Integrated Monitoring Guide for Sustainable Development Goal 6 on Water and Sanitation – Targets and global indicators

This publication will be continually updated throughout the duration of the 2030 Agenda for Sustainable Development, to incorporate new developments and lessons learned.

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About the Guide

The UN-Water Integrated Monitoring Initiative for Sustainable Development Goal (SDG) 6 supports countries in monitoring water and sanitation and compiles data to report on global progress. The Initiative is a collaboration between United Nations agencies to streamline global monitoring efforts and foster cross-sectoral collaboration.

The Integrated Monitoring Guide for SDG 6 constitutes a main point of reference in this work, and comprises the following components:

Guide component	Description	Target audience
Integrated Monitoring Guide for SDG 6 – Good practices for country monitoring systems	Good practices on processes and principles for implementing SDG 6 monitoring at the national level, including success factors, institutional arrangements, stakeholder involvement and resource requirements	Senior staff responsible for setting up and coordinating SDG 6 monitoring (e.g. SDG 6 focal points); technical staff responsible for monitoring the SDG 6 indicators; politicians and the general public (for a better understanding of the overall process)
Integrated Monitoring Guide for SDG 6 – Targets and global indicators (this document)	Presentation of SDG 6 and its targets, highlighting interlinkages within SDG 6 and with other SDGs; broad overview of SDG 6 global indicators, their rationale and recommended methodologies for monitoring them	Senior staff responsible for setting up and coordinating SDG 6 monitoring (e.g. SDG 6 focal point); technical staff responsible for monitoring the components of SDG 6; politicians and the general public
Step-by-step methodologies for SDG 6 global indicators	Step-by-step guidance on recommended methodologies for monitoring the SDG 6 global indicators, including advice on data collection and management	Technical staff responsible for monitoring the components of SDG 6

The Guide should not be seen as a prescriptive set of rules to be adhered to, but rather as promoting an integrated approach for monitoring SDG 6. We anticipate that the Guide will be continually revised during the SDG period, to incorporate methodological and technological developments, as well as institutional good practices that can improve monitoring effectiveness and efficiency.

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Acronyms

FAO	Food and Agriculture Organization of the United Nations	OSU	Oregon State University
GEF	Global Environment Facility	SDG	Sustainable Development Goal
GEMI	Integrated Monitoring of Water and Sanitation-Related SDG Targets	TBA	transboundary aquifer
GLAAS	Global Analysis and Assessment of Sanitation and Drinking-Water	TWAP	Transboundary Waters Assessment Programme
GRDC	Global Runoff Data Centre	UNECE	United Nations Economic Commission for Europe
IBNET	International Benchmarking Network for Water and Sanitation Utilities	UN Environment	United Nations Environment Programme
IGRAC	International Groundwater Resources Assessment Centre	UNESCO	United Nations Educational, Scientific and Cultural Organization
ISARM	Internationally Shared Aquifer Resources Management	UN-Habitat	United Nations Human Settlements Programme
ISIC	International Standard Industrial Classification of All Economic Activities	UNICEF	United Nations Children's Fund
IWRM	integrated water resources management	UNIDO	United Nations Industrial Development Organization
JMP	Joint Monitoring Programme for Water Supply, Sanitation and Hygiene	UNSD	United Nations Statistics Division
LEGOS	Laboratory for studies on Spatial Geophysics and Oceanography	WASH	Water, Sanitation and Hygiene
MDG	Millennium Development Goal	WHO	World Health Organization
ODA	official development assistance	WHOS	WMO Hydrological Observing System
OECD	Organisation for Economic Co-operation and Development	WMO	World Meteorological Organization

Water and sanitation in the 2030 Agenda

The core of sustainable development

Safe drinking water and adequate sanitation and hygiene are fundamental to human health and well-being. Aside from domestic purposes, water is needed for food, energy and industrial production – uses that are highly interconnected and potentially conflicting. These uses generate wastewater, which may cause pollution if not properly managed. Water is also needed to ensure healthy ecosystems, which in turn can improve the quantity and quality of freshwater, as well as overall resilience to human-induced and environmentally induced changes. The effects of climate change are often seen in changes in water availability, such as increasing water scarcity in some regions and flooding in others. Consequently, water is a key factor in managing risks related to famine, disease epidemics, migration, inequalities within and between countries, political instability and natural disasters.

