Food and Agriculture
Organization of the
United Nations

6 CLEAN WATER AND SANITATION

Progress on Water-use Efficiency

Global baseline for SDG indicator 6.4.1

2018

UN WATER

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2018

FOOD AND AGRICULTURAL ORGANIZATION OF THE UNITED NATIONS
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Presenting the UN-Water Integrated Monitoring Initiative for SDG 6

Through the UN-Water Integrated Monitoring Initiative for Sustainable Development Goal (SDG) 6, the United Nations seeks to support countries in monitoring water- and sanitation-related issues within the framework of the 2030 Agenda for Sustainable Development, and in compiling country data to report on global progress towards SDG 6.

The Initiative brings together the United Nations organizations that are formally mandated to compile country data on the SDG 6 global indicators, who organize their work within three complementary initiatives:

- **WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP)**[1]

  Building on its 15 years of experience from Millennium Development Goals (MDG) monitoring, the JMP looks after the drinking water, sanitation and hygiene aspects of SDG 6 (targets 6.1 and 6.2).

- **Integrated Monitoring of Water and Sanitation-Related SDG Targets (GEMI)**[2]

  GEMI was established in 2014 to harmonize and expand existing monitoring efforts focused on water, wastewater and ecosystem resources (targets 6.3 to 6.6).

- **UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS)**[3]

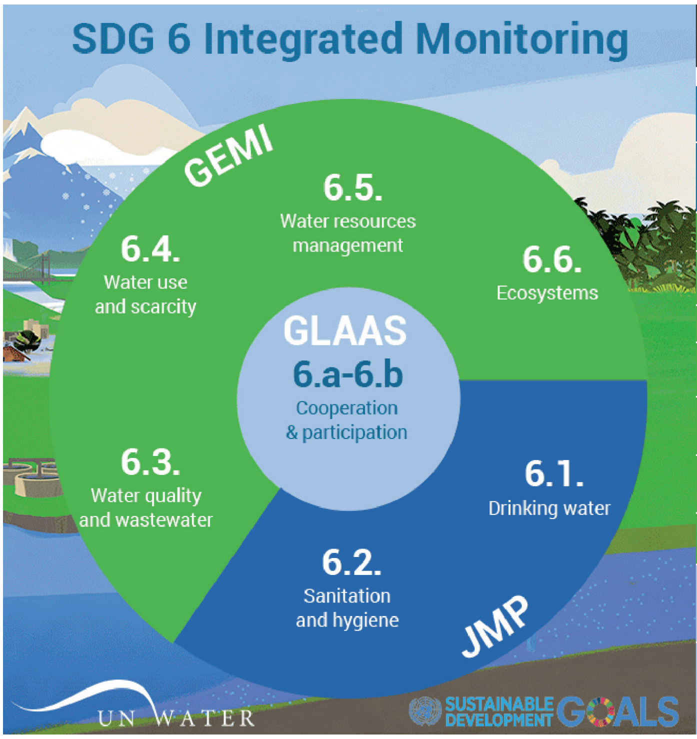
  The means of implementing SDG 6 (targets 6.a and 6.b) fall under the remit of GLAAS, which monitors the inputs and the enabling environment required to sustain and develop water and sanitation systems and services.

The objectives of the Integrated Monitoring Initiative are to:

- Develop methodologies and tools to monitor SDG 6 global indicators
- Raise awareness at the national and global levels about SDG 6 monitoring
- Enhance technical and institutional country capacity for monitoring
- Compile country data and report on global progress towards SDG 6

The joint effort around SDG 6 is especially important in terms of the institutional aspects of monitoring, including the integration of data collection and analysis across sectors, regions and administrative levels.

To learn more about water and sanitation in the 2030 Agenda for Sustainable Development, and the Integrated Monitoring Initiative for SDG 6, visit our website: www.sdg6monitoring.org



INDICATORS	CUSTODIANS
6.1.1 Proportion of population using safely managed drinking water services	WHO, UNICEF
6.2.1 Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water	WHO, UNICEF
6.3.1 Proportion of wastewater safely treated	WHO, UN-Habitat, UNSD
6.3.2 Proportion of bodies of water with good ambient water quality	UN Environment
6.4.1 Change in water-use efficiency over time	FAO
6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources	FAO
6.5.1 Degree of integrated water resources management implementation (0-100)	UN Environment
6.5.2 Proportion of transboundary basin area with an operational arrangement for water cooperation	UNESCO, UNECE
6.6.1 Change in the extent of water-related ecosystems over time	UN Environment, Ramsar
6.a.1 Amount of water- and sanitation-related official development assistance that is part of a government-coordinated spending plan	WHO, UN Environment, OECD
6.b.1 Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management	WHO, UN Environment, OECD

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FOREWORD

Water is the lifeblood of ecosystems, vital to human health and well-being and a precondition for economic prosperity. That is why it is at the very core of the 2030 Agenda for Sustainable Development. Sustainable Development Goal 6 (SDG 6), the availability and sustainable management of water and sanitation for all, has strong links to all of the other SDGs.

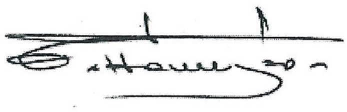
In this series of progress reports under the UN-Water Integrated Monitoring Initiative for SDG 6, we evaluate progress towards this vital goal. The United Nations organizations are working together to help countries monitor water and sanitation across sectors and compile data so that we can report on global progress.

SDG 6 expands the Millennium Development Goal focus on drinking water and basic sanitation to include the management of water and wastewater and ecosystems, across boundaries of all kinds. Bringing these aspects together is an essential first step towards breaking down sector fragmentation and enabling coherent and sustainable management, and hence towards a future where water use is sustainable.

This report is part of a series that track progress towards the various targets set out in SDG 6 using the SDG global indicators. The reports are based on country data, compiled and verified by the responsible United Nations organizations, and sometimes complemented by data from other sources. The main beneficiaries of better data are countries. The 2030 Agenda specifies that global follow-up and review "will be primarily based on national official data sources", so we sorely need stronger national statistical systems. This will involve developing technical and institutional capacity and infrastructure for more effective monitoring.

To review overall progress towards SDG 6 and identify interlinkages and ways to accelerate progress, UN-Water produced the SDG 6 Synthesis Report 2018 on Water and Sanitation. It concluded that the world is not on track to achieve SDG 6 by 2030. This finding was discussed by Member States during the High-level Political Forum on Sustainable Development (HLPF) in July 2018. Delegates sounded the alarm about declining official development aid to the water sector and stressed the need for finance, high-level political support, leadership and enhanced collaboration within and across countries if SDG 6 and its targets are to be met.

To achieve SDG 6, we need to monitor and report progress. This will help decision makers identify and prioritize what, when and where interventions are needed to improve implementation. Information on progress is also essential to ensure accountability and generate political, public and private sector support for investment. The UN-Water Integrated Monitoring Initiative for SDG 6 is an essential element of the United Nations' determination to ensure the availability and sustainable management of water and sanitation for all by 2030.



Gilbert F. Houngbo
UN-Water Chair and President of the International Fund for Agricultural Development

FOREWORD

It is my pleasure to present this report, which sets the baseline for monitoring indicator 6.4.1 – Change in water-use efficiency over time – in the context of the Sustainable Development Goals (SDGs) global report.

The 2030 Agenda for Sustainable Development stresses the importance of “leaving no one behind”. This can only by achieved if the interlinkages between its 17 SDGs are adequately understood and appropriate actions are undertaken to bring them together for the benefit of all, including addressing socioeconomic and gender inequalities.

Within this framework, SDG target 6.4 is particularly relevant as it focuses on ensuring that water resources are sufficient for all users, and that such availability is the outcome of a deliberate management of these resources. The Food and Agriculture Organization (FAO), in coordination with other agencies through UN-Water, is committed to supporting countries in implementing this target, through direct actions in agricultural and environmental fields and by supporting the assessment of progress towards achieving it.

To this end, FAO has joined the Integrated Monitoring Initiative, which has gathered experiences and resources aimed at ensuring a coherent monitoring framework for water and sanitation by 2030. Such a framework will help countries achieve progress through well-informed decision-making on water, based on harmonized, comprehensive, timely and accurate information.

As few countries have the natural and financial resources to continue increasing water supplies, the alternative is to make better use of available resources. This report addresses the importance of increasing water-use efficiency, which is used as a measure of the value of water to the economy and society in units of value added per cubic metre of water used.

The indicator on water-use efficiency addresses the economic component of target 6.4. It is defined as the value added per volume of water withdrawn in all water-using sectors. The global average for water-use efficiency is USD 15/m^3, but values range from as little as USD 2/m^3 for countries whose economies largely depend on agriculture, to over USD 1,000/m^3 in highly industrialized, service-based economies. As this is a new indicator, adequate time series data are not available to analyse trends. As Member States advance in using the efficiency indicator, additional indicators detailing water-use efficiency levels in various sectors would help support decision makers.

FAO, predominantly through its AQUASTAT database, remains committed to improving the quality and quantity of data produced and analysed, in close partnership with the relevant authorities of our Member States. This report is an important step towards a more widespread and operational knowledge of the status of water resources and the sustainability of their use.

René Castro-Salazar

Assistant Director-General
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EXECUTIVE SUMMARY

Access to safe water and sanitation and sound management of freshwater ecosystems are at the very core of sustainable development. This is the aim of Sustainable Development Goal 6 (SDG 6), which further enhances Millennium Development Goal 7 (MDG 7) by including approaches to water management, such as environmental flow requirements, international cooperation, capacity-building and stakeholder participation.

SDG target 6.4 addresses water-use efficiency and water stress, aiming by 2030, to "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".

Two indicators were developed to track progress for this target:

6.4.1 Change in water-use efficiency over time

6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources

For each indicator, monitoring methodologies and other support tools were developed and tested in five pilot countries, namely, Jordan, the Netherlands, Peru, Senegal and Uganda. These were chosen based on the countries' expression of interest and to ensure a good representation of global regions.

This report describes the methodology testing process for indicator 6.4.1 in the five pilot countries and presents the global baseline period (2015–2018) for this indicator.

Methodology testing

Indicator 6.4.1 had not previously been monitored worldwide as part of the MDGs and was newly introduced into the SDG process. As such, an entirely new methodology had to be built to monitor the indicator. In addition, since no previous data existed for the indicator, new computations and interpretation of gathered data were required. The indicator has been defined as the value added per unit of water used, expressed in USD/m^3, over time of a given major economic sector: agriculture (A), industry (M, from MIMEC, as explained in section 2.1) and services (S).

It is calculated as the sum of water-use efficiency (WUE) of each of these three sectors (A_{we}, M_{we}, S_{we}), weighted according to the proportion of water used by each sector over the total uses (P_A, P_M, P_S), using the formula:

$$WUE = A_{we} \times P_A + M_{we} \times P_M + S_{we} \times P_S$$

Though the indicator had not previously been monitored, statistical data were generally available and updated from governmental sources for the variables included in the methodology. Data were taken from international sources, such as the World Bank or United Nations Food and Agricultural Organization (FAO) in those cases where information was lacking.

To implement and test the methodology, each of the pilot countries established working groups with relevant stakeholders to gather the required expert knowledge. A national institution was appointed in each country to lead the groups in the process of compiling the indicator, coordinating the review of all the national, subnational and basin data sources, such as maps, reports, yearbooks and articles. This collection focused on the most recent data available, without excluding any potential sources of information. Partial data (with respect to time or area) were also collected, such as data produced by local projects. Meetings with all institutions involved were held throughout 2016 to track progress, share findings and endorse the results obtained.

A United Nations organization was designated to coordinate activities, acting as a custodian agency. In the case of indicator 6.4.1, FAO provided technical and/or logistical support to the countries that requested it.

Even though the data-collection process was feasible for all pilot countries, certain problems were encountered that should be considered for future reference, which most notably include handling economic data, data inconsistencies among various sources, weak monitoring by country institutions, varied reference years, different parameters when defining variables, outdated data, weak reporting into international databases and potential double counting data. These problems are described in detail in the following text.

Global data

Water-use efficiency is a little over USD 15/m^3 worldwide, though there are significant differences among countries and regions. Lowest regional water-use efficiencies are USD 2/m^3 in Central and Southern Asia, around USD 7/m^3 in sub-Saharan Africa and almost USD 8/m^3 in Northern Africa and Western Asia. The highest values are USD 50/m^3 in Oceania and USD 38/m^3 in Europe and Northern America. Average values are found in Eastern and South-Eastern Asia (around USD 15/m^3) and Latin America and the Caribbean (about USD 13/m^3).

Deeper analysis shows that 75 countries have efficiencies of less than USD 10/m^3 (of those, 10 countries are below USD 1/m^3). Fifty-six countries have water-use efficiencies between USD 10/m^3 and USD 40/m^3, 17 countries between USD 40/m^3 and USD 80/m^3 and 20 countries above USD 80/m^3.

This first assessment at the global and regional levels was based on nationally and internationally available data sets suggested by the methodology. Figures were available for 168 countries. The FAO AQUASTAT database was used to provide data on water use for agriculture, industry (MIMEC) and services. Economic data on gross value added in each of the three major economic sectors (agriculture, industry and services), were acquired from national statistical departments or other relevant national government agencies and international sources, such as the World Bank, United Nations Statistics Division (UNSD) and Organisation for Economic Co-operation and Development (OECD). These data sources follow the set of concepts, definitions, classifications and accounting rules recommended in the System of National Accounts (SNA). This allows countries' data and economic performances to be compared internationally.

KEY MESSAGES AND RECOMMENDATIONS

To date, the Inter-agency Expert Group on SDG indicators (IAEG-SDG) has not defined a framework for data collection on global indicators to provide guidance to Member States and custodian agencies. At present, the only clear indication is that countries should retain ownership of their data and of the monitoring process in general. The IAEG-SDG is expected to agree on a standardized reporting framework at its next meeting in autumn 2018. The establishment of such a framework will help to improve and rationalize significantly the data-collection process of the SDG global indicators, clarifying the roles and responsibilities of both national institutions and custodian agencies.

To implement the SDG methodologies further, specific national data should be collected to compute the indicator, including greater disaggregation of data for major subsectors. Countries should therefore take ownership of the process and be mindful of the importance of quality, timely and reliable disaggregated data and their accessibility, to ensure well-informed decision-making. Custodian United Nations organizations should create awareness among countries on this matter and support them in this process. Organizations could launch a communication campaign to help achieve this.

Countries should have a good understanding of the methodology and an awareness of the issues to consider when using the indicator's formula (i.e. not to include water used for hydropower, currency conversion, gross domestic product (GDP) deflator, etc.). This is also a task for custodian United Nations organizations when explaining the methodology. An e-learning course is being developed to facilitate this understanding.

To enable data comparison, countries should provide the relevant metadata when submitting their data in order to record how the information was obtained and which reference years and units of measurement were used, etc. The AQUASTAT questionnaire offers guidance to countries on how to prepare metadata. Moreover, FAO provides a calculation sheet to help countries maintain consistency when compiling their data.

