areas and countries. Conflicts can be reduced by ensuring public access to information [16.10] and involving all stakeholders in design, planning and operation [16.7] through the implementation of IWRM, including at the transboundary level [6.5]. Technical measures are also needed, such as adequate reservoir operation to ensure sufficient environmental flows to maintain ecosystems and fish migration [15.5].



Hoover Dam. Photo: William Warby, Creative Commons Attribution



International meeting. Photo: UNISDR, Creative Commons Attribution.

## 7. Conclusions: Implications for implementation of the 2030 Agenda

### 7.1. Harnessing synergies

Improvements in access to safe drinking water supply, sanitation and hygiene (WASH) services [6.1, 6.2, 1.4, 11.1] in homes, healthcare facilities, schools and workplaces, and improving ambient water quality [6.3] are essential for reducing multidimensional poverty [1.1, 1.2], improving nutrition [2.2], improving health [3.2, 3.3] and education [4.1–4.3], achieving gender equality [4.5, 5.1, 5.2, 5.5, 10.2, 10.3], improving work opportunities [8.5] and overcoming inequalities [10.1]. These improvements are also required to meet international commitments to the human right to water and sanitation.

There are strong synergies between a number of targets that call for reductions in water pollution [6.3, 6.6], including in the areas of health [3.9], decoupling economic growth from environmental degradation [8.4], cities [11.6], sustainable consumption and production [12.4, 12.5], and marine [14.1] and terrestrial [15.1] ecosystems.<sup>36</sup>

<sup>36</sup> UNESCO International Hydrological Programme, 2015: *International Initiative on Water Quality*. Paris, UNESCO, <http://unesdoc.unesco.org/images/0024/002436/243651e.pdf>.



*One of India's "barefoot" solar engineers. Photo: Abbie Trayler-Smith / Panos Pictures / Department for International Development, Creative Commons Attribution.*

There are also strong synergies between the targets on wastewater reuse [6.3] and sustainable and efficient water use [6.4] and meeting the Goals on food [2] and energy [7], and work and productivity [8]. Adopting an Integrated Water Resources Management (IWRM) approach [6.5] is essential to ensure that synergies are harnessed at all levels and across all sectors, including at the transboundary level.

Achieving sustainable economic growth and meeting the water Goal and its targets are inextricably linked. The Goals on energy [7], economic growth [8], infrastructure and industrialization [9], cities and communities [11], and consumption and production [12] all depend on the availability of water on a sustainable basis. Sustainable and efficient use of water resources [6.4] is fundamental to avoid overexploitation of surface and groundwater.

To ensure that the 2030 Agenda has long-term benefits, planning and implementation of all the Goals must take account of resilience. Most of the impacts of climate change [13] are felt through the water cycle, so

the linkages are critical. Emphasis will be needed during implementation on climate adaptation in relation to the water targets, as well reducing risks to other Goals from water-related disasters (for example, floods, droughts, tropical cyclones and increased variability) [11.5]. Strategies for achieving targets linked with Goal 6 thus need to take related predictions, uncertainties and vulnerabilities into account.

Targets under the Goal on governance [16] and implementing IWRM at all levels [6.5] are mutually reinforcing. Both call for effective, accountable and transparent institutions at all levels [16.6], inclusive decision-making at all levels [16.7], access to information [16.10], as well as well-defined procedures for consultation and provisions on conflict resolution in transboundary agreements [16.3].

Harnessing synergies is critical to meeting the 2030 Agenda, particularly given the ambitious nature of the Sustainable Development Goal targets and the aim to "leave no one behind".



## 7.2. Overcoming potential conflicts

The majority of linkages with Goal 6 are positive, as all the other Goals depend to a greater or lesser extent on Goal 6. However, some targets within the other Goals could be detrimental to Goal 6 and any potential conflicts must be recognized and managed. Moreover, many measures to achieve progress towards the 2030 Agenda have impacts across national borders, for which transboundary cooperation [6.5] is essential to capture synergies and manage potential conflicts.<sup>37</sup>

There is potential conflict in meeting the development aspects of some targets under the Goals on energy, work, industry and cities [7, 8, 9, 11] and Goal 6, particularly targets on water quality [6.3], sustainable water use [6.4] and ecosystems [6.6]. This will require appropriate infrastructure design and technical solutions that take account of other targets so optimum benefits can be secured. Optimized design and operation of multi-purpose infrastructure, for example, for food [2] and energy [7], must be undertaken so that Goal 6 targets are not compromised.

Increasing access to basic services for poverty reduction [1], food [2] and energy [7], as well as Goal 6 targets for WASH [6.1, 6.2] can have negative impacts on water quality [6.3], water availability [6.4] and ecosystems [6.6] if care is not taken to reduce pollution, use water sustainably and maintain adequate environmental flows.