Cross-cutting and fragmentation

Water can be instrumental in the implementation of integrated solutions across different sectors. However, water resources are commonly developed and managed by different government departments and within different sectors, resulting in little coordination between them and a lack of overview on the state of the resource. Inherent to this sectoral approach is the problem of coherence, where policies and decision-making in one sector may contradict or duplicate those in another. Furthermore, water resources are naturally confined to water basins so from a physical and ecological perspective, it would be most appropriate to manage these resources at this scale. However, water resources are often managed according to administrative units, which commonly cut across water basins, resulting in further fragmentation, especially in the case of transboundary water basins.

Towards a sustainable water future

To ensure sustainable management of water and sanitation for all, it is essential to look at the water cycle in its entirety, including all uses and users. Countries need to move away from the sectoral development and management of water resources, in favour of a more integrated approach that can balance different needs fairly. This is exactly what SDG 6 seeks to do – by expanding the Millennium Development Goal (MDG) focus on drinking water and basic sanitation to include water, wastewater and ecosystem resources, and together with target SDG 11.5 on water-related disasters, all the main aspects related to freshwater in the context of sustainable development are covered. Bringing these aspects together under one goal is an initial step towards addressing sector fragmentation and enabling coherent and sustainable management, thereby establishing SDG 6 as a major step towards a sustainable water future.

Monitoring makes it happen

Monitoring is not an end but rather a means to implement more effectively and efficiently. High-quality data help policy- and decision makers at all levels of government to identify challenges and set priorities, identify interlinkages across sectors (to harness synergies and manage potential conflicts) and learn about good practices. Data communicate progress over time, or lack thereof (and therefore associated requirements), to ensure accountability between governments and their citizens, as well as to raise awareness and gain political support, which in turn stimulates investment.

Monitoring SDG 6

Moving from MDGs to SDGs

The shift from the MDGs to the SDGs is a game changer for water and sanitation, where countries need to transition from a relatively narrow focus on providing access to improved sources of drinking water and basic sanitation, to a more comprehensive focus on sustainably managing the whole water cycle in an equitable manner. Naturally, the shift has implications on monitoring – where the MDGs included only three indicators on water and sanitation, the SDGs include 11 and where the MDG indicators were monitored primarily through household surveys, SDG 6 monitoring will inevitably involve many national authorities from different sectors. There is thus a real need to strengthen national capacity and resources for monitoring, and to generate political support to do so.

UN-Water Integrated Monitoring Initiative for SDG 6

To support countries monitoring progress towards SDG 6, UN-Water has launched the Integrated Monitoring Initiative, building on the experience and lessons learned during the MDG period. All the custodian agencies of the SDG 6 global indicators have come together under the Initiative, which comprises the work of the World Health Organization (WHO)/United Nations Children's Fund (UNICEF) Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP), the Integrated Monitoring of Water and Sanitation-Related SDG Targets (GEMI) and the UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS).

The objectives of the Integrated Monitoring Initiative are to:

- Develop methodologies and tools to monitor SDG 6 global indicators
- Raise awareness at 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 important with regards to the institutional aspects of monitoring, in particular the integration of data collection and analysis across different sectors, regions and administrative levels. To learn more about the Integrated Monitoring Initiative, please refer to our website.

Core principles

The work of the Integrated Monitoring Initiative for SDG 6, including the methodology development, is guided by the following core principles:

- **Building on and harmonizing national monitoring efforts**: Countries own the monitoring and reporting of the SDGs, they are the main beneficiaries of better quality data and in most cases, they already have monitoring systems in place. Global (and regional) monitoring efforts must therefore build on, and reinforce, what already exists and focus on strengthening national statistical systems. They must also work to ensure that data from one country are comparable with data from another, and comparable over time. This harmonization process is based on internationally agreed definitions and standards, and necessitates striking an important balance between country ownership and global (and regional) comparability.
- **Steps for progressive monitoring**: To enable Member States to launch monitoring efforts at a level in line with their national capacity and available resources, there is a need for flexible methodologies, for which the concept of "progressive monitoring steps" is useful. With this approach, countries can start with simple methodologies, such as using alternative data sources and models or monitoring a limited number of parameters at a limited number of sites. As their capacity and resources increase, they can

progressively adopt more advanced and accurate monitoring methodologies. Furthermore, new technologies, such as Earth observations, cell phone applications and geospatial data collection, are rapidly improving the capacity to collect, store, analyse, report and share data, while reducing the costs involved.