The pilot process has proven that monitoring a given indicator at the country level calls for the involvement of a varied number of stakeholders and institutions. The lead institution plays a key role in coordinating these stakeholders, who should have a clear understanding of their role in the process, the actions they should implement and the support available. Custodian United Nations organizations should focus their efforts on building strong relationships with lead agencies. Considering that this indicator includes economic variables, country teams should involve at least one economist in the process.

The two target 6.4 indicators are strongly linked and offer complementary information: indicator 6.4.1 is an economic indicator, assessing to what extent a country's economic growth is dependent on the use of water resources. Indicator 6.4.2 is an environmental indicator, tracking the physical availability of freshwater resources. Decision makers can combine the information from these indicators to understand how increasing water use affects the availability of water resources and to define a tipping-point target to aim at for decoupling water use from economic growth. Such information would enable countries to adequately follow-up on target 6.4.

Countries are advised to consider a reporting period of no more than two years, as this will allow them to identify early trends, helping them detect any potential issues.

1

Introduction and background

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In September 2015, Heads of State from all around the world adopted the 2030 Agenda for Sustainable Development, consisting of 17 Sustainable Development Goals (SDGs) with 169 targets. The 2030 Agenda includes a goal on water and sanitation (SDG 6) that sets out to "**ensure availability and sustainable management of water and sanitation for all**" (UNGA, 2015).

Access to safe water and sanitation and the sound management of freshwater ecosystems are at the very core of sustainable development. Not only does SDG 6 have strong linkages with all the other SDGs, it is essential to achieving them. In other words, the successful implementation of the 2030 Agenda will strongly depend on meeting SDG 6 (CBS, 2016).

SDG 6 expands the focus of Millennium Development Goal 7 (MDG 7) on drinking water and sanitation to the entire water cycle, including the management of water, wastewater and ecosystem resources (UNGA, 2015). It also addresses other approaches to water management such as international cooperation, capacity-building and stakeholder participation. This is reflected by the number of water-related targets set under SDG 6, which has increased from two as part of MDG 7 to eight (Box 1).

Target 6.4 deals with water scarcity, aiming to ensure there is sufficient water for the population, the economy and the environment by increasing water-use efficiency across socioeconomic sectors. Two indicators have been defined to track progress for this target:

> **6.4.1 Change in water-use efficiency over time**
>
> **6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources**

Indicator 6.4.1 had never been monitored or reported at the global level and therefore required the development of an entirely new methodology. Since there were no previous data for the indicator, new computation and the related interpretation had to be undertaken.

Indicator 6.4.1 is particularly important as it allows countries to assess to what extent their economic growth depends on the use of their water resources. An interesting feature of this indicator is that it adds a time dimension to the measurements, thus tracking the change in water-use efficiency. When the indicator's measurements are compared over time, the change in countries' water-use efficiency becomes visible, providing a complete picture of their situation. The water-use efficiency concept differs from the concept of water productivity as it does not consider the productivity of water used in a given activity as an input to a production. Instead, this indicator shows the level of decoupling of econo-

KEY FACTS

Indicator 6.4.1 allows countries to assess **how much their economic growth depends on water resources.**

SDG 6 **expands the focus** of Millennium Development Goal 7 (MDG 7) on **drinking water and sanitation to the entire water cycle.**

mic growth from water use – in other words, how much water use increases if the value added produced by economy increases by 10 per cent. It estimates to what extent a country's economic growth relies on the exploitation of its water resources. The indicator increases if the value added of a sector or the whole economy grows more than the relevant water use, thus indicating that water is not a limiting factor for economic growth.

The two indicators monitored as part of target 6.4 provide highly complementary data. Indicator 6.4.1 is an economic indicator assessing the relationship between a country's economic growth in relation to its use of water resources, whereas indicator 6.4.2 is an environmental indicator, tracking the physical availability of freshwater resources. Decision makers can combine the complementary information offered by the two indicators to understand how increasing water use affects the availability of water resources and consequently, can develop a tipping-point target to aim at for decoupling water use from economic growth. Such information would enable countries to adequately follow up on target 6.4.

Increasing water-use efficiency over time is strongly linked with sustainable food production (SDG 2), economic growth (SDG 8), infrastructure and industrialization (SDG 9), cities and human settlements (SDG 11), as well as consumption and production (SDG 12).

BOX 1

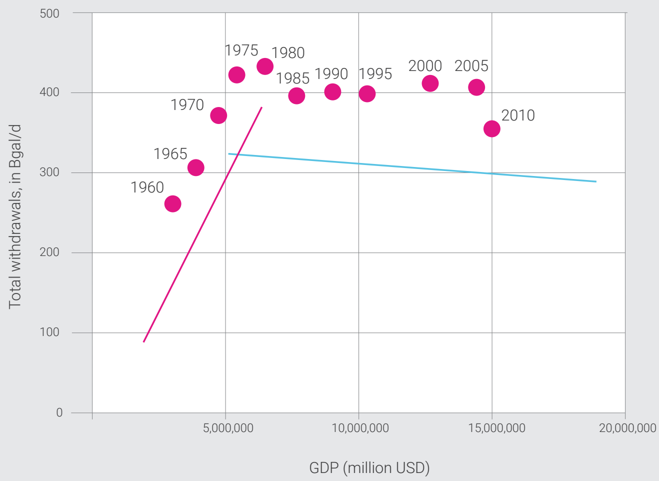
Water-related targets for MDG 7 and SDG 6

MDG 7 (2000–2015)	SDG 6 (2015–2030)
7.A Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources. 7.C Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.	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. 6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies. 6.b Support and strengthen the participation of local communities in improving water and sanitation management.

BOX 2

Example of decoupling economic growth from water use in the United States

As shown in the figure below, from 1960 to 1980 water abstractions in the United States grew at a similar rate as GDP. After 1980, withdrawals remained constant until 2005 and even decreased by 2010, despite population and economic growth in the period. Water productivity doubled between 1980 and 2005 (UNEP, 2015). As the pressure on water resources increases, efforts should be made to anticipate the tipping point.



Source: United States Geological Survey (USGS), 2018; World Bank, 2018

As acknowledged by the United Nations General Assembly (UNGA, 2015), quality, accessible, timely and reliable disaggregated data are needed to help measure SDG progress and ensure that no one is left behind in the process. Access to reliable data is also essential for well-informed decision-making.

To support the data-collection process, UN-Water launched the inter-agency Integrated Monitoring of Water and Sanitation-Related SDG Targets Initiative (GEMI), which aims to establish and manage a coherent monitoring framework for the implementation of SDG targets 6.3 to 6.6.[1] It was established in 2014 as a partnership between the Food and Agriculture Organization of the United Nations (FAO), UN Environment, the United Nations Human Settlements Programme (UN-Habitat), the United Nations Economic Commission for Europe (UNECE), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Children's Fund (UNICEF), the World Health Organization (WHO) and the World Meteorological Organization (WMO).

The first phase of GEMI implementation (2015–2018) has focused on developing monitoring methodologies and other support tools for the indicators related to the aforementioned targets. This has included pilot testing the monitoring methodologies in five countries: Jordan, the Netherlands, Peru, Senegal and Uganda. These were chosen based on the countries' expressions of interest and to ensure a good representation of global regions (sub-Saharan Africa, Europe, Latin America and the Caribbean and Northern Africa/the Middle East). Asia was originally represented by Bangladesh but the process experienced a significant slowdown due to the country's complex institutional environment.

In addition, GEMI has worked on establishing a global baseline for SDG targets 6.3 to 6.6.

This report describes the methodology testing process in the five pilot countries (section 2) and presents the global baseline 2015–2018 for indicator 6.4.1 (section 3).

[1] Indicators 6.1 and 6.2 are covered by the Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) developed by WHO and UNICEF.

2

Method and process

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2.1. Methodology

2.1.1. About the methodology developed by GEMI

Indicator 6.4.1 has been defined as the change in water-use efficiency over time (CWUE) which is formulated as the value added per unit of water used, expressed in USD/m^3, of a given major economic sector (showing the trend in water-use efficiency). Following International Standard Industrial Classification of all Economic Activities (ISIC) Rev. 4 codes (annex 4), sectors are considered as:

1. Agriculture (ISIC A, excluding forestry and fishing)
2. Mining and quarrying, manufacturing, electricity, gas, steam and air conditioning supply, and constructions – MIMEC (ISIC B, C, D and F)
3. All the service sectors (ISIC E and G to T)

Water-use efficiency (WUE) is calculated as the sum of these three sectors, weighted according to the proportion of water used by each sector over the total uses, following the formula:

$$WUE = A_{we} \times P_A + M_{we} \times P_M + S_{we} \times P_S$$

Where:

- WUE – Water-use efficiency [USD/m^3]
- A_{we} – irrigated agriculture water-use efficiency [USD/m^3]
- M_{we} – MIMEC water-use efficiency [USD/m^3]
- S_{we} – Services water-use efficiency [USD/m^3]
- P_A – Proportion of water used by the agricultural sector over the total use
- P_M – Proportion of water used by the MIMEC sector over the total use
- P_S – Proportion of water used by the service sector over the total use

KEY FACTS

The formula's most difficult component to obtain was the **proportion of agricultural gross value added from rain-fed agriculture** (C_r).

Stakeholder engagement is vital for implementing the monitoring methodology.

The involvement of different agencies in the process has helped to **strengthen institutional relationships** that will improve indicator monitoring and other aspects of water management at the national level.

It is important to note that only run-off water and groundwater (so-called blue water) should be considered when computing the indicator. This is particularly important regarding water use for the agricultural sector. For this reason, a specific parameter (C_r) has been introduced in the formula to extract the amount of agricultural production carried out in rainfed conditions. For the same reason, the value added of subsectoral productions that largely use non-abstracted water should not be included when calculating the sector's overall value added.

The computing of each sector is as follows:

A_{we}. Irrigated agriculture water-use efficiency (USD/m³). This is calculated as the agriculture value added per agriculture water use and is used as a proxy indicator for the agriculture sector's water-use efficiency. It is determined using the formula:

$$A_{we} = \frac{GVA_{al} + GVA_{aa} + [GVA_{ai} \times (1 - C_r)])}{V_a}$$

Where:

- GVA_{al} – Gross value added of the livestock subsector [USD]
- GVA_{aa} – Gross value added of the freshwater aquaculture subsector [USD]
- GVA_{ai} – Gross value added of the irrigated cultivations subsector [USD]

The gross value added of these three subsectors is calculated by adding all outputs and subtracting intermediate inputs, without deducting the depreciation of fabricated assets or depletion and degradation of natural resources.

Forestry and fishing values should not be included in the calculation, with the exception of forest tree nurseries and freshwater aquaculture. In terms of ISIC codes, the sectors to consider are:

01	Crop and animal production, hunting and related service activities
0210	Silviculture and other forestry activities
0322	Freshwater aquaculture

- V_a – Volume of water used by the agricultural sector [m³]

This is the annual quantity of self-supplied water used for irrigation, livestock (watering, sanitation, cleaning, etc.) and aquaculture purposes. It corresponds to the ISIC sections A [1–3], but excludes forestry and fishing. It includes water from renewable freshwater resources, as well as water from over-abstraction of renewable groundwater or abstraction of fossil groundwater, direct use of agricultural drainage water, (treated) wastewater and desalinated water.

- C_r – Proportion of agricultural gross value added produced by rainfed agriculture

If disaggregated data on value added of rainfed and irrigated agriculture are not reported in national accounts, it can be calculated from the proportion of irrigated land on the total cultivated land, using the formula:

$$C_r = \frac{1}{1 + \frac{A_i}{(1 - A_i) * 0.375}}$$

Where:

- A_i – Proportion of irrigated land on the total cultivated land, in decimals
- 0.375 – Generic default ratio between rainfed and irrigated yields

M_{we}. MIMEC water-use efficiency (USD/m³). This is the value added per unit of water used by mining and quarrying, manufacturing, electricity, gas, steam, air conditioning supply and constructions, calculated using the formula:

$$M_{we} = \frac{GVA_m}{V_m}$$

Where:

- GVA_m – Gross value added of MIMEC (including energy) [USD]

  It is computed by adding the value added of each of the four MIMEC sectors as defined in ISIC codes B, C, D and F.

- V_m – Volume of water used by MIMEC (including energy) [m³]

  This is the annual quantity of water withdrawn for industrial uses. It includes water from renewable freshwater resources, as well as over-abstraction of renewable groundwater or withdrawal of fossil groundwater and potential use of desalinated water or direct use of (treated) wastewater. This sector refers to self-supplied industries that are not connected to the public distribution network. It includes cooling for thermoelectric plants but excludes hydropower. However, water use for this sector should include evaporation losses from artificial lakes that are used for hydropower production. This sector corresponds to the ISIC sections B, C, D and F.

S_{we}. Services water-use efficiency (USD/m³). This is the service sector value added divided by the water supplied by the water collection, treatment and supply sector and is calculated using the formula:

$$S_{we} = \frac{GVA_s}{V_s}$$

Where:

- GVA_s – Gross value added of services from ISIC sections E and G to T [USD]

- V_s – Volume of water used by the service sector [m³]

  This is the annual quantity of water withdrawn primarily for the population's direct use. It includes water from renewable freshwater resources, as well as over-abstraction of renewable groundwater or withdrawal of fossil groundwater and the potential use of desalinated water or direct use of treated wastewater. It is usually computed as the total water withdrawn by the public distribution network. It can include the part of industries that is connected to the municipal distribution network and corresponds to ISIC section E.

P_A, P_M and **P_S** are calculated by dividing the volumes of water used by each sector (V_a, V_m and V_s) by the total water use.

As this indicator is directly linked to economic growth, data should be collected annually, even in cases where no substantial changes in water use are foreseen on a yearly basis. In any case, particularly in countries with high water stress and strong economic and demographic growth, a reporting period of no more than two years should be considered, as this will enable countries to identify early trends and thus detect any potential issues.

Finally, the change in water-use efficiency (CWUE) is then computed as the ratio of water-use efficiency (WUE) in time t minus water-use efficiency in time t-1, divided by water-use efficiency in time t-1 and multiplied by 100, using the formula:

$$CWUE = \frac{WUE_t - WUE_{t-1}}{WUE_{t-1}} * 100$$

2.1.2. Applying and testing the methodology in the five pilot countries

As already mentioned, this indicator had never been monitored or reported at a global level and required the development of an entirely new methodology. As such, no previous data existed for the indicator, meaning that computation and the resulting data interpretation needed to be newly undertaken.

Despite having never been monitored, statistical data were generally available from governmental sources for the variables included in the methodology. In the cases where data were missing (for example, data on cultivated land in Senegal and Uganda or water use by MIMEC, livestock and rural supply in Uganda), these were obtained from international sources, such as the World Bank or the FAO AQUASTAT database. It was also difficult to obtain up-to-date data for irrigated areas in Peru, since information was only available from the 2012 agricultural census.

Countries mostly consolidated and published data at the national level, except for the Netherlands, which provides figures for value added at the regional and basin level, and Peru, which has numbers on water use for its three major basins (Pacific, Amazon and Titicaca).

Though data were mostly available, certain problems were encountered that must be considered when implementing the methodology, as described in section 2.2.2. To implement and test the methodology, each of the pilot countries established working groups with relevant stakeholders to share findings and validate the data and analysis conducted (see sections 2.2.1. and 2.3.).