Implementing an IWRM approach [6.5] is a key tool for addressing potential conflicts with other Goals. This approach helps to cut across sectoral jurisdictions, so that policies, plans, laws, regulations, information and participation are all used to help resolve the trade-offs between water use and environmental sustainability. This ensures both infrastructure and institutional arrangements for all Goals improve human well-being without depleting natural resources or impeding ecosystem function.

## 7.3. Integration and partnerships

The three dimensions of sustainable development are inseparable. This demands collaboration across sectors, establishing partnerships of different interest groups and across different institutions responsible for implementing the 2030 Agenda. This will be a significant factor in successfully implementing the 2030 Agenda. No Goal-oriented policy or sector plan, at any administrative level – national, municipal, district or local – can be pursued in isolation. The 2030 Agenda provides a common development vision that should be applied “at all levels” so that the policy environment is consistent and supported by all. At all levels also means the participation of all relevant stakeholders to ensure broad commitment, address local concerns and utilize local knowledge. This requires more effective dialogue between technical and political levels.

<sup>37</sup> See UNESCO International Hydrological Programme, 2016: *Transboundary Water Cooperation and the Sustainable Development Goals*. Paris, UNESCO, <http://unesdoc.unesco.org/images/0024/002440/244045e.pdf>



*Striking balance, Indonesia. Photo: Javi Sanchez de la Viña, Creative Commons Attribution.*

The need for integration is broadly accepted in principle but not easy in practice. Traditionally, economic development has often taken place within a linear institutional structure with different ministries and other actors having narrowly defined responsibilities, often sidelining environmental or social issues. The 2030 Agenda recognizes the increased complexity of sustainable development and the need for a more integrated approach to capitalize on interlinkages between the Sustainable Development Goals.

This Analytical Brief has outlined the way Goal 6 interlinks with the complete 2030 Agenda. It is important for those engaged in implementing all the Sustainable Development Goals to appreciate such interlinkages and the need for coordination and cooperation for planning and implementation. Meeting the 2030 Agenda will require policy changes and institutional organization that take account of the linkages discussed in this Brief.

The manner in which linkages interact will vary by region, from country to country and even from river basin to river basin, so it is proposed that regional organizations and governments carry out their own analysis to identify key interlinkages as a basis for implementation of the 2030 Agenda.<sup>38</sup> Further, governments will need to establish coordination mechanisms across institutional structures with differing mandates so that the linkages between Sustainable Development Goals and targets are discussed, synergies harnessed and conflicts

managed. For example, this could take the form of intersectoral partnerships, interministerial coordinating committees, memorandums of understanding to promote coordination, and joint monitoring and evaluation processes. With the emphasis in the 2030 Agenda of "leaving no one behind", national human rights institutions may also offer useful cross-sectoral cooperation mechanisms.

This Analytical Brief has provided a first step in identifying the target-level interlinkages relevant to Goal 6 across the 2030 Agenda. As such, it is beyond this publication's scope to provide specific policy recommendations. A next step would be to prepare one or more Policy Briefs, building on discussions on this Brief with Member States and other stakeholders, as well as further regional and national assessments. These would further support governments and others to adopt an integrated and partnership approach for the implementation of the 2030 Agenda.

<sup>38</sup> For example, the regional analysis for Asia–Pacific – Economic and Social Commission for Asia and the Pacific: "Analytical Framework for Integration of the Water and Sanitation SDGs and Targets Using Systems Thinking Approach" (forthcoming).

## Annex 1: Summary of interlinkages between targets related to Sustainable Development Goal 6

The full text of Goal 6 is provided in Box 1 of the Introduction. This Annex provides a summary table of relevant linkages between Goal 6 and other water- and sanitation-related targets.

The symbols used in the table below follow two main categories of linkages described in section 2.2 of this Analytical Brief and summarized below.

 **Main synergies:** Links that are likely to be mainly positive in that they may be mutually reinforcing or have positive interdependencies. Understanding linkages enables the full exploitation of synergies, and integrated planning and management can support advocacy and decision-making, reduce investment costs and facilitate implementation.

 **Potential conflict:** Links that usually still have positive aspects, but there exists a potential conflict in one or both directions unless policies, plans and implementation address the constraints and trade-offs. Understanding linkages enables trade-off optimization, and integrated planning and management can allow for the achievement of potentially conflicting targets.