- **Data integration**: Monitoring SDG 6 will involve a wide range of stakeholders across different sectors and levels of government. To enable a comprehensive assessment and analysis of the state of water resources and possible development paths, one of the monitoring effort's key objectives is to collate all the information, in support of an integrated management approach that helps reduce institutional fragmentation.
- **Data usage and disaggregation**: Another key objective of monitoring is to inform policy- and decision making and planning. To this end, it is important that the data can be disaggregated to indicate where, when, how and at whom to target interventions. The 2030 Agenda emphasizes that "no one will be left behind"; to track progress in this regard, data should be disaggregated by a number of socioeconomic strata.

This publication illustrates how these principles have been applied to the different indicators. For more information about these core principles, please refer to the first component of the Guide, Good practices for country monitoring systems.

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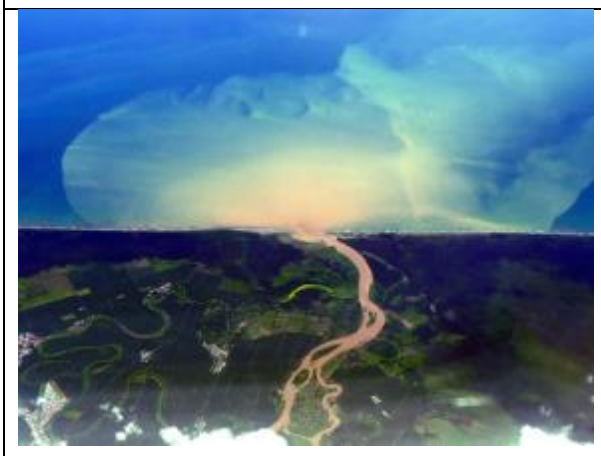

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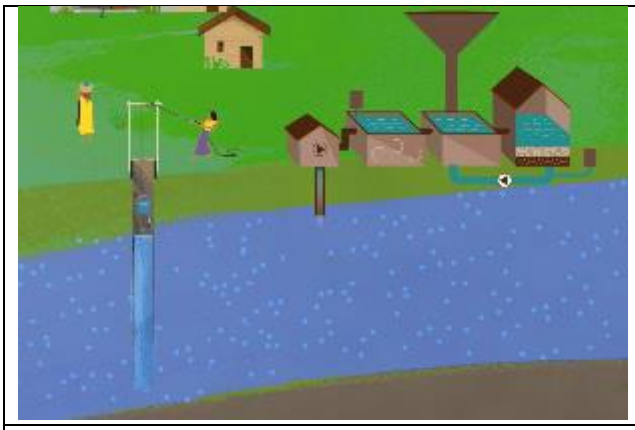
Target 6.1 Drinking water

"By 2030, achieve universal and equitable access to safe and affordable drinking water for all."

One of the most important uses of water is for drinking and hygiene purposes within households. This use is captured in target 6.1, which seeks to secure safe and affordable drinking water for all. Water "for all" households represents an important share of total water use (target 6.4). "Safe" drinking water means that it is free of contaminants – the treatment needed for water to qualify as "safe" is directly dependent on the quality of the raw water (targets 6.2, 6.3 and 6.6).

Targets 6.1 and 6.2 build on the MDG targets on drinking water and sanitation, and respond directly to the human right to safe drinking water and sanitation. These two targets contribute to reducing multidimensional poverty and achieving universal access to basic services (SDGs 1 and 11), and are prerequisites for wider improvements in nutrition (SDG 2), health (SDG 3), education (SDG 4), gender equality (SDG 5) and productivity (SDG 8).