BOX 3

Methodological development of indicator 6.4.1

The development of the methodology to compute this indicator has been a complex process that included several months of discussions among experts, with various changes, amendments and even turns along the way.

To provide an answer to the indications expressed in the text of target 6.4 on increasing water-use efficiency across all sectors, the discussion started with trying to define water-use efficiency in the various sectors, including agriculture, irrigation, industry, energy and municipal.

At first, it appeared that different sectors require their own definition of water-use efficiency, including different measurement units. For example, water-use efficiency in agriculture could be measured as value per cubic metre consumed, but also as nutritional value per cubic meter, while the volume could be measured either as water consumed or water abstracted.

Similarly, water-use efficiency in the energy sector could be based on the quantity of energy produced in MW, again per water consumed or abstracted. On another hand, water-use efficiency in irrigation is usually measured in cubic metres of water delivered to plants over cubic metres of water abstracted, while at the municipal level a possible parameter would be the number of households per volume of water used.

While each of these possible parameters has its own advantages and disadvantages, it became clear after some discussion that merging some or all of them would have resulted in a hybrid indicator, or more aptly, an index, which would have been difficult to interpret and not in line with the SDG monitoring framework requirements, which stipulates indicators rather than indexes.

To reduce this complexity, monetary value was chosen as the metric, in terms of the gross value added of production over the volume of water used, as it is understandable, universal and data are relatively available.

The volume of water used by each sector was defined as the water abstracted, for two main reasons: (i) using water consumption would have extremely reduced the water allocated to industries and services, not considering the high impact that these users have on the availability of water resources; and (ii) to align the indicator to the definition of System of Environmental-Economic Accounting for Water (SEEA-Water), which defines water use as the water abstracted by a given economic sector or received from another sector.

This definition is also the reason for considering reused treated water, drainage water and desalinated water, in addition to freshwater directly abstracted from its source.

Finally, a parameter was introduced in the indicator's formula to separate the irrigated agriculture value from the rainfed agriculture value in order to be able to assess the economic pressure on the renewable water resources. Including the water directly used from precipitation in the indicator would have largely increased the quantities, making them more difficult to estimate, which in turn, would have provided decision makers with misleading information on the potential of their water sources. Thus, the indicator focusses on "blue water" rather than "green water".

2.1.3. The monitoring ladder

The monitoring ladder for indicator 6.4.1 is described as follows:

1. At the first level, the indicator can be populated with estimations based on national data. If needed, data can be retrieved from international databases, both for water use and for economic data corresponding to different sectors. The agricultural rainfed production factor C_r can be calculated following the default coefficient provided in the methodology (section 2.1.2.).

2. At the next level, the indicator can be populated with nationally produced data. Again, the agricultural rainfed production factor C_r can be calculated following the default coefficient provided in the methodology.

3. For more advanced levels, the nationally produced data have a high accuracy (e.g. geo-referenced and based on metered volumes). The agricultural rainfed production factor C_r is calculated according to national studies.

The pilot countries had statistical data produced at the national level available for most of the variables defined for indicator 6.4.1 and are therefore considered at least level 2 of the ladder (Figure 1).

Senegal and Uganda faced some difficulties when collecting in-country data, which is why they are placed closer to level 1. Some of the data needed were missing and had to be gathered from international sources. For example, figures for cultivated land, in both Senegal and Uganda, and water use by MIMEC, livestock and rural supply in Uganda were retrieved either from the World Bank or FAO. Data for the C_r value were estimated using the formula provided by the methodology.

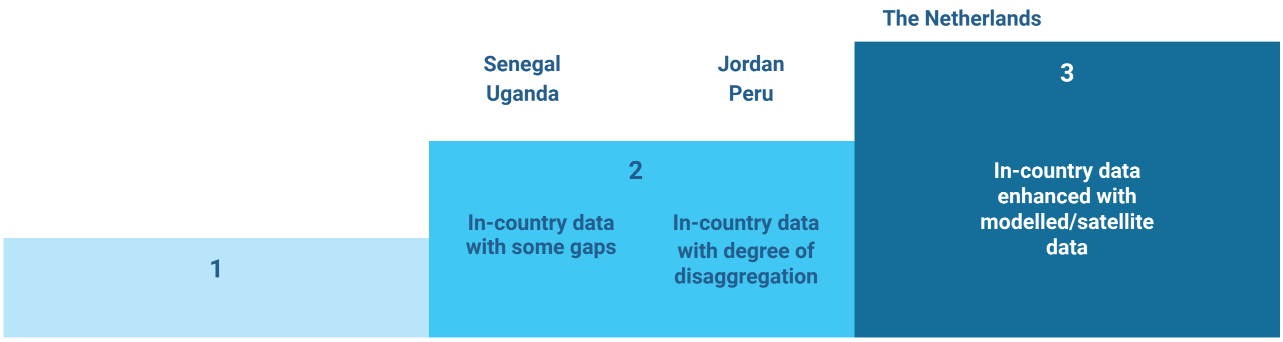
Jordan and Peru had nationally produced statistical data for most of the variables but still had to estimate some figures. In Jordan, estimates were needed for water used by MIMEC, whereas in Peru, the C_r value was estimated using the provided methodology formula and by inputting A_i data from 2012. However, since Jordan calculated the C_r value using its statistical data from its agricultural census and Peru was able to provide data at the basin level for water use, both countries have been placed closer to level 3 on the ladder.

The Netherlands can be placed at level 3 as it was able to provide more accurate data, fully disaggregated at the subnational and basin level for the economic variables. The country can also complement statistical data with modelled data to estimate:

- water withdrawals per sector and per source (surface or groundwater) at the national level
- the proportion of rainfed agriculture at the national level
- the total agricultural gross value added calculated per individual crop species

However, the Netherland's C_r value was obtained using the formula provided in the methodology, which is why the country is placed closer to level 2 on the ladder scale.

Figure 1. Country situation in the ladder approach



BOX 4

What next for IAEG-SDG?

The Inter-agency and Expert Group on SDG Indicators (IAEG-SDG) was established by the United Nations Statistical Commission to develop and implement the SDG global indicator framework and targets of the 2030 Agenda. It comprises United Nations Member States, with regional and international agencies participating as observers.

This global indicator framework was agreed upon in March 2017. Now, the IAEG-SDG's work will entail finalizing a framework for indicator monitoring and reporting and reviewing and refining the indicator framework and its implementation on an ongoing basis. The group is expected to agree on a standardized reporting framework during its next meeting, in autumn 2018. The establishment of such a framework will help improve and rationalize the data-collection process for the SDG global indicators, clarifying the roles and responsibilities of national institutions and custodian agencies alike.

2.2. Stakeholders and sources of data

2.2.1 Stakeholders involved

All the pilot countries engaged relevant institutions in the SDG 6 process to provide data and endorse the methodology and the results obtained. Table 1 provides a comparative summary of the institutions and organizations involved in each country.

The main institutions involved were water-related ministries and agencies and departments of statistics. In the Netherlands, a research institution (Deltares) and consultancy (eLEAF) participated in launching a project to show which data could be compiled for the country and what could be compiled to support other countries.

2.2.2. Sources of data

This section provides an overview of the different sources consulted in each of the pilot countries for the methodology's main components: **(1) gross value added by sector; and (2) volume of water used by sector (Table 2)**.

Bentiu, South Sudan. Photo: UN Photo/JC McIlwaine

Table 1. Stakeholders involved in testing the indicator 6.4.1 methodology in the pilot countries

	General coordination	Main data-collecting agencies	Other government bodies/institutions involved
Jordan	Ministry of Water and Irrigation	Ministry of Water and Irrigation Department of Statistics (DOS) Ministry of Agriculture Ministry of Planning and International Cooperation	Environment Statistics Division (DOS), FAO
The Netherlands	Ministry of Foreign Affairs	Statistics Netherlands (CBS)	Deltares, eLEAF University of Twente Water Footprint Network Utrecht University IHE Delft Institute for Water Education Netherlands Water Partnership Netherlands IHP-HWRP Committee
Peru	National Water Authority (ANA)	National Water Authority (ANA) Ministry of Agriculture and Irrigation National Institute for Statistics and Informatics (INEI)	Water Resources Management Unit (ANA), Water Resources Planning and Conservation Unit (ANA), FAO
Senegal	Ministry of Water and Sanitation (Water Resources Management and Planning Unit)	Ministry of Water and Sanitation Water Utilities Association Statistics and Demography Agency (ANSD)	
Uganda	Ministry of Water and Environment (MWE) (Water for Production Department and Water Resource Planning & Regulation Department)	Ministry of Water and Environment National Water and Sewerage Corporation Ministry of Gender, Labour and Social Development Uganda Bureau of Statistics Uganda Prisons FAO and United Nations Forum on Forests (UNFF) Buganda Kingdom	Ministry of Agriculture, Animal Industry and Fisheries Ministry of Trade, Industry and Cooperatives (Department of Industry and Technology) Ministry of Finance, Planning and Economic Development

Source: National reports ANA, 2016; Abu Zahra, 2016; DGPRE, 2016; MWE, 2016; CBS, 2016

Table 2. Sources of data for gross value added and water use by major economic sector

	Jordan	The Netherlands	Peru	Senegal	Uganda
Gross value added (GVA), USD					
GVA agriculture	Department of Statistics (DOS) Central Bank of Jordan	Statistics Netherlands (CBS)	National Institute of Statistics and Informatics (INEI)	Statistics and Demography Agency (ANSD)	Uganda Bureau of Statistics (UBOS)
C_r	Department of Statistics (Agricultural census)	Estimated with formula provided A_i was available from Statistics Netherlands (CBS)	Estimated with formula provided A_i was available from the INEI 2012 agriculture census	Estimated with formula provided A_i was calculated with data from the World Bank and agroecological studies	Estimated with formula provided A_i was calculated with data from the World Bank and the Uganda National Water Development Report (NWDR) from 2005
GVA MIMEC **GVA services**	Department of Statistics (DOS)	Statistics Netherlands (CBS)	National Institute of Statistics and Informatics (INEI)	Statistics and Demography Agency (ANSD)	Uganda Bureau of Statistics (UBOS)
ISIC	Rev. 3	Rev. 4	Rev. 4	Not specified	Not specified
Frequency of collection/ publication	Collected and published annually and from 2014, quarterly	Collected and published annually and quarterly	Collected and published annually	Available annually	Economic data available annually (per financial year)
Coverage	Country level	Country level Regional level Basin level	Country level	Country level	Country level

Source: National reports ANA, 2016; Abu Zahra, 2016; DGPRE, 2016; MWE, 2016; CBS, 2016

Table 2. Sources of data for gross value added and water use by major economic sector (cont.)

	Jordan	The Netherlands	Peru	Senegal	Uganda
Water use by major economic sector (m³)					
Agriculture freshwater withdrawal (Wa)	Ministry of Water and Irrigation *(Water Balance Reports 2010–2014)* Department of Statistics (DOS) *(Environment Statistics Reports 2010–2014)*	Statistics Netherlands (CBS) LEI research institute (for area under irrigation)	Water Resources Management Unit (ANA) (from local operators)	Organizations in charge of water supply Statistics and Demography Agency (ANSD)	Ministry of Water and Environment (MWE) *Water for livestock estimated based on livestock population
Industry freshwater withdrawal (Wm)		Statistics Netherlands (CBS) (annual environmental reports, national groundwater register)			AQUASTAT (figure for 2008)
Services freshwater withdrawal (Ws)	Ministry of Water and Irrigation and Department of Statistics Data gaps were estimated using intermediate consumption	Association of Dutch Water Companies (Vewin)			Urban supply: National Water and Sewerage Corporation MWE (database for Small Towns Water Supply) Rural supply: Estimated based on rural population
Frequency of collection/ publication	Collected annually, published every four years	Collected biennially (by economic activity), annually (total withdrawls)	Collected annually	Not specified	Wa: less than every 5 years Wm: Every 5 years (AQUASTAT) Ws: annually
Coverage	Country level	Country level Subnational level Basin level	Country level Basin level	Country level	Country level

Source: National reports ANA, 2016; Abu Zahra, 2016; DGPRE, 2016; MWE, 2016; CBS, 2016

The data gathering process indicated that statistical data were generally available from governmental sources for the variables included in the methodology. Where data were missing – for example, cultivated land in Senegal and Uganda or water use by MIMEC in Uganda – these were either taken from international sources such as the World Bank, Organisation for Economic Co-operation and Development (OECD) and United Nations Statistics Division (UNSD) (for the economic variables) or the FAO AQUASTAT database (for the water use variables). It was also difficult to obtain up-to-date data for irrigated land in Peru, since there was only information from the 2012 agricultural census.

Economic data are gathered through national accounts. These accounts are generally built using the internationally agreed System of National Accounts (SNA) recommendations prepared under the auspices of the United Nations, the European Commission, the OECD, the International Monetary Fund (IMF) and the World Bank Group. National statistics departments or agencies are responsible for collecting, consolidating and publishing this type of data, which is usually completed annually.

The set of concepts, definitions, classifications and accounting rules in the SNA recommendations allow for the international comparison of data and economic performance among countries. Essentially, three approaches (output, expenditure and income) are used to compile economic data in national accounts. The "output approach" – which is used in the indicator 6.4.1 methodology – provides sectoral value added data following the ISIC Rev. 3 or 4 coding. The Netherlands and Peru are following ISIC 4, while Jordan is using ISIC 3; Uganda does not specify whether data are collected according to those standards.

Among all economic components of the formula, the most difficult to obtain was the proportion of agricultural gross value added of rainfed agriculture (C_r). Except for Jordan, which has annual figures from its agricultural census since the year 2000, the remaining pilot countries had to estimate the value using the methodology formulas, where C_r is derived from the proportion of irrigated land over the total cultivated land (A_i). A_i data were statistically available for the Netherlands and Peru, though for the latter they were only updated to 2012. Senegal estimated its C_r value using figures on total cultivated land from the World Bank database and figures on irrigated areas from studies on agroecological areas of the Senegal River Valley, the Senegal River Delta and the Casamance and Niayes regions. Uganda used figures on cultivated land from the World Bank (though these were only updated to 2011) and data on irrigated land from the Uganda National Water Development Report (NWDR), prepared jointly by the Ministry of Water and Environment (through its Directorate of Water Development) and the World Water Assessment Programme (WWAP) in 2005.

As for data on water use, these were generally updated to 2016, 2015 or 2014. In Jordan, the Netherlands and Peru, figures are reported annually or biennially, as recommended by the GEMI methodology. However, Senegal and Uganda have not specified how regularly they collect and publish their data.

Countries mostly consolidate and publish data at the country level, except for the Netherlands, which provides figures economic data at regional and basin level, and Peru which has figures on water use for its three major basins (Pacific, Amazon and Titicaca).

Even though sources of data were largely available, problems were encountered that countries should address when collecting data, as detailed in section 2.3.3.

2.3. Data-collection process

2.3.1. Approach

As previously mentioned, to implement and test the methodology, each of the pilot countries established working groups with relevant stakeholders (section 2.2.1) to gather the required expert knowledge.