Note that even if there is a synergy between targets in one direction, there may be a potential conflict in the other direction. For example, improving water quality [6.3] supports the reduction of poverty [1.1, 1.2, 1.4], but infrastructure development aimed at reducing poverty may have a negative impact on water quality if proper provisions are not set in place to maintain or improve it. This Brief addresses links in both directions, that is, it considers what impacts Goal 6 targets have on other targets and what impacts other targets have on those of Goal 6 (see Table 4). If there is potential conflict in either direction, the “see-saw” symbol is used, even though there may be positive aspects of the linkage.

The linkages in Table 4 are all discussed in the main body of this Brief and are therefore not explained here; the extracted wording of the targets only includes the aspects of each target that are relevant for the linkages with Goal 6.

Note that target 11.5 on reducing the social and economic impact of disasters, including water-related disasters, with a focus on the poor and vulnerable has a number of synergies across most of the Sustainable Development Goal targets, particularly those related to resilience. The main synergies include 1.5, 2.4, 9.1, 11.1, 13.1–13.3, 14.2 and 15.9.

Targets	6.1	6.2	6.3	6.4	6.5	6.6
<b>1.1, 1.2, 1.4</b> ... eradicate extreme <b>poverty</b> ... / ... reduce ... <b>poverty</b> in all its dimensions ... / ... ensure that all ... have ... <b>access to basic services</b> , ownership and control over land and other forms of property ... natural resources, appropriate new technology ...						
<b>1.5</b> ... build the <b>resilience of the poor</b> and those in vulnerable situations and reduce their exposure and vulnerability to ... shocks and disasters						
<b>2.1</b> ... <b>end hunger</b> and ensure access by all ... to safe, nutritious and sufficient <b>food</b> all year round						
<b>2.2</b> ... end all forms of <b>malnutrition</b> ...						
<b>2.3</b> ... double the <b>agricultural productivity</b> and incomes of small-scale ... producers ...						
<b>2.4</b> ... ensure <b>sustainable food production</b> systems and implement <b>resilient agricultural practices</b> ...						
<b>3.1, 3.2, 3.8</b> ... reduce ... <b>maternal mortality</b> ... / ... end preventable <b>deaths of newborns and children under 5 years of age</b> ... / Achieve ... access to quality essential <b>health-care services</b> ...						
<b>3.3, 3.9</b> ... combat ... <b>water-borne diseases</b> and other communicable diseases / ... reduce ... deaths and illnesses from ... water and soil pollution ...						



Targets	6.1	6.2	6.3	6.4	6.5	6.6
11.5 ... reduce the number of deaths and the number of people affected ... decrease the direct economic losses ... caused by disasters, including <b>water-related disasters</b> , with a focus on protecting the poor and ... vulnerable ...						
11.6 ... reduce ... <b>per capita environmental impact of cities</b> ... paying special attention to air quality and municipal and other <b>waste management</b>						
11.7 ... provide universal access to ... <b>green and public spaces</b> ...						
12.1, 12.2, 12.3 Implement ... <b>Sustainable Consumption and Production</b> ... / ... achieve the sustainable management and efficient use of natural resources / ... halve ... global <b>food waste</b> at the retail and consumer levels and ... production and supply chains ...						
12.4, 12.5 ... achieve the <b>environmentally sound management of chemicals</b> and all wastes throughout their life cycle ... reduce their release to air, water and soil ... / ... reduce <b>waste generation</b> through prevention, reduction, recycling and reuse						
13.1 Strengthen resilience and adaptive capacity to <b>climate-related hazards and natural disasters</b> ...						
13.2, 13.3 Integrate <b>climate change measures into national policies</b> , strategies and planning / Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning						
14.1 ... prevent and significantly reduce <b>marine pollution</b> of all kinds, in particular from land-based activities, including marine debris and nutrient pollution						
14.2 ... sustainably <b>manage and protect marine and coastal ecosystems</b> ... including by strengthening their <b>resilience</b> , and take action for their restoration ...						
15.1, 15.2, 15.3, 15.4, 15.5 ... ensure the conservation, restoration and sustainable use of ... <b>freshwater ecosystems and their services</b> ... / ... promote ... sustainable management of all types of forests ... increase afforestation and reforestation ... / ... restore degraded land and soil, including land affected by desertification, drought and floods ... / ... ensure the conservation of mountain ecosystems, including their biodiversity... / ... reduce the degradation of natural habitats ... loss of biodiversity ...						
15.9 ... integrate <b>ecosystem and biodiversity values into national and local planning</b> , development processes, poverty reduction strategies and accounts						
16.3, 16.7 Promote the <b>rule of law</b> at the national and international levels ... / Ensure <b>responsive, inclusive, participatory and representative decision-making</b> at all levels						
16.5, 16.6 Substantially <b>reduce corruption</b> and bribery in all their forms / Develop <b>effective, accountable and transparent institutions</b> at all levels						









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