In 2015, 71 per cent of people worldwide used safely managed drinking water services (i.e. from an improved source, located in the home, available when needed and free of contamination) and an additional 17 per cent used basic services (i.e. from an improved source, located within a 30-minute round trip from the home).[1] In 2015, estimates for safely managed drinking water were available for 96 countries, representing 35 per cent of the global population. Source: Progress on drinking water, sanitation and hygiene: 2017 update and SDG baselines (JMP, 2017)



Drinking water can easily be contaminated through poor sanitation and hygiene.

By monitoring use of drinking water services, policy- and decision makers find out who has access to a reliable source of good-quality drinking water at home and who requires it. Household surveys are an important source of data on the use of drinking water services.

Normative interpretation of target 6.1

Target text	Normative interpretation of target text
By 2030, achieve universal	Implies all exposures and settings including households, schools, health-care facilities and the workplace
and equitable	Implies progressive reduction and elimination of inequalities among population subgroups
access	Implies that sufficient water to meet domestic needs is reliably available close to home
to safe	Safe drinking water is free of pathogens and elevated levels of toxic chemicals at all times

[1] By the end of the MDG period in 2015, 91 per cent of people worldwide used an "improved water source", which is similar to "basic services" but also includes sources further away than a 30-minute round trip from the home. Source: Millennium Development Goals Report (2015)

and affordable	Implies payment for services does not present a barrier to access or prevent people from meeting basic human needs
drinking water	Water used for drinking, cooking, food preparation and personal hygiene
for all	Suitable for use by men, women, girls and boys of all ages, including people with disabilities

Global indicator 6.1.1 "Proportion of population using safely managed drinking water services"

Definition	Population using an improved drinking water source (piped water into dwellings, yards or plots; public taps or standpipes; boreholes or tube wells; protected dug wells; protected springs; rainwater; packaged or delivered water) that is located on the premises and available when needed, and free of faecal and priority chemical contamination. Drinking water from an improved source that does not fulfil the above-mentioned criteria is categorized as "basic" services, provided that the collection time is not more than a 30-minute round trip, including queuing. If the improved drinking water source is located further away, the service is categorized as "limited".
Disaggregation	This indicator can be disaggregated by service level – no services, limited services, basic services and safely managed services. The monitoring of access "for all", as well as the aspect of affordability, require disaggregation of data to capture potential inequalities across socioeconomic strata, including within households and geographical locations.
Rationale and use	This indicator builds on the MDG indicator, "proportion of population using an improved drinking water source", but also incorporates aspects on quality (is it free of bacteria and other types of contamination?), accessibility (is it located on the premises?) and availability (is it available when needed?) to further address the normative criteria of the human right to water. By analysing these different aspects, policy- and decision makers can, for example, decide to focus their interventions on treatment to improve quality, on extending distribution networks to improve accessibility or on rehabilitating the existing distribution network to improve availability and safeguard quality. By disaggregating the data spatially and by different socioeconomic strata, it is possible to identify which parts of the population are being left behind.
Complementary indicators	In certain regions, it may be useful to include an indicator on time spent collecting water, to further analyse the state of "basic" services. It is also imperative to monitor access beyond the household, in institutional settings such as schools, health-care facilities and the workplace.