The pilot countries appointed national institutions to lead the process of compiling the indicator data (Table 1). These institutions coordinated the review of all the relevant national, subnational and basin unit data sources, such as maps, reports, yearbooks and articles. Though the collection primarily focused on the most recent data, it included all potential sources of information and any partial data (by time or area), such as those produced by local projects.

In-country meetings with all the involved institutions were held throughout 2016 to track progress, share findings and endorse the results obtained. In addition, the Netherlands hosted a Work in Progress workshop in September 2016 that gathered key representatives of all pilot countries and experts of GEMI-Target Teams from United Nations organizations. The aim of this meeting was to (1) discuss proof of concept process for GEMI indicators (6.3.1, 6.3.2, 6.4.1, 6.4.2, 6.5.1, 6.5.2 and 6.6.1); (2) share feedback, lessons learned and experiences on the proposed methods and indicators; and (3) identify additional activities to be undertaken to overcome challenges.

To provide support to countries in the proof of concept process, a United Nations organization was designated to coordinate activities in each of the pilot countries and for each indicator (Table 3). For indicator 6.4.1, FAO provided technical and/or logistical support to the countries that requested it. In Jordan, Peru and Uganda, FAO also provided a local consultant to work with and support the working groups.

All countries engaged actively in the process and have provided the data to establish a baseline for indicator 6.4.1. The implementation of the pilot phase has demonstrated the importance of stakeholder engagement in the process. It is crucial that countries take ownership of the process and involve the necessary institutions and agencies. Organizing in-person meetings helped build relationships between members of working groups and ensured that individuals had a good understanding of their role in the process and of the importance of knowledge-sharing during the process. The effective coordination of the organizations involved as well as the clear definition and division of roles and responsibilities in the process are crucial for achieving efficient and successful monitoring.

2.3.2. Use of international data sources

International sources were used to fill national data gaps. The data from these sources were discussed with countries in different workshops and meetings to ensure their relevance.

The methodology recommended the following:

- For data on gross value added:

  The World Bank Databank[2]
  UNSD[3]
  OECD – national accounts data files[4]

- For data on cultivated land and irrigated areas:

  FAOSTAT[5]
  AQUASTAT[6]

- For data on water withdrawal:

  AQUASTAT[7]

Table 3. United Nations support to pilot countries

Country	Coordinating agency/agencies	
	GEMI process	Indicator 6.4.1
Jordan	UNESCO, UN-Habitat	FAO
The Netherlands	UNESCO	FAO
Peru	FAO, WHO	FAO
Senegal	FAO	FAO
Uganda	UN Environment	FAO

[2] http://databank.worldbank.org/data/home.aspx
[3] http://unstats.un.org/unsd/snaama/selbasicFast.asp
[4] http://www.oecd-ilibrary.org/economics/data/oecd-national-accounts-statistics_na-data-en
[5] http://www.fao.org/faostat/en/#data
[6] http://www.fao.org/nr/water/aquastat/main/index.stm
[7] http://www.fao.org/nr/water/aquastat/main/index.stm

During this pilot phase, Senegal used international data to determine the proportion of irrigated land on the total cultivated land (A_i). Data on cultivated land were taken from the World Bank database and figures for irrigated areas were found in studies on the country's agroecological areas. In Uganda, the most recent data on the proportion of irrigated land on total cultivated were the World Bank's 2011 figures.

2.3.3. Challenges and opportunities

The proof of concept process conducted in the five pilot countries highlighted a number of challenges and opportunities that should be considered when implementing the methodology.

The **challenges** identified are as follows:

- **Handling economic data**

The methodology's economic variables are based on the economic activities classification of **ISIC Rev. 4**. However, some countries (i.e. Jordan) may still collect information based on ISIC Rev. 3. This could lead to inconsistent data aggregations of the major economic sectors. Thus, it is important to understand the different industrial classification systems and adjust possible aggregation inconsistencies before using the "sectoral gross value added" for computing the water-use efficiency for each sector.

Another important issue regarding economic data is the **base year (GDP deflators)** used to convert "current or nominal" data to "real or constant" data. Ideally, countries should all use the same base year, though there can be exceptions for countries that already have an established base year for their statistics.

In addition, the **conversion from national currency to US dollars** would have to be based on an exchange rate that is calculated in the same way for all countries. The prevailing exchange rate at the base year should be used for the conversion.

When compiling economic data, some countries use **financial years** which usually do not correspond to **calendar years** (June 2016 to May 2017 rather than January to December 2016). In these cases, it is necessary to explain how the conversion to calendar years was made. The methodology recommends using the figure of a given financial year for the calendar year corresponding to the last part of the period (for example, the 2016/17 figure for 2017).

- **Data inconsistency among various sources**

The availability of different sources of information for the same variable could potentially be problematic, since figures could be different depending on the source consulted. This was an issue in Uganda, when estimating agricultural water withdrawals.

In such cases, the differences stem either from the reference years considered (long term averages versus annual data) or the factors taken into account for the calculations. For example, in some cases, water for livestock/aquaculture/silviculture is not included as an agricultural withdrawal, which is particularly relevant in countries where the agricultural non-crop production sector is important.

To address this challenge, the factors that led to the differences must be understood and the data harmonized or the value with the reference that best matches the definition stated in the indicator's methodology taken. It is also important to keep the same data source over time.

- **Weak monitoring by country institutions**

While data were generally available, these were not always in the format or the quality, quantity and frequency required. For example, data on industry withdrawals in Uganda or irrigated land in Peru were not sufficiently up to date.

In some cases, certain parameters were not being monitored or were weakly monitored, such as rural water consumption in Uganda and agriculture water withdrawals in Senegal respectively.

It is crucial to support countries in strengthening their national capacity and mobilizing resources to implement the methodology. Efficient cooperation and sharing of responsibilities among the institutions involved in monitoring the indicator at the national level remain key to success of the whole process.

- **Reference years/periods**

Although data were generally up to date, reference years or periods can vary between variables and countries. For example, the latest available values on water withdrawals can differ significantly from country to country. It is therefore highly important to always specify the reference years used.

- **Parameters to take into account when defining variables**

To define figures for the indicator 6.4.1 variables, several factors must be considered, as specified in the methodology. During the pilot process, certain difficulties were noted for some components, including aspects related to agriculture value added, sectoral water use, and proportion of irrigated land over the total cultivated land, as explained below.

When calculating **agriculture value added and water use**, forestry and fishing subsectors must not be included.

Regarding water use for the **MIMEC** sector, water used for hydropower should not be included in the calculation, as it is removed from the source for a very short time.

To calculate the **proportion of irrigated land over the total cultivated land (A_i)**, the FAOSTAT definition of cultivated land – the sum of arable land and permanent crops – should be followed. This was the case in the Netherlands, where horticulture and forage sectors were not initially considered when calculating irrigated areas, as in the national statistics, these two sectors are not classified as arable land. Since this may be the case for other countries, attention should be given to include all forms of crop production under the category of cultivated land.

As for irrigated land, the AQUASTAT definition of "total harvested irrigated crop area" should be used, which refers to crops grown under full control irrigation. It is important to note that areas under double irrigated cropping (same area cultivated and irrigated twice a year) are counted twice. Thus, the total area may be larger than the full or partial control equipped area, which gives an indication of the cropping intensity.

- **Outdated data**

In the event that up-to-date data are not available (from in-country or international sources), efforts should be made to provide the most accurate estimate possible. This was an issue for industrial water withdrawals in Uganda. The most recent data were from 2008, which was the figure used for 2016, despite the industrial value added increasing by more than 20 per cent in the past decade. Similarly, in Peru, the most recent data available for irrigated land were from 2012.

- **Weak reporting from country institutions into international databases**

It was noted that international databases such as AQUASTAT (which are repositories of data provided by countries) did not have the latest figures available in some cases. Countries should therefore endeavour to share their data with these international sources to ensure that they are regularly updated.

When reporting the data, it is very important that countries reference all the sources used and the years considered for data collection or estimations, as well as the type of data collected (statistical, modelled, remote sensing). While this is essential to ensuring the quality of the process, it was noted that not all of the pilot countries provided such information for all of the indicator's variables.

- **Double counting**

There is a potential risk of double counting data when computing water use by the different sectors.

This pilot exercise was an **opportunity** to further improve data collection and estimations in each of the countries and furthermore, to improve the way water resources are managed. In Senegal, for example, testing the methodology has led to a proposal of an action plan for the water and sanitation sector.

The necessary involvement of different agencies in this process has helped to strengthen institutional relations and build or consolidate networks of professionals which will help improve the monitoring of the indicator and, most likely, other aspects of water management at the national level.

BOX 5

Frequently asked questions

How does the efficiency concept used for indicator 6.4.1 differ from productivity concept?

Although these have similar measurement units, the present indicator aims to establish a link between the total output of all economic sectors and the country's use of water resources, considered as part of the natural resource base. It therefore does not consider the actual specific output produced by a single water unit used in the various sectors. Rather, it identifies the relation between economic development and exploitation of water resources.

Why use the water abstraction category rather than water consumption?

Consumption is a concept that is more so linked to productivity and mostly applies to the agricultural sector. In fact, industrial plants and cities do not consume much water, yet they use huge amounts of the resource. Though most of this water returns to the environment, this does little to reduce the impact they have on the resource. If it did, cities would never suffer from water scarcity, which is clearly not the case.

Why is rainfed agricultural production excluded?

The indicator aims to identify the economic pressure on water resources. In other words, it focuses on "blue water" rather than "green water". Including water directly used from precipitation into the indicator would largely increase the quantities, making them more difficult to estimate and misleading decision makers about the potential of their water sources.

Rainfed value could be added without adding the rainwater used – why was this not done?

If this approach were taken, the indicator would be distorted and would not give indications on the need to improve water management. Moreover, such an indicator would be biased "against" irrigation, as it would automatically decrease if more water was used for irrigation.

Why choose economic value as the assessment unit when other choices were also possible, such as calories in agriculture or megawatts in energy production?

Expressing the indicator in such a way (calories in agriculture or megawatts in energy production) would have had two main disadvantages: (i) it would have been oriented again towards production and productivity, which has been excluded as described above, and (ii) it would have been very complex to reduce all the values for the various sectors, expressed in different units, to one single indicator.

3

Results and analysis

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3.1. Global and regional estimates for indicator 6.4.1

After testing the methodology in the five pilot countries, a preliminary global analysis for indicator 6.4.1 was conducted using available databases from international organizations (see section 3.2.). The data from these sources are, in any case, being checked with a number of countries in order to ensure they are representative. From 2019, data will be crosschecked with all countries in two different ways: (1) the custodian agency collects the data and sends them to governments for endorsement or (2) countries send the data to custodian agencies directly.

The results of this analysis indicate that water-use efficiency is a little over USD 15/m^3 worldwide, though significant differences exist among countries and regions. Figure 2 shows calculated regional values for water-use efficiency based on data from 168 countries (Annex 2). Some small countries did not have data, but these would have had little impact on regional and global values.

Lowest regional water-use efficiencies are about USD 2/m^3 in Central and Southern Asia, around USD 7/m^3 in sub-Saharan Africa, and almost USD 8/m^3 in Northern Africa and Western Asia.

The highest values are USD 50/m^3 in Oceania and USD 38/m^3 in Europe and Northern America. When looking at these two broad regions more closely, the aforementioned regional differences can be identified. In Oceania, figures are much higher for Australia and New Zealand than in the rest of the continent. In addition, Europe has a markedly higher average than in Northern America.

Average values for water-use efficiency are found in Eastern and South-Eastern Asia (around USD 15/m^3) and Latin America and the Caribbean (about USD 13/m^3).

The distribution of water-use efficiency resembles a logarithmic curve where most countries have efficiencies in water use below USD 100/m^3 – only a few countries surpass this value or even reach over USD 1,000/m^3 (Figure 4).

Further analysis (Figure 3 and Table 4), reveals that 75 countries have efficiencies less than USD 10/m^3 (of those, 10 countries are below USD 1/m^3), 56 countries between USD 10/m^3 and USD 40/m^3, and 17 countries between USD 40/m^3 and USD 80/m^3. Finally, there are 20 countries with efficiencies above USD 80/m^3.

KEY FACTS

Water-use efficiency is a little **over USD 15/m^3 worldwide**, though significant differences exist among countries and regions.

The **lowest** water-use efficiency is in **Central and Southern Asia** at USD 2/m^3.

The **highest** water-use efficiency is in **Oceania** at USD 50/m^3.

75 countries have efficiencies less than USD 10/m^3 (of those, 10 countries are below USD 1/m^3), **56 countries** between USD 10/m^3 and USD 40/m^3, and **17 countries** between USD 40/m^3 and USD 80/m^3.

Figure 2. Water-use efficiency by region (USD/m³), base year 2015

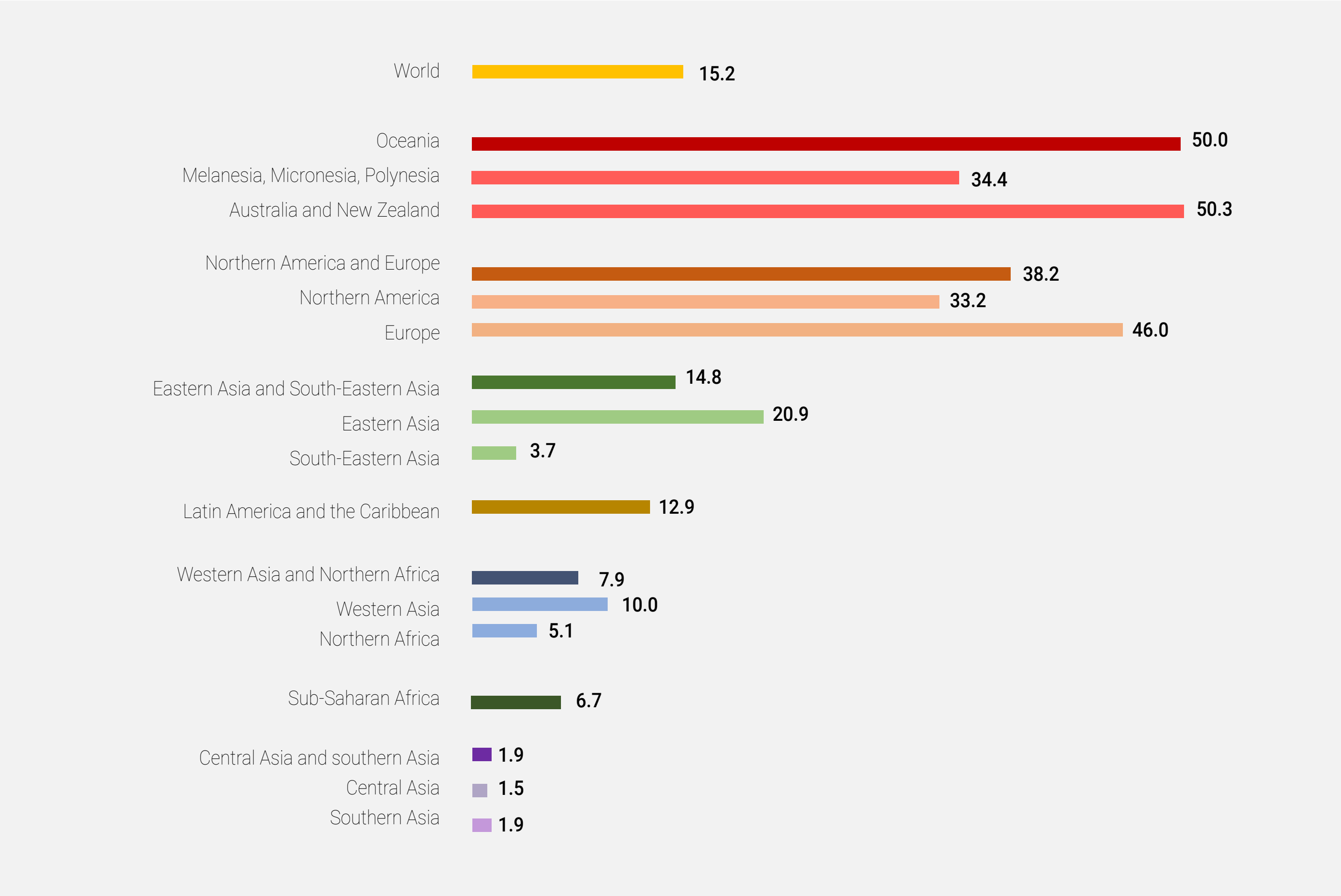


Figure 3. Water-use efficiency (USD/m³) by country, base year 2015

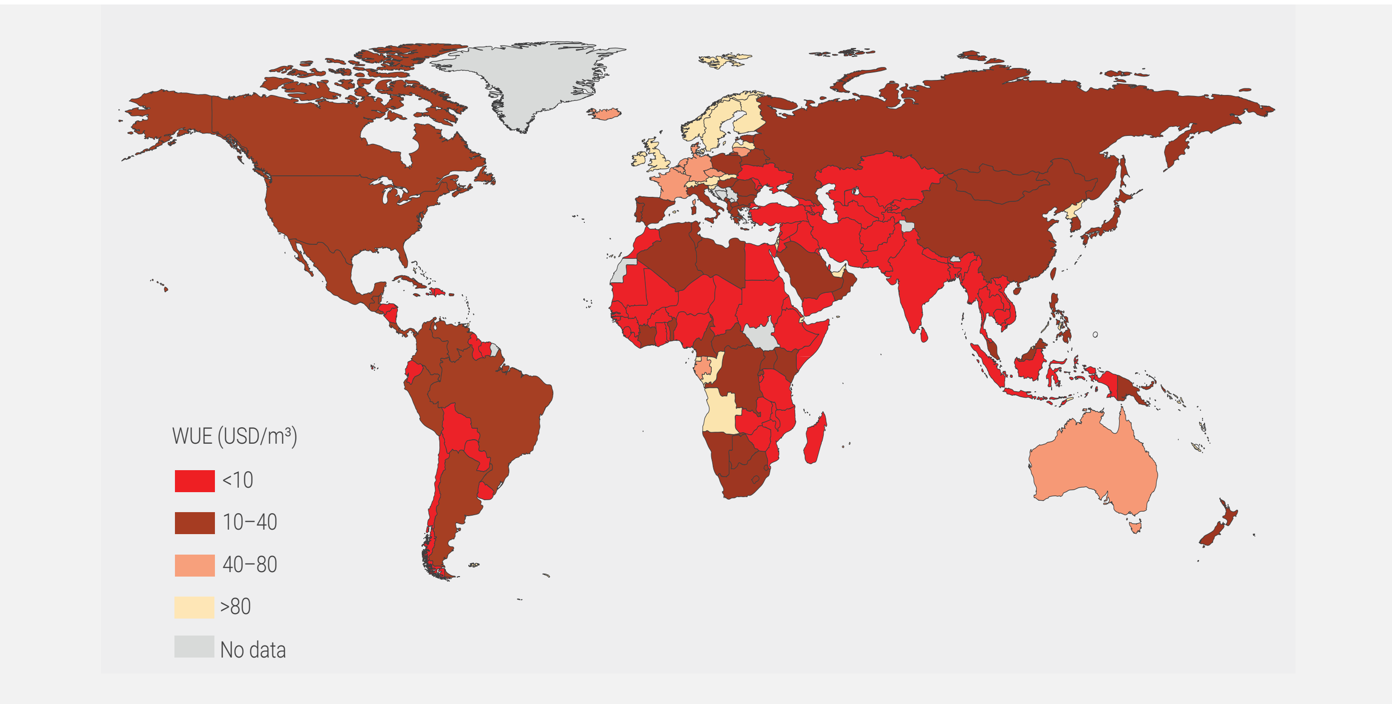
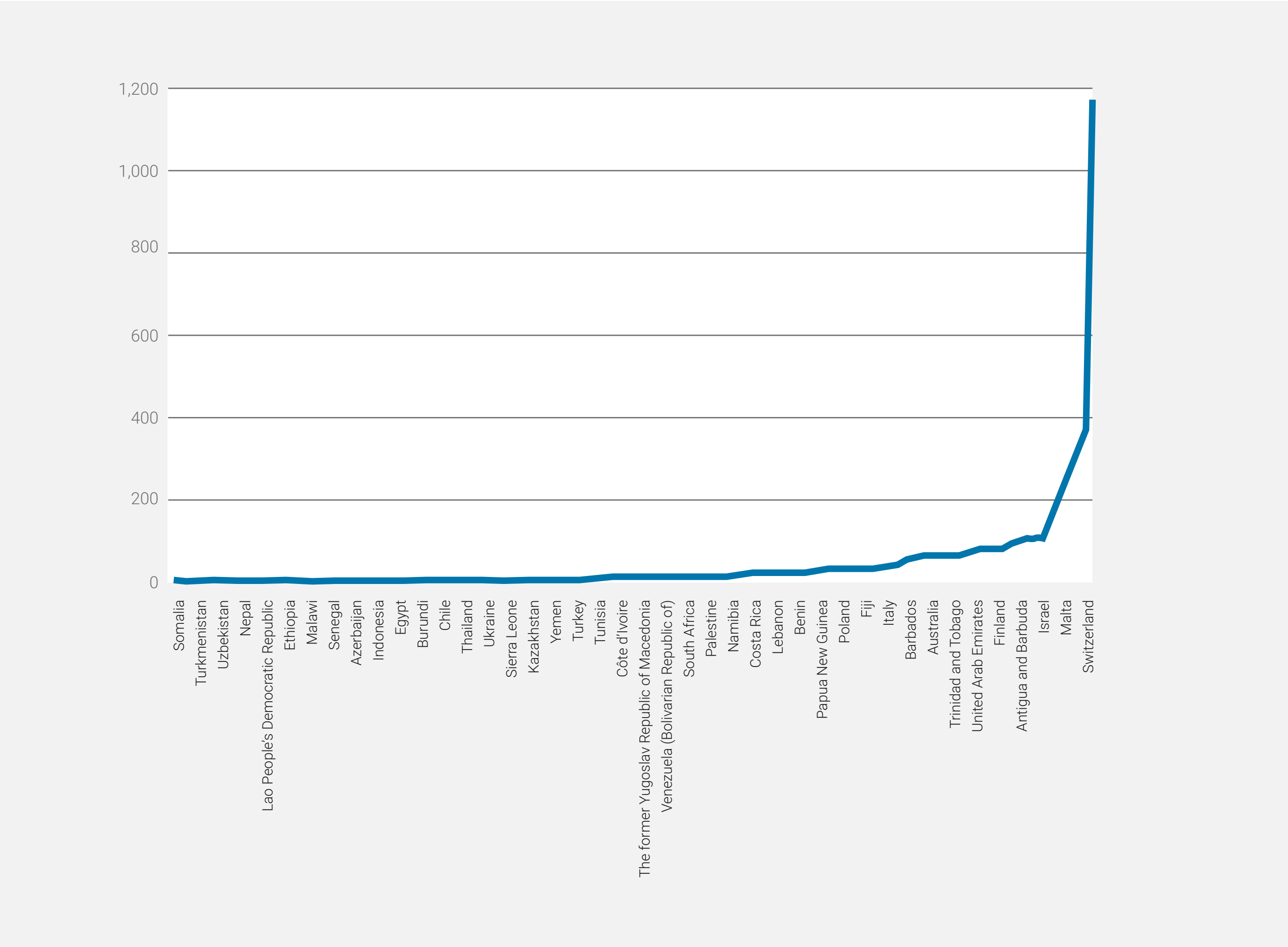


Figure 4. Country distribution of water-use efficiency (USD/m³), base year 2015



Countries with highest efficiencies are mostly located in Northern and Western Europe. These countries have a prominent services sector (above 60 per cent of GDP) and a highly technological agriculture sector.

3.2. Considerations about data availability at the global level

This first assessment at the global and regional levels was based on nationally and internationally available data sets provided by the methodology. Figures were available for 168 countries. Data were missing for some of the small countries, though their information is unlikely to have greatly impacted regional values.

The FAO AQUASTAT database was used to provide data on water use for agriculture, industry (MIMEC) and services.

Economic data – gross value added in each of the three major economic sectors (agriculture, industry and services) – were acquired from national statistical departments or other relevant national government agencies and international sources, such as the World Bank, UNSD and OECD.

These sources of data follow the set of concepts, definitions, classifications and accounting rules in the System of National Accounts (SNA) recommendations, which allows data and economic performances to be compared among countries. Essentially, three approaches (the output, expenditure and income approaches) are used to compile economic data in national accounts. Of these approaches, the output approach best fits the indicator methodology, since it provides sectoral value added data following the ISIC Rev. 3 or Rev. 4 codes.

Table 4. Countries according to levels of water-use efficiency (USD/m³), base year 2015

WUE (USD/m³)	Countries
< 10	Number of countries: 75 Afghanistan, Albania, Armenia, Azerbaijan, Bangladesh, Belize, Bhutan, Bolivia, Bulgaria, Burkina Faso, Burundi, Cambodia, Chad, Chile, Democratic People's Republic of Korea, Dominican Republic, Ecuador, Egypt, El Salvador, Eritrea, Ethiopia, Eswatini, Gambia, Ghana, Georgia, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Iran (Islamic Republic of), Iraq, Kazakhstan, Kyrgyzstan, Lao People's Democratic Republic, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Myanmar, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Paraguay, Philippines, Republic of Moldova, Senegal, Sierra Leone, Somalia, Sri Lanka, Sudan, Suriname, Syrian Arab Republic, Tajikistan, Thailand, Timor-Leste, Togo, Turkey, Turkmenistan, United Republic of Tanzania, Ukraine, Uruguay, Uzbekistan, Viet Nam, Yemen, Zambia, Zimbabwe
10–40	Number of countries: 56 Algeria, Argentina, Belarus, Benin, Botswana, Brazil, Cabo Verde, Cameroon, Canada, Central African Republic, China, Colombia, Comoros, Costa Rica, Côte d'Ivoire, Cuba, Democratic Republic of the Congo, Estonia, Fiji, Greece, Guatemala, Hungary, Italy, Jamaica, Jordan, Kenya, Lebanon, Lesotho, Libya, Malaysia, Mexico, Mongolia, Montenegro, Namibia, New Zealand, Oman, Palestine, Panama, Papua New Guinea, Peru, Poland, Portugal, Puerto Rico, Republic of Korea, Romania, Russian Federation, Rwanda, Saudi Arabia, Slovenia, South Africa, Spain, the former Yugoslav Republic of Macedonia, Tunisia, Uganda, United States of America, Venezuela (Bolivarian Republic of)
40–80	Number of countries: 17 Australia, Bahrain, Barbados, Belgium, Croatia, Czechia, France, Gabon, Germany, Iceland, Japan, Kuwait, Lithuania, Netherlands, Seychelles, Trinidad and Tobago, United Arab Emirates
> 80	Number of countries: 20 Angola, Antigua and Barbuda, Austria, Congo, Cyprus, Denmark, Equatorial Guinea, Finland, Ireland, Israel, Latvia, Luxembourg, Malta, Norway, Qatar, Singapore, Slovakia, Sweden, Switzerland, United Kingdom of Great Britain and Northern Ireland

Most of the data from the international databases consulted were not up to date. For some countries, reference years dated back to the late 1990s. These databases are informed by data produced or published by countries, making them useful tools for future assessments. However, without specific effort from countries, no update, and consequently no monitoring can be done. Ideally, data should be updated every one or two years to track economic growth, even when there is little change in a country's annual water use. A national institution should be tasked with coordinating and compiling the indicator, including reviewing all national and subnational sources of relevant data. Establishing this process may require additional institutional capacity and coordination to collect and process data.

This indicator addresses three main aggregated economic sectors (agriculture; mining, manufacturing, construction and energy; and services), though further disaggregation would enable more detailed analysis of water-use efficiency for national planning and decision-making. In particular, disaggregation of agriculture by subsectors may be needed to adequately cover water-use for livestock and aquaculture.

Thus, the main challenge for this indicator is to obtain enough information to demonstrate increases in value added per unit of water withdrawn, especially in the poorest regions. To achieve this objective, other challenges must be considered, such as how to reduce water withdrawal for agriculture, how to scale-up technologies that reduce the use of water for all sectors and how to monitor and ensure the quality and quantity of water supplies.

Although the two indicators for target 6.4 monitor different information, there are strong links between them and they need to be understood as complementary. Indicator 6.4.1 is an economic indicator that assesses to what extent a country's economic growth relies on the use of water resources. Indicator 6.4.2 is an environmental indicator that tracks the physical availability of freshwater resources. Decision makers can use the complementary information offered by these two indicators to understand how increasing water use affects the availability of water resources and consequently, to define a tipping-point target to aim at for decoupling water use from economic growth. Such information would help countries to adequately follow-up on target 6.4.

Limitations of the present data set

As previously mentioned, indicator 6.4.1 introduces a time factor in water-use efficiency assessments, yet, data are still only available for specific periods of time. This implies that the actual indicator, which is the change in water-use efficiency over time, cannot be computed. For that reason, the data presented in this report are labelled as preliminary.

In addition, given that this indicator has no previous history, it is not possible to propose interpretations beyond what has been described in this report, let alone produce actual analyses of the data. However, in terms of policy, the focus of the indicator is to identify the breaking point, after which the increase in water use – if any – is decoupled from the increase in the value added produced by the economy. While this may not be something that developing countries experience for some years, anticipating this point should be the focus of water policies in order to reduce the risk of countries overstretching their available resources.

More detailed analyses will be possible when more data tracking the change in water-use efficiency become available.

Next steps in global data collection

As Box 4 details, the IAEG-SDG has not defined a framework for collecting global indicator data that Member States and custodian agencies can follow. The only clear indication is that countries should retain ownership of their data and of the monitoring process. Given the difficulties countries face in collecting specific data, information from recognized international data sets has been used to compile the baseline global indicators that are the subject of this report.

To make this process more robust for the next rounds of data collection, two main steps will be undertaken, focusing on countries and the AQUASTAT database.