Data and progressive monitoring for indicator 6.1.1

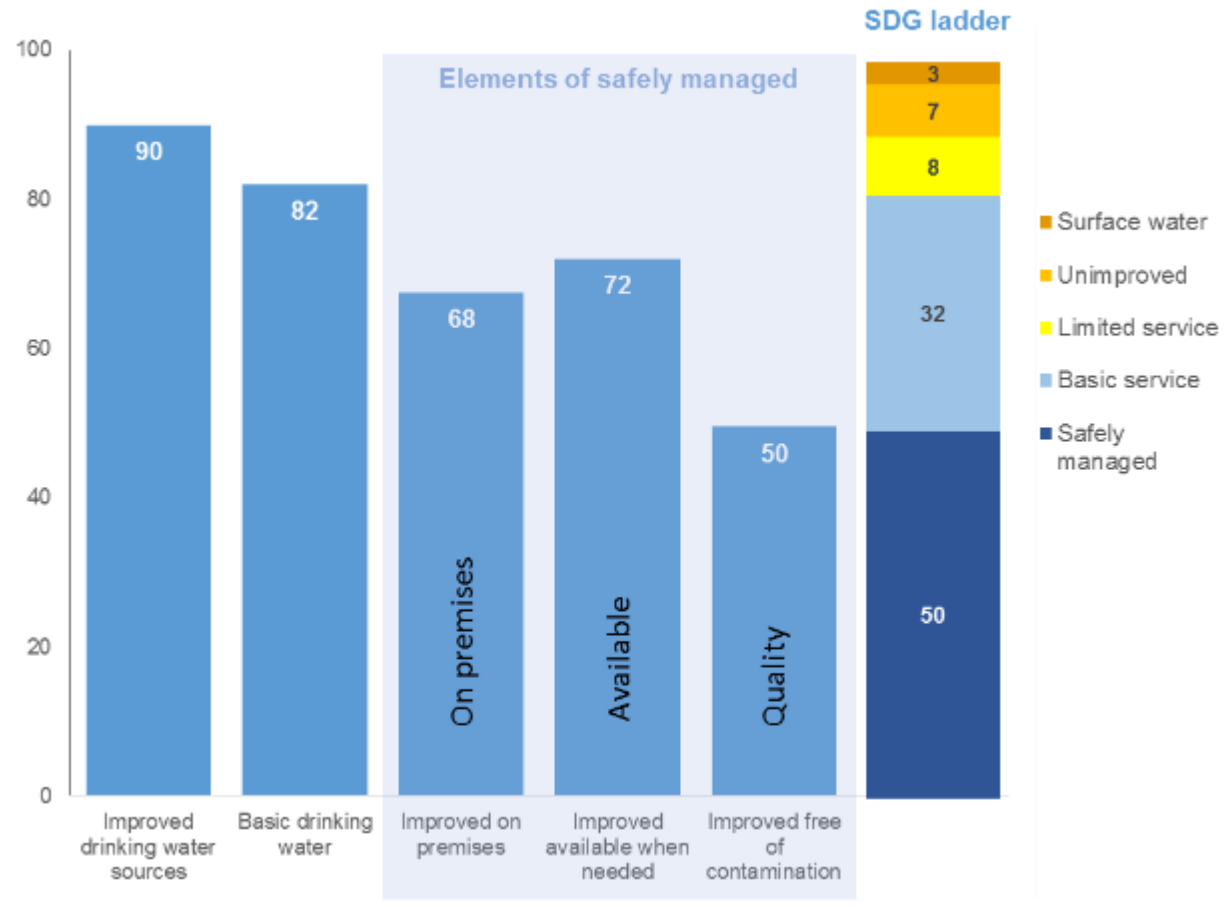
The extended scope of indicator 6.1.1 has implications on the monitoring process. During the MDG period, data were mainly collected from household surveys; with the SDG indicator, data on water quality and availability will also be gathered from relevant institutions and utilities. Countries can start their monitoring effort with existing data on basic services and gradually incorporate more information about water quality and availability, as well as improve the data disaggregation.

The JMP will publish updates biennially and related reports, for example, on WASH in schools and health-care facilities, in the intervening years.

Data sources and compilation	First step of progressive monitoring (example)	Second step of progressive monitoring (example)	Third step of progressive monitoring (example)
National sources: Household surveys and institutional/utility records Global databases: WHO/UNICEF JMP Global compilation: WHO/UNICEF	Household surveys combined with population records for information on access and type of services No information on water quality; reporting to the basic services level but not to the safely managed services level Disaggregation of household data by place of residence, subnational region and wealth	Inclusion of water quality testing for faecal contamination in household survey instruments Incomplete data from utilities and national authorities on availability and quality of drinking water services Disaggregation of data by informal settlements and locally important marginalized groups	Inclusion of water quality testing for faecal contamination and priority chemicals (arsenic and fluoride) by utilities and/or in household survey instruments High temporal and spatial resolution of institutional/utility data Disaggregation of data by intra-household characteristics