At the national level, all Member States will receive pre-compiled data-collection sheets by the end of 2018, which they will be required to revise, confirm or update with new data. This will encourage countries to take ownership of their data and assume responsibility for the quality of the information.

The AQUASTAT database is currently undergoing an overhaul, which will result in the establishment of a network of national correspondents who will ensure that countries produce regular and consistent relevant data.

4

Conclusions

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Summary of findings

The methodology and pilot process

Indicator 6.4.1 was newly introduced by the SDG process and had never been monitored at a global level within the context of the MDGs. Thus, an entirely new methodology needed to be developed to monitor the indicator. This also meant that no previous data existed for the indicator, resulting in new data computations and related interpretation of the results.

Despite this, the proof of concept process tested in five pilot countries proved that statistical data were generally available – and reasonably up to date – from governmental sources for the methodology's variables.

In the cases where data were missing, international sources such as the World Bank or FAO were consulted for information. However, the data available from these sources were not always recent.

National statistics departments or agencies generally collect and publish economic data annually through their national accounts. Jordan, the Netherlands and Peru follow ISIC recommendations, whereas Senegal and Uganda do not specify whether their data are collected according to these standards.

As regards data on water use, these were generally updated to 2016, 2015 or 2014. In the Netherlands and Peru, figures are reported annually or biennially, as the GEMI methodology recommends. However, for Jordan, Senegal and Uganda the consultant's reports did not specify how regularly data are collected and published.

Each of the pilot countries consolidate and publish data at the national level. In addition, the Netherlands has separate economic data at the regional and basin level and Peru has information on water use for its three major basins (Pacific, Amazon and Titicaca).

- **Handling economic data**. When collecting data for the economic variables, various issues have to be taken into account: (1) economic sectors should be aggregated based on ISIC Rev. 4; (2) data have to be converted from "current or nominal" to "real or constant" using the base year defined by the methodology; (3) local currency has to be converted to US dollars using the prevailing exchange rate of the base year; (4) annual data have to be reported based on calendar years (sometimes financial years cover periods that include two calendar years).

- **Data inconsistency among various sources.** The availability of different sources of information for the same variable could potentially be problematic, since figures could be different depending on the source consulted (due to years of reference considered or other components taken into account). To address this challenge, the factors that caused the differences must be understood and the data harmonized or the value with the reference that best matches the definition stated in the indicator's methodology taken. It is also important to keep the same data source over time.

- **Weak monitoring by country institutions.** While data were generally available, these were not always in the format, quality, quantity and frequency required. In other cases, certain parameters were not being monitored or were weakly monitored. There is a need to improve countries' capacity and resources for implementing the methodology, and to strengthen cooperation and the sharing of responsibilities among the institutions involved in monitoring the indicator.

- **Reference years/periods**. Although data were generally up to date, reference years or periods can vary between variables and countries. In this regard, it is very important to always specify the reference years used.

- **Parameters to take into account when defining variables.** To define a figure for each parameter considered in the indicator, certain points should be clear: (1) when calculating agriculture **value added and water use**, forestry and fishing subsectors should not be included; (2) regarding water use for **MIMEC**, hydropower should not be included in the calculation; and (3) when calculating the proportion of **irrigated land over the total cultivated land (A_i)**, the definition of cultivated land to adhere to should be the one provided by FAOSTAT.

- **Outdated data**. In the event that up-to-date data are not available (from in-country or international sources), efforts should be made to provide the most accurate estimate possible.

- **Weak reporting from country institutions into international databases**. It was noted that international databases such as AQUASTAT (which are repositories of data provided by countries) did not have the latest figures available in some cases. Countries should therefore endeavour to share their data with these international sources to ensure that they are regularly updated.

- **Double counting**. There is a potential risk of double counting when computing water use by the different sectors.

To implement and test the methodology, the pilot countries established working groups with relevant stakeholders to share findings and validate the data and analysis conducted. A national institution was appointed in each country to lead the process of compiling the indicator. These institutions coordinated the review of all the national, subnational and basin unit sources of relevant data, such as maps, reports, yearbooks and articles. The collection focused on the most recent data, without excluding any potential sources of information. Partial data (by time or area) were also collected, such as data produced by local projects. Meetings with all the institutions involved were held throughout 2016 to track progress, share findings and validate the results obtained.

Global data

The global average for water-use efficiency is a little over USD 15/m^3, although significant differences exist among countries and regions. The lowest regional water-use efficiencies are USD 2/m^3 in Central and Southern Asia, around USD 7/m^3 in sub-Saharan Africa, and almost USD 8/m^3 in Northern Africa and Western Asia. The highest values are USD 50/m^3 in Oceania and USD 38/m^3 in Europe and Northern America. Average values are found in Eastern and South-Eastern Asia (around USD 15/m^3) and Latin America and the Caribbean (about USD 13/m^3).

This first assessment at the global and regional levels was based on nationally and internationally available data sets provided by the methodology. Figures were available for 168 countries.

The FAO AQUASTAT database was used to provide data on water use for agriculture, industry (MIMEC) and services. Economic data on the gross value added in these three major economic sectors was acquired from national statistical departments or other relevant national government agencies and international sources such as the World Bank, UNSD and OECD. These sources of data follow the set of concepts, definitions, classifications and accounting rules in the System of National Accounts (SNA) recommendations, allowing countries' data and economic performances to be compared.

International databases are constantly updated with data produced or published by countries, making them useful tools for future assessments. Nonetheless, it is desirable that specific national data are collected to compute the indicator, such as further disaggregated data of major subsectors.

Recommendations and next steps

To date, the IAEG-SDG has not defined a framework for data collection on global indicators to provide guidance to Member States and custodian agencies alike – the only clear indication being that countries should retain ownership of their data and of the monitoring process in general. The IAEG-SDG is expected to develop and agree on a standardized reporting framework during its next meeting, in autumn 2018. The establishment of such framework will help significantly improve and rationalize the data-collection process for the SDG global indicators, clarifying the roles and responsibilities of both national institutions and custodian agencies.

To further implement SDG methodologies, specific national data should be collected to compute the indicator. Countries should therefore take ownership of the process and be mindful of the importance of quality, timely and reliable disaggregated data as well as their accessibility, to enable well-informed decision-making. Custodian United Nations organizations must endeavour to raise awareness of this point and support countries in this process. A communication campaign among institutions involved could be launched.

Setting up or strengthening the data-collection mechanisms at the national level is needed to ensure regular updating of the data sets used to compile the indicator. Ideally, this should be done every one or two years to track economic growth, even when there is little change in annual water use. A national institution should be appointed in each country to coordinate and compile the indicator, including the review of all national and subnational sources of relevant data. Establishing this process may require additional institutional capacity and coordination to undertake data collection and processing.

Country teams should develop a good understanding of the methodology, so that they are aware of the issues that require consideration when using the formula provided (for example, not including water used for hydropower, currency conversion, GDP deflators, etc.). This is also a task for custodian United Nations organizations when explaining the methodology. In fact, an indicator-specific e-learning course is being developed by FAO to facilitate this understanding.

BOX 6

Using indicator 6.4.1 to achieve SDG 6 at the national level

Indicator 6.4.1 has been designed to assess the economic and social use of water resources in terms of the value added when they are used in different sectors of the economy. Water-use efficiency is strongly influenced by a country's economic structure, the proportion of water intensive sectors and any "real" improvements or deteriorations.

The indicator can help formulate water policy by focusing attention on sectors or regions with low water-use efficiency. This will guide countries in their efforts to improve water-use efficiency and help them to apply successful actions from sectors or regions with higher water-use efficiency levels to those with lower efficiency levels. However, it should be noted that in most cases, it would be futile to try to devise policies that aim to move water from one economic sector to another to increase the value of water-use efficiency. If a country's general development becomes unbalanced due to its use of water resources, other indicators will signal problems and the need for changes.

Increasing water-use efficiency over time means decoupling economic growth from water use across the main water-using sectors, which are agriculture, industry, energy and municipal water supply. This is strongly interlinked with sustainable food production (SDG 2), economic growth (SDG 8), infrastructure and industrialization (SDG 9), cities and human settlements (SDG 11) and consumption and production (SDG 12).

Since agriculture is by far the largest water consumer, this sector offers the greatest opportunities for water savings. Saving just a fraction of the amount used can significantly alleviate water stress in other sectors, particularly in arid countries where agriculture consumes as much as 90 per cent of available water resources. Agricultural water savings can come in many forms, such as more sustainable and efficient food production ("more crop per drop"), through sustainable water management practices and technologies. Water consumption can be reduced by growing less water-intensive crops in water-scarce regions, and minimizing losses in municipal distribution networks and industrial and energy cooling processes can also make a difference.

The use of supplementary indicators at the country level, including the monitoring of irrigation, municipality networks, and industrial and energy cooling efficiencies would enhance the interpretation of this indicator.

To enable data comparisons, countries should detail how data were obtained and which reference years and units of measurement were used. To this end, the AQUASTAT questionnaire offers countries guidance in preparing this metadata. In addition, FAO provides countries with a calculation sheet in order to maintain consistency when compiling data.

The pilot process has proven that monitoring indicators requires the strengthening of current systems and involvement of various stakeholders and institutions. The lead institution plays a key role in coordinating these stakeholders, who should have a clear understanding of their role in the process, the actions they should implement and the support available. Custodian United Nations organizations should focus their efforts on developing strong bonds with lead agencies.

As this indicator includes economic variables, country teams should involve at least one economist in the process.

A reporting period of no more than two years is recommended, so that early trends can be identified and possible issues detected in good time.

References

Abu Zahra, S. H. 2016. *Current Situation for the Target 6.4 of the Sustainable Development Goals (SDGs) in Jordan.*

ANA (National Water Authority). 2016. G*EMI – Seguimiento Integrado de las Metas de ODS relacionadas con Agua y Saneamiento. Informe Final*. [GEMI – Integrated Monitoring of the SDG targets related to water and sanitation. Final Report]. Peru, ANA.

ANA. 2017. *Síntesis del informe final del Proyecto Monitoreo Integrado de las metas del ODS 6 relacionadas con agua y saneamiento (GEMI)*. [Summary of the final report on the integrated monitoring project for SDG 6 targets related to water and sanitation (GEMI)]. Peru, ANA.

CBS (Statistics Netherlands), Deltares, eLEAF. 2016. Sustainable Development Goals for water - SDG 6.4 - Three step approach for monitoring. https://cbs.nl/en-gb/background/2016/51/sdgs-for-water-three-step-approach-for-monitoring

Directorate of Water Development/WWAP (World Water Assessment Program). 2005. National Water Development Report. Uganda, Directorate of Water Development/WWAP.

DGPRE (Department of Water Resources Management and Planning). 2016. *Rapport phase pilote du processus de renseignement des indicateurs de l'ODD6 de l'initiative GEMI au Sénégal.* [Report on the pilot phase testing of the GEMI SDG 6 indicators in Senegal]. Senegal, DGPRE.

GEMI (Integrated Monitoring of Water and Sanitation-Related SDG Targets Initiative). 2017. Step-by-step monitoring methodology for indicator 6.4.1. http://unwater.org/publications/step-step-methodology-monitoring-water-use-efficiency-6-4-1/

Ministry of Infrastructure and the Environment. 2016. *GEMI proof of concept report. Pilot testing of the draft monitoring methodologies for SDG 6 global indicators.* The Netherlands, Ministry of Infrastructure and the Environment. http://ihp-hwrp.nl/wp-content/uploads/2016/12/Netherlands-GEMI-Proof-of-Concept-Report-December-2016.pdf

MWE (Ministry of Water and Environment). 2016. Monitoring of Sustainable Development Goals. Piloting SDG No. 6: Target 6.4. Report on data compilation for Indicators 6.4.1 and 6.4.2. Uganda, MWE.

MWE/UN-Water. 2016. *Testing methodologies for Global Monitoring Indicators (GEMI) for SDG 6 on Water and Sanitation. Uganda Report*. Uganda, MWE/UN-Water.

UNEP (UN Environment). 2015. *Options for decoupling economic growth from water use and water pollution. A report of the Water Working Group of the International Resource Panel*. http://idaea.csic.es/sites/default/files/Options_for_decoupling_economic_growth_from_water_use_and_water_pollution__A_report_of_the_Water_Working_Group_of_the_International_Resource_Panel-20.pdf

United Nations Economic and Social Council. 2017. *Progress towards the Sustainable Development Goals. Report of the Secretary-General*. 2017 session, 28 July 2016–27 July 2017. https://unstats.un.org/sdgs/files/report/2017/secretary-general-sdg-report-2017--EN.pdf

UNGA (United Nations General Assembly). 2015. *Transforming our world: the 2030 Agenda for Sustainable Development.* Resolution adopted by the General Assembly on 25 September 2015. http://un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

USGS (United States Geological Survey). 2018. *USGS water use data for the nation*. https://waterdata.usgs.gov/nwis/wu

World Bank. 2018. *DataBank – World Development Indicators*. http://databank.worldbank.org/data/home.aspx

ANNEX 1. Water-use efficiency (WUE) in USD/m^3 by country

#	Country	WUE	#	Country	
1	Afghanistan	0.3	44	Denmark	377.6
2	Albania	5.1	45	Dominican Republic	7.1
3	Algeria	15.5	46	Ecuador	6.7
4	Angola	108.7	47	Egypt	3.8
5	Antigua and Barbuda	91.2	48	El Salvador	9.2
6	Argentina	12.1	49	Equatorial Guinea	337.8
7	Armenia	2.5	50	Eritrea	4.7
8	Australia	56.1	51	Estonia	10.8
9	Austria	93.8	52	Ethiopia	1.9
10	Azerbaijan	2.9	53	Eswatini	2.1
11	Bahrain	45.1	54	Fiji	31.0
12	Bangladesh	3.0	55	Finland	81.0
13	Barbados	47.7	56	France	65.9
14	Belarus	31.5	57	Gabon	70.1
15	Belgium	65.3	58	Gambia	4.7
16	Belize	8.4	59	Georgia	4.8
17	Benin	24.8	60	Germany	66.2
18	Bhutan	3.2	61	Ghana	5.6
19	Bolivia (Plurinational State of)	9.1	62	Greece	23.9
20	Botswana	38.2	63	Guatemala	12.9
21	Brazil	21.2	64	Guinea	5.4
22	Bulgaria	4.0	65	Guinea-Bissau	2.4
23	Burkina Faso	5.2	66	Guyana	1.5
24	Burundi	4.5	67	Haiti	4.6
25	Cabo Verde	29.4	68	Honduras	6.2
26	Cambodia	3.5	69	Hungary	17.7
27	Cameroon	12.3	70	Iceland	78.1
28	Canada	30.7	71	India	1.9
29	Central African Republic	12.3	72	Indonesia	3.2
30	Chad	3.9	73	Iran (Islamic Republic of)	3.8
31	Chile	4.8	74	Iraq	1.3
32	China	16.7	75	Ireland	210.7
33	Colombia	15.5	76	Israel	103.9
34	Comoros	20.4	77	Italy	36.5
35	Congo	97.9	78	Jamaica	15.1
36	Costa Rica	19.7	79	Japan	51.5
37	Côte d'Ivoire	11.3	80	Jordan	26.5
38	Croatia	60.4	81	Kazakhstan	6.9
39	Cuba	11.5	82	Kenya	10.9
40	Cyprus	81.7	83	Kuwait	70.7
41	Czechia	62.0	84	Kyrgyzstan	0.5
42	Democratic People's Republic of Korea	1.7	85	Lao People's Democratic Republic	1.5
43	Democratic Republic of the Congo	23.8	86	Latvia	90.4