Moving from MDGs to SDGs – the example of drinking water

While the SDG indicator of "safely managed drinking water services" is introduced, coverage under this indicator will inevitably be lower than coverage of "improved drinking water services", as tracked for the MDGs. This is illustrated in the following example, from a country where 90 per cent of the population had access to an improved source of drinking water at the end of the MDG period. When factoring in that the source needs to be located on the premises, this number drops to 68 per cent; when looking at how many people have continuous access to water throughout the day and the week, it changes to 72 per cent; when looking at water quality, only 50 per cent has access to water that is safe to drink. In this case, the resulting percentage for this country on SDG indicator 6.1.1 would be 50 per cent, which is significantly lower than the initial 90 per cent and highlights the limitations of the improved drinking water indicator. However, this example is also a good illustration of the power of the indicator – disaggregating by three different components gives a clear indication of where action is needed to ensure safe drinking water for all by 2030.



Indicator 6.1.1 builds on the MDG indicator on the use of an improved drinking water source, but also considers whether that source is located in the home, if water is available when needed and is free of bacteria and other types of contamination.

Target 6.2 Sanitation and hygiene

"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."

In the above-mentioned aim for target 6.2, "adequate" implies a system that safely separates excreta and wastewater from human contact along the sanitation chain, either by safe containment and disposal near the home or by safe transport and treatment off-site.

A safely managed sanitation chain is essential to protecting the health of individuals and communities and the environment. Leaking latrines and raw wastewater can spread disease and provide a breeding ground for mosquitoes, as well as pollute groundwater and surface water (targets 6.3 and 6.6) that may serve as potential sources of drinking water (target 6.1).

Good hygiene practices such as handwashing with soap and water after using the toilet and before preparing and eating meals, are essential to limiting the spread of communicable diseases.

The aim to pay special attention to the needs of women and girls – also part of target 6.1 – includes increasing access to drinking water and sanitation services in the home. Not having to walk for hours to collect water or care for sick household members frees up women's time, and not having to share sanitary facilities with other households improves women's security. Improved access to safe drinking water and sanitation facilities in the public sphere, including for menstrual hygiene management, will also help to enable more women and girls to attend school and work outside the home.

In 2015, 39 per cent of people worldwide used safely managed sanitation services (i.e. an improved facility that is not shared with other households, where excreta are safely disposed of in situ or transported and treated off-site) and an additional 29 per cent used basic services (i.e. an improved facility that is not shared with other households).[2] 892 million people (12 per cent) still practised open defecation. Estimates for safely managed sanitation were available for 84 countries, representing 48 per cent of the global population. For handwashing, comparable data was available from 70 countries, representing 30 per cent of the global population, which is insufficient to produce a global estimate. Source: Progress on drinking water, sanitation and hygiene: 2017 update and SDG baselines (JMP, 2017)

Poor sanitation and hygiene affect human health and damage the environment.

The monitoring of target 6.2 illustrates to policy- and decision makers the importance of having a private toilet with a handwashing facility at home. Household surveys

[2] By the end of the MDG period in 2015, 68 per cent of people worldwide used an "improved sanitation facility", which is identical to "basic" services. Source: Millennium Development Goals Report (2015)

	are an important source of data on the use of sanitation services.

Normative interpretation of target 6.2

Target text	Normative interpretation of target text
By 2030, achieve access	Implies facilities close to home that can be easily reached and used when needed
to adequate	Implies a system that hygienically separates excreta from human contact and safely reuses/treats excreta in situ or safely transports and treats it off-site
and equitable	Implies progressive reduction and elimination of inequalities among population subgroups
sanitation	The provision of facilities and services for safe management and disposal of human urine and faeces
and hygiene	The conditions and practices that help maintain health and prevent spread of disease including handwashing, menstrual hygiene management and food hygiene
for all	Suitable for use by men, women, girls and boys of all ages, including people with disabilities
and end open defecation,	Excreta of adults or children are: deposited (directly or after being covered by a layer of earth) in the bush, a field, on a beach or in any other open area; discharged directly into a drainage channel, river, sea or any other water body; or wrapped in temporary material and discarded
paying special attention to the needs of women and girls	Implies reducing the burden of water collection and enabling women and girls to manage sanitation and hygiene needs with dignity. Special attention should be given to the needs of women and girls in high-use settings such as schools and the workplace, and high-risk settings such as health-care facilities and detention centres
and those in vulnerable situations	Implies paying attention to specific drinking water, sanitation and hygiene (WASH) needs found in special cases including refugee camps, detention centres, mass gatherings and pilgrimages