#	Country	WUE	#	Country	
87	Lebanon	23.3	128	Romania	22.3
88	Lesotho	27.9	129	Russian Federation	10.7
89	Liberia	1.7	130	Rwanda	14.0
90	Libya	18.5	131	Saudi Arabia	19.4
91	Lithuania	52.0	132	Senegal	2.7
92	Luxembourg	1,157.9	133	Seychelles	55.0
93	Madagascar	0.5	134	Sierra Leone	6.5
94	Malawi	2.0	135	Singapore	85.0
95	Malaysia	16.8	136	Slovakia	107.1
96	Mali	0.8	137	Slovenia	30.5
97	Malta	184.6	138	Somalia	0.1
98	Mauritania	1.9	139	South Africa	14.9
99	Mauritius	7.6	140	Spain	30.9
100	Mexico	11.9	141	Sri Lanka	3.2
101	Mongolia	13.9	142	Sudan	1.6
102	Montenegro	15.0	143	Suriname	5.9
103	Morocco	7.1	144	Sweden	148.1
104	Mozambique	6.5	145	Switzerland	306.9
105	Myanmar	0.2	146	Syrian Arab Republic	2.8
106	Namibia	17.3	147	Tajikistan	0.4
107	Nepal	1.2	148	Thailand	5.3
108	Netherlands	61.0	149	The former Yugoslav Republic of Macedonia	12.2
109	New Zealand	28.9	150	Timor-Leste	0.4
110	Nicaragua	5.4	151	Togo	8.3
111	Niger	2.8	152	Trinidad and Tobago	63.9
112	Nigeria	6.7	153	Tunisia	10.8
113	Norway	103.3	154	Turkey	8.4
114	Oman	32.3	155	Turkmenistan	0.4
115	Pakistan	1.0	156	Uganda	14.4
116	Palestine	15.7	157	Ukraine	5.7
117	Panama	39.1	158	United Arab Emirates	69.8
118	Papua New Guinea	27.5	159	United Kingdom of Great Britain and Northern Ireland	281.1
119	Paraguay	6.9	160	United Republic of Tanzania	2.0
120	Peru	11.0	161	United States of America	33.4
121	Philippines	2.7	162	Uruguay	6.8
122	Poland	29.4	163	Uzbekistan	0.6
123	Portugal	16.0	164	Venezuela (Bolivarian Republic of)	13.7
124	Puerto Rico	25.2	165	Viet Nam	1.4
125	Qatar	233.9	166	Yemen	7.3
126	Republic of Korea	26.2	167	Zambia	4.3
127	Republic of Moldova	3.4	168	Zimbabwe	1.2

ANNEX 2. Country data for the water-use efficiency (WUE) indicator

Country	WUE Agriculture	WUE MIMEC	WUE Services	P% Agriculture[1]	P% MIMEC	P% Services	WUE
Afghanistan	0.1	14.6	19.3	99	1	1	0.3
Albania	0.9	8.5	7.6	39	18	43	5.1
Algeria	0.7	172.8	18.2	59	5	36	15.5
Angola	0.2	205.2	86.1	21	34	45	108.7
Antigua and Barbuda	2.4	70.3	120.6	16	22	63	91.2
Argentina	0.2	35.5	53.3	74	11	15	12.1
Armenia	0.5	26.9	3.3	66	4	29	2.5
Australia	0.3	122.5	186.8	66	13	22	56.1
Austria	3.2	35.5	321.6	2	77	21	93.8
Azerbaijan	0.2	10.3	16.8	76	19	4	2.9
Bahrain	0.5	314.9	54.2	45	6	50	45.1
Bangladesh	0.4	38.6	17.8	88	2	10	3.0
Barbados	0.7	98.8	160.6	68	8	25	47.7
Belarus	0.1	43.4	49.0	32	32	36	31.5
Belgium	1.2	16.9	427.5	1	88	12	65.3
Belize	0.2	8.9	56.4	68	21	11	8.4
Benin	0.2	47.8	43.3	45	23	32	24.8
Bhutan	0.3	185.5	25.5	94	1	5	3.2
Bolivia (Plurinational State of)	0.2	256.2	75.7	92	2	7	9.1
Botswana	0.0	102.1	48.5	41	18	41	38.2
Brazil	0.3	34.5	53.8	55	17	28	21.2
Bulgaria	0.1	1.6	17.0	11	72	16	4.0
Burkina Faso	0.1	54.2	8.0	51	3	46	5.2
Burundi	0.2	22.4	17.5	77	6	17	4.5
Cabo Verde	0.3	417.7	386.9	93	1	6	29.4
Cambodia	0.3	85.2	43.0	94	2	4	3.5
Cameroon	0.0	71.3	43.3	76	7	17	12.3
Canada	0.4	12.1	147.6	6	80	14	30.7
Central African Republic	0.2	23.4	10.2	1	17	83	12.3
Chad	0.1	7.4	25.3	76	12	12	3.9
Chile	0.2	15.6	71.0	83	13	4	4.8
China	1.7	32.0	66.6	65	23	12	16.7
Colombia	0.6	29.1	36.1	54	19	27	15.5
Comoros	0.1	81.6	33.9	47	5	48	20.4
Congo	0.7	304.0	45.6	9	22	70	97.9
Costa Rica	0.8	40.7	45.7	57	11	32	19.7
Côte d'Ivoire	0.2	16.3	19.1	38	21	41	11.3
Croatia	7.6	85.4	55.1	1	20	79	60.4

[1] P stands for "Proportion of water used by a given sector over the total use".

Country	WUE Agriculture	WUE MIMEC	WUE Services	P% Agriculture	P% MIMEC	P% Services	WUE
Cuba	0.2	25.0	35.8	65	11	24	11.5
Cyprus	1.6	471.2	208.7	66	4	30	81.7
Czechia	1.5	40.1	99.3	2	60	38	62.0
Democratic People’s Republic of Korea	0.4	6.1	5.9	76	13	10	1.7
Democratic Republic of the Congo	0.2	45.9	20.5	11	21	68	23.8
Denmark	8.4	460.7	516.3	25	20	55	377.6
Dominican Republic	0.2	24.7	41.4	80	8	12	7.1
Ecuador	0.5	45.6	28.8	81	6	13	6.7
Egypt	0.5	57.4	16.6	86	3	12	3.8
El Salvador	0.2	29.1	27.5	68	10	22	9.2
Equatorial Guinea	0.0	1,666.2	112.0	6	15	79	337.8
Eritrea	0.1	727.1	63.7	95	0	5	4.7
Estonia	0.2	3.3	218.1	0	96	3	10.8
Eswatini	0.1	82.2	45.2	97	1	2	2.1
Ethiopia	0.0	66.1	14.1	89	1	10	1.9
Fiji	0.3	57.3	81.6	59	11	30	31.0
Finland	2.0	35.5	326.8	2	82	16	81.0
France	1.8	20.3	285.0	13	69	18	65.9
Gabon	0.3	446.3	40.7	29	10	61	70.1
Gambia	0.0	5.1	9.9	43	19	37	4.7
Georgia	0.6	5.5	16.4	58	22	20	4.8
Germany	1.1	23.6	336.9	3	83	14	66.2
Ghana	0.1	26.6	12.4	66	10	24	5.6
Greece	0.6	146.5	210.3	88	3	9	23.9
Guatemala	0.8	22.5	33.2	57	18	25	12.9
Guinea	0.2	24.7	7.8	53	9	38	5.4
Guinea-Bissau	0.2	14.2	11.9	82	5	13	2.4
Guyana	0.2	31.8	21.2	94	1	4	1.5
Haiti	0.2	56.7	19.1	83	4	13	4.6
Honduras	0.2	29.5	20.0	73	7	20	6.2
Hungary	0.9	7.0	85.1	6	79	14	17.7
Iceland	0.0	234.1	118.6	42	8	49	78.1
India	0.3	29.3	14.0	90	2	7	1.9
Indonesia	0.2	24.2	12.3	82	7	12	3.2
Iran (Islamic Republic of)	0.2	151.7	27.3	92	1	7	3.8
Iraq	0.1	6.6	3.6	79	15	7	1.3
Ireland	0.0	1,221.3	190.4	20	6	75	210.7
Israel	2.1	427.2	214.1	58	6	36	103.9
Italy	1.0	27.5	130.7	44	36	20	36.5
Jamaica	0.4	41.3	31.0	55	9	35	15.1
Japan	0.6	100.2	188.5	66	15	19	51.5
Jordan	0.7	208.0	56.8	65	4	31	26.5
Kazakhstan	0.1	9.6	96.6	66	30	4	6.9
Kenya	0.3	80.5	20.6	59	4	37	10.9
Kuwait	0.6	1,526.3	81.4	54	2	44	70.7
Kyrgyzstan	0.2	2.4	9.1	93	4	3	0.5

Country	WUE Agriculture	WUE MIMEC	WUE Services	P% Agriculture	P% MIMEC	P% Services	WUE
Lao People's Democratic Republic	0.3	10.9	19.6	91	5	4	1.5
Latvia	0.0	103.3	106.8	15	21	64	90.4
Lebanon	1.2	34.5	64.3	60	11	29	23.3
Lesotho	0.0	26.9	34.2	9	46	46	27.9
Liberia	0.8	0.7	2.5	9	36	54	1.7
Libya	0.1	259.6	49.5	83	5	12	18.5
Lithuania	0.0	25.4	148.4	10	66	24	52.0
Luxembourg	0.5	3,231.0	1,064.8	1	5	95	1,157.9
Madagascar	0.0	7.8	11.4	96	1	3	0.5
Malawi	0.0	16.1	13.2	86	4	11	2.0
Malaysia	1.1	18.2	25.3	22	43	35	16.8
Mali	0.0	383.6	21.7	98	0	2	0.8
Malta	2.2	1,309.6	456.8	64	2	34	184.6
Mauritania	0.1	41.0	12.0	91	2	7	1.9
Mauritius	0.3	87.7	16.9	68	3	30	7.6
Mexico	0.2	47.9	52.0	77	9	14	11.9
Mongolia	1.0	12.3	62.9	44	43	13	13.9
Montenegro	1.2	8.7	20.4	4	40	57	15.0
Morocco	0.4	110.1	44.4	88	2	10	7.1
Mozambique	0.1	104.2	18.4	73	2	25	6.5
Myanmar	0.1	4.5	1.1	89	1	10	0.2
Namibia	0.1	129.0	43.4	70	5	25	17.3
Nepal	0.4	73.4	42.4	98	0	2	1.2
Netherlands	55.3	15.5	414.4	1	88	11	61.0
New Zealand	4.4	34.1	84.6	57	19	23	28.9
Nicaragua	0.3	36.9	18.6	77	5	19	5.4
Niger	0.0	18.4	7.1	67	3	30	2.8
Nigeria	0.2	25.9	8.5	53	15	31	6.7
Norway	0.8	107.5	189.2	28	41	31	103.3
Oman	0.8	1,246.2	134.4	88	1	10	32.3
Pakistan	0.2	29.6	11.3	94	1	5	1.0
Palestine	0.7	55.8	24.1	45	7	48	15.7
Panama	0.3	947.5	53.2	43	1	56	39.1
Papua New Guinea	0.0	28.4	26.9	0	43	57	27.5
Paraguay	0.1	39.5	28.5	79	6	15	6.9
Peru	0.5	208.0	66.3	89	2	9	11.0
Philippines	0.1	9.2	22.2	82	10	8	2.7
Poland	0.1	13.9	107.6	9	74	18	29.4
Portugal	0.2	29.7	137.0	78	13	9	16.0
Puerto Rico	4.1	31.1	6.8	2	76	23	25.2
Qatar	0.2	9,228.6	172.1	59	2	39	233.9
Republic of Korea	1.2	63.3	53.8	55	15	30	26.2
Republic of Moldova	0.5	0.8	20.0	3	83	14	3.4
Romania	0.3	12.5	91.1	18	67	15	22.3
Russian Federation	0.1	6.2	34.2	20	60	20	10.7
Rwanda	0.2	37.3	45.3	68	8	24	14.0

Country	WUE Agriculture	WUE MIMEC	WUE Services	P% Agriculture	P% MIMEC	P% Services	WUE
Saudi Arabia	0.3	412.0	74.5	88	3	9	19.4
Senegal	0.0	30.4	41.7	93	3	4	2.7
Seychelles	2.9	183.6	45.1	7	9	84	55.0
Sierra Leone	1.9	5.2	9.0	22	26	52	6.5
Singapore	0.0	47.2	128.4	0	53	47	85.0
Slovakia	2.3	79.4	147.4	5	49	46	107.1
Slovenia	13.1	12.1	142.1	0	85	14	30.5
Somalia	0.0	30.6	18.1	99	0	0	0.1
South Africa	0.2	60.7	32.1	61	8	31	14.9
Spain	0.5	50.5	128.5	65	18	17	30.9
Sri Lanka	0.2	15.9	32.0	87	6	6	3.2
Sudan	0.2	34.6	37.0	96	0	4	1.6
Suriname	1.0	10.8	35.2	70	22	8	5.9
Sweden	3.1	78.7	269.2	4	58	38	148.1
Switzerland	5.2	251.9	376.5	8	32	60	306.9
Syrian Arab Republic	0.3	27.9	17.3	88	4	9	2.8
Tajikistan	0.1	3.2	3.2	91	4	6	0.4
Thailand	0.3	45.4	59.4	90	5	5	5.3
The former Yugoslav Republic of Macedonia	2.9	8.5	20.6	23	36	41	12.2
Timor-Leste	0.0	28.2	3.8	91	0	8	0.4
Togo	0.1	104.0	11.0	45	2	53	8.3
Trinidad and Tobago	1.7	105.8	45.6	4	34	62	63.9
Tunisia	0.3	73.0	46.3	80	5	15	10.8
Turkey	0.5	23.6	35.5	74	11	15	8.4
Turkmenistan	0.1	5.1	6.3	94	3	3	0.4
Uganda	0.0	63.9	18.2	41	8	51	14.4
Ukraine	0.1	3.7	17.9	30	48	22	5.7
United Arab Emirates	0.5	2,228.5	200.8	83	2	15	69.8
United Kingdom of Great Britain and Northern Ireland	0.7	434.7	312.8	16	14	70	281.1
United Republic of Tanzania	0.1	121.6	12.7	89	0	10	2.0
United States of America	0.4	13.5	206.1	36	51	13	33.4
Uruguay	0.2	80.4	43.2	87	2	11	6.8
Uzbekistan	0.1	6.4	3.4	90	3	7	0.6
Venezuela (Bolivarian Republic of)	0.4	212.0	26.2	74	4	23	13.7
Viet Nam	0.2	15.3	43.5	95	4	1	1.4
Yemen	0.8	156.8	42.8	90	2	8	7.3
Zambia	0.2	16.3	15.2	73	8	18	4.3
Zimbabwe	0.0	8.4	5.8	82	6	12	1.2

ANNEX 3. Countries in regions

The countries included in the global analysis of indicator 6.4.1 are listed by region in the following tables.

Africa				
Northern Africa	Sub-Saharan Africa			
	Eastern Africa	Middle Africa	Southern Africa	Western Africa
Algeria	Burundi	Angola	Botswana	Benin
Egypt	Comoros	Cameroon	Eswatini	Burkina Faso
Libya	Djibouti	Central African Republic	Lesotho	Cabo Verde
Morocco	Eritrea	Chad	Namibia	Côte d'Ivoire
Sudan	Ethiopia	Congo	South Africa	Gambia
Tunisia	Kenya	Democratic Republic of the Congo		Ghana
	Madagascar	Equatorial Guinea		Guinea
	Malawi	Gabon		Guinea-Bissau
	Mauritius	Sao Tome and Principe		Liberia
	Mozambique			Mali
	Rwanda			Mauritania
	Seychelles			Niger
	Somalia			Nigeria
	Uganda			Senegal
	United Republic of Tanzania			Sierra Leone
	Zambia			Togo
	Zimbabwe			

Americas			
Northern America	**Latin America and the Caribbean**		
	Caribbean	**Central America**	**South America**
Canada	Antigua and Barbuda	Belize	Argentina
United States of America	Bahamas	Costa Rica	Bolivia (Plurinational State of)
	Barbados	El Salvador	Brazil
	Cuba	Guatemala	Chile
	Dominica	Honduras	Colombia
	Dominican Republic	Mexico	Ecuador
	Grenada	Nicaragua	Guyana
	Haiti	Panama	Paraguay
	Jamaica		Peru
	Puerto Rico		Suriname
	Saint Kitts and Nevis		Uruguay
	Saint Lucia		Venezuela (Bolivarian Republic of)
	Saint Vincent and the Grenadines		
	Trinidad and Tobago		

Europe			
Eastern Europe	**Northern Europe**	**Southern Europe**	**Western Europe**
Belarus	Denmark	Albania	Austria
Bulgaria	Estonia	Andorra	Belgium
Czechia	Finland	Bosnia and Herzegovina	France
Hungary	Iceland	Croatia	Germany
Poland	Ireland	Greece	Luxembourg
Republic of Moldova	Latvia	Italy	Monaco
Romania	Lithuania	Malta	Netherlands
Russian Federation	Norway	Montenegro	Switzerland
Slovakia	Sweden	Portugal	
Ukraine	United Kingdom of Great Britain and Northern Ireland	San Marino	
		Serbia	
		Slovenia	
		Spain	
		The former Yugoslav Republic of Macedonia	

Asia				
Central Asia	**Eastern Asia**	**South-Eastern Asia**	**Southern Asia**	**Western Asia**
Kazakhstan	China	Brunei Darussalam	Afghanistan	Armenia
Kyrgyzstan	Democratic People's Republic of Korea	Cambodia	Bangladesh	Azerbaijan
Tajikistan	Japan	Indonesia	Bhutan	Bahrain
Turkmenistan	Mongolia	Lao People's Democratic Republic	India	Cyprus
Uzbekistan	Republic of Korea	Malaysia	Iran (Islamic Republic of)	Georgia
		Myanmar	Maldives	Iraq
		Philippines	Nepal	Israel
		Singapore	Pakistan	Jordan
		Thailand	Sri Lanka	Kuwait
		Timor-Leste		Lebanon
		Viet Nam		Palestine
				Oman
				Qatar
				Saudi Arabia
				Syrian Arab Republic
				Turkey
				United Arab Emirates
				Yemen

Oceania			
Australia and New Zealand	**Melanesia**	**Micronesia**	**Polynesia**
Australia	Fiji	Kiribati	Cook Islands
New Zealand	Papua New Guinea	Marshall Islands	Niue
	Solomon Islands	Micronesia (Federal States of)	Samoa
	Vanuatu	Nauru	Tonga
		Palau	Tuvalu

ANNEX 4. International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 4

ISIC Activity	Va	Wa	Vm	Wm	Vs	Ws
A – Agriculture, forestry and fishing 01 – Crop and animal production, hunting and related service activities	✗	✗				
02 – Forestry and logging	-	-				
03(1) – Fishing	-	-				
03(2) – Aquaculture	✗	✗				
B (05–09) – Mining and quarrying C (10–33) – Manufacturing D (35) – Electricity, gas, steam and air conditioning supply			✗	✗		
E – Water supply; sewerage, waste management and remediation activities 36 – Water collection, treatment and supply					✗	✗
37 – Sewerage 38 – Waste collection, treatment and disposal activities; materials recovery 39 – Remediation activities and other waste management services					✗	-
F (41–43) – Construction			✗	✗		
G (45–47) – Wholesale and retail trade; repair of motor vehicles and motorcycles H (49–53) – Transportation and storage I (55–56) – Accommodation and food service activities J (58–63) – Information and communication K (64–66) – Financial and insurance activities L (68) – Real estate activities M (69–75) – Professional, scientific and technical activities N (77–82) – Administrative and support service activities O (84) – Public administration and defence; compulsory social security P (85) – Education Q (86–88) – Human health and social work activities R (90–93) – Arts, entertainment and recreation S (94–96) – Other service activities T (97–98) – Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use					✗	-
U (99) – Activities of extraterritorial organizations and bodies	-	-	-	-	-	-

LEARN MORE ABOUT PROGRESS TOWARDS SDG 6

6 CLEAN WATER AND SANITATION

SDG 6 expands the MDG focus on drinking water and basic sanitation to include the more holistic management of water, wastewater and ecosystem resources, acknowledging the importance of an enabling environment. Bringing these aspects together is an initial step towards addressing sector fragmentation and enabling coherent and sustainable management. It is also a major step towards a sustainable water future.

The monitoring of progress towards SDG 6 is a means to making this happen. High-quality data help policy- and decision makers at all levels of government to identify challenges and opportunities, to set priorities for more effective and efficient implementation, to communicate progress and ensure accountability, and to generate political, public and private sector support for further investment.

In 2016–2018, following the adoption of the global indicator framework, the UN-Water Integrated Monitoring Initiative focused on establishing the global baseline for all SDG 6 global indicators, which is essential for effective follow-up and review of progress towards SDG 6. Below is an overview of the resultant indicator reports produced in 2017–2018. UN-Water has also produced the SDG 6 Synthesis Report 2018 on Water and Sanitation, which, building on baseline data, addresses the cross-cutting nature of water and sanitation and the many interlinkages within SDG 6 and across the 2030 Agenda, and discusses ways to accelerate progress towards SDG 6.

Progress on Drinking Water, Sanitation and Hygiene – 2017 Update and SDG Baselines (including data on SDG indicators 6.1.1 and 6.2.1) By WHO and UNICEF	One of the most important uses of water is for drinking and hygiene purposes. A safely managed sanitation chain is essential to protecting the health of individuals and communities and the environment. By monitoring use of drinking water and sanitation services, policy- and decision makers can find out who has access to safe water and a toilet with handwashing facilities at home, and who requires it. Learn more about the baseline situation for SDG indicators 6.1.1 and 6.2.1 here: http://www.unwater.org/publication_categories/whounicef-joint-monitoring-programme-for-water-supply-sanitation-hygiene-jmp/.
Progress on Safe Treatment and Use of Wastewater – Piloting the monitoring methodology and initial findings for SDG indicator 6.3.1 By WHO and UN-Habitat on behalf of UN-Water	Leaking latrines and raw wastewater can spread disease and provide a breeding ground for mosquitoes, as well as pollute groundwater and surface water. Learn more about wastewater monitoring and initial status findings here: http://www.unwater.org/publications/progress-on-wastewater-treatment-631.
Progress on Ambient Water Quality – Piloting the monitoring methodology and initial findings for SDG indicator 6.3.2 By UN Environment on behalf of UN-Water	Good ambient water quality ensures the continued availability of important freshwater ecosystem services and does not negatively affect human health. Untreated wastewater from domestic sources, industry and agriculture can be detrimental to ambient water quality. Regular monitoring of freshwaters allows for the timely response to potential sources of pollution and enables stricter enforcement of laws and discharge permits. Learn more about water quality monitoring and initial status findings here: http://www.unwater.org/publications/progress-on-ambient-water-quality-632.
Progress on Water-Use Efficiency – Global baseline for SDG indicator 6.4.1 By FAO on behalf of UN-Water	Freshwater is used by all sectors of society, with agriculture being the biggest user overall. The global indicator on water-use efficiency tracks to what extent a country's economic growth is dependent on the use of water resources, and enables policy- and decision makers to target interventions at sectors with high water use and low levels of improved efficiency over time. Learn more about the baseline situation for SDG indicator 6.4.1 here: http://www.unwater.org/publications/progress-on-water-use-efficiency-641.

Progress on Level of Water Stress – Global baseline for SDG indicator 6.4.2 By FAO on behalf of UN-Water	A high level of water stress can have negative effects on economic development, increasing competition and potential conflict among users. This calls for effective supply and demand management policies. Securing environmental water requirements is essential to maintaining ecosystem health and resilience. Learn more about the baseline situation for SDG indicator 6.4.2 here: http://www.unwater.org/publications/progress-on-level-of-water-stress-642.
Progress on Integrated Water Resources Management – Global baseline for SDG indicator 6.5.1 By UN Environment on behalf of UN-Water	Integrated water resources management (IWRM) is about balancing the water requirements of society, the economy and the environment. The monitoring of 6.5.1 calls for a participatory approach in which representatives from different sectors and regions are brought together to discuss and validate the questionnaire responses, paving the way for coordination and collaboration beyond monitoring. Learn more about the baseline situation for SDG indicator 6.5.1 here: http://www.unwater.org/publications/progress-on-integrated-water-resources-management-651.
Progress on Transboundary Water Cooperation – Global baseline for SDG indicator 6.5.2 By UNECE and UNESCO on behalf of UN-Water	Most of the world's water resources are shared between countries; where the development and management of water resources has an impact across transboundary basins, cooperation is required. Specific agreements or other arrangements between co-riparian countries are a precondition to ensuring sustainable cooperation. SDG indicator 6.5.2 measures cooperation on both transboundary river and lake basins, and transboundary aquifers. Learn more about the baseline situation for SDG indicator 6.5.2 here: http://www.unwater.org/publications/progress-on-transboundary-water-cooperation-652.
Progress on Water-related Ecosystems – Piloting the monitoring methodology and initial findings for SDG indicator 6.6.1 By UN Environment on behalf of UN-Water	Ecosystems replenish and purify water resources and need to be protected to safeguard human and environmental resilience. Ecosystem monitoring, including that of ecosystem health, highlights the need to protect and conserve ecosystems and enables policy- and decision makers to set de facto management objectives. Learn more about ecosystem monitoring and initial status findings here: http://www.unwater.org/publications/progress-on-water-related-ecosystems-661.
UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS) 2017 report – Financing universal water, sanitation and hygiene under the Sustainable Development Goals (including data on SDG indicators 6.a.1 and 6.b.1) By WHO on behalf of UN-Water	Human and financial resources are needed to implement SDG 6, and international cooperation is essential to making it happen. Defining the procedures for local communities to participate in water and sanitation planning, policy, law and management is vital to ensuring that the needs of everyone in the community are met, and to ensuring the long-term sustainability of water and sanitation solutions. Learn more about the monitoring of international cooperation and stakeholder participation here: http://www.unwater.org/publication_categories/glaas/.
SDG 6 Synthesis Report 2018 on Water and Sanitation By UN-Water	This first synthesis report on SDG 6 seeks to inform discussions among Member States during the High-level Political Forum on Sustainable Development in July 2018. It is an in-depth review and includes data on the global baseline status of SDG 6, the current situation and trends at the global and regional levels, and what more needs to be done to achieve this goal by 2030. Read the report here: http://www.unwater.org/publication_categories/sdg-6-synthesis-report-2018-on-water-and-sanitation/.

UN-WATER REPORTS

UN-Water coordinates the efforts of United Nations entities and international organizations working on water and sanitation issues. By doing so, UN-Water seeks to increase the effectiveness of the support provided to Member States in their efforts towards achieving international agreements on water and sanitation. UN-Water publications draw on the experience and expertise of UN-Water's Members and Partners.

PERIODIC REPORTS

Sustainable Development Goal 6 Synthesis Report 2018 on Water and Sanitation

The SDG 6 Synthesis Report 2018 on Water and Sanitation was published in June 2018 ahead of the High-level Political Forum on Sustainable Development, where Member States reviewed SDG 6 in depth. Representing a joint position from the United Nations family, the report offers guidance to understanding global progress on SDG 6 and its interdependencies with other goals and targets. It also provides insight into how countries can plan and act to ensure that no one is left behind when implementing the 2030 Agenda for Sustainable Development.

Sustainable Development Goal 6 Indicator Reports

This series of reports shows the progress towards targets set out in SDG 6 using the SDG global indicators. The reports are based on country data, compiled and verified by the United Nations organizations serving as custodians of each indicator. The reports show progress on drinking water, sanitation and hygiene (WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene for targets 6.1 and 6.2), wastewater treatment and ambient water quality (UN Environment, UN-Habitat and WHO for target 6.3), water-use efficiency and level of water stress (FAO for target 6.4), integrated water resources management and transboundary water cooperation (UN Environment, UNECE and UNESCO for target 6.5), ecosystems (UN Environment for target 6.6) and means for implementing SDG 6 (UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water for targets 6.a and 6.b).

World Water Development Report

This annual report, published by UNESCO on behalf of UN-Water, represents the coherent and integrated response of the United Nations system to freshwater-related issues and emerging challenges. The theme of the report is harmonized with the theme of World Water Day (22 March) and changes annually.

Policy and Analytical Briefs

UN-Water's Policy Briefs provide short and informative policy guidance on the most pressing freshwater-related issues, which draw upon the combined expertise of the United Nations system. Analytical Briefs provide an analysis of emerging issues and may serve as a basis for further research, discussion and future policy guidance.

UN-WATER PLANNED PUBLICATIONS 2018

- Update of UN-Water Policy Brief on Water and Climate Change
- UN-Water Policy Brief on the Water Conventions
- UN-Water Analytical Brief on Water Efficiency

More information on UN-Water Reports at www.unwater.org/publications

Few countries have the natural and financial resources to further enhance water supplies for human use. The alternative is to use the available resources more efficiently. The global indicator on water-use efficiency tracks to what extent a country's economic growth is dependent on the use of water resources, and enables policy- and decision makers to target interventions at sectors with high water use and low levels of improved efficiency over time.

This indicator addresses the economic component of target 6.4. In this report, you can learn more about the baseline situation for water-use efficiency. More information and metrological guidance can be found at: http://www.fao.org/sustainable-development-goals/indicators/641/

This report is part of a series that tracks progress towards the various targets set out in SDG 6 using the SDG global indicators. To learn more about water and sanitation in the 2030 Agenda for Sustainable Development, and the Integrated Monitoring Initiative for SDG 6, visit our website: www.sdg6monitoring.org

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