Global indicator 6.2.1 "Proportion of population using safely managed sanitation services, including a handwashing facility with soap and water"

Definition	This indicator is tracked through two sub-indicators: the proportion of the population using safely managed sanitation services and the proportion of the population with basic handwashing facilities in the home. The population using safely managed sanitation services is defined as the population using an improved sanitation facility at the household level that is not shared with other households, and where excreta are treated and disposed of in situ or transported and treated off-site. Improved sanitation facilities include flush or pour-flush toilets to sewerage systems, septic tanks or pit latrines, improved pit latrines (pit latrines with a slab or ventilated pit latrines) and composting toilets. Improved sanitation facilities that do not fulfil the above-mentioned criteria for treatment are categorized as "basic" services. If the facility is shared with other households the service is categorized as "limited". The presence of handwashing facilities is used as a proxy for handwashing behaviour. Households that have a handwashing facility with soap and water available on the premises will meet the criteria for a "basic" hygiene facility. A handwashing facility is a device to contain, transport or regulate the flow of water to facilitate handwashing.

Disaggregation	The sanitation can be disaggregated by service level – no services, basic services and safely managed services – while the hygiene indicator can be disaggregated by basic, limited and no facilities. The monitoring of access "for all" calls for further disaggregation of data to highlight inequalities across socioeconomic strata, including within households and geographical locations.
Rationale and use	This indicator builds on the MDG indicator – "proportion of population using an improved sanitation facility" – and incorporates aspects of accessibility (at the household level) and acceptability and safety (not shared with other households), to further address the normative criteria of the human right to water. To ensure public health beyond the household level, this indicator incorporates the safe management of faecal waste along the entire sanitation chain, from containment to treatment. Handwashing with soap is widely agreed to be the top hygiene priority for improving health outcomes. By analysing these different aspects, indicator 6.2.1 focuses the attention of policy- and decision makers on where investment matters the most for health, gender and environmental outcomes. By disaggregating the data spatially and by different socioeconomic strata, it is possible to identify which parts of the population are being left behind.
Complementary indicators	It is also imperative to monitor access beyond the household, in institutional settings such as schools, health-care facilities and the workplace.

Data and progressive monitoring for indicator 6.2.1

The extended scope of indicator 6.2.1 has implications on the monitoring process. During the MDG period, data were mainly collected from household surveys; with the SDG indicator, data on collection, treatment and reuse will also be gathered from institutions, utilities and other service providers. The hygiene component is included as a standard element in many household surveys and is recorded by field team observations rather than through self-reporting by survey respondents. Countries can start their monitoring effort with existing MDG data and gradually incorporate more information about on-site and off-site management of excreta, as well as improve the data disaggregation. Data on 6.2.1 feeds directly into the monitoring of 6.3.1.

The JMP will publish updates biennially and related reports, for example, on WASH in schools and health-care facilities, in the intervening years.

Data sources and compilation	First step of progressive monitoring (example)	Second step of progressive monitoring (example)	Third step of progressive monitoring (example)
National sources: Household surveys, institutional/utility records and licensed emptying service providers Global databases: WHO/UNICEF JMP Global compilation: WHO/UNICEF	Household surveys combined with population records for information on access and type of services Estimation of proportion of total population using basic sanitation services, but no national data on management of faecal waste	Inclusion of questions on emptying pit latrines and septic tanks in household survey instruments Estimations backed up by surveys of service providers and data from off-site treatment plants Disaggregation of data by informal settlements and	Detailed and high-resolution data from off-site service providers Consideration of the use of on-site disposal and licensed emptying service providers

	Disaggregation of household data by place of residence, subnational region and wealth	locally important marginalized groups	Disaggregation of data by intra-household characteristics

Target 6.3 Water quality and wastewater

"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."

Target 6.3 sets out to improve ambient water quality, which is essential to protecting both ecosystem health (target 6.6 and SDGs 14 and 15) and human health (recreational waters and drinking water sources, target 6.1), by eliminating, minimizing and significantly reducing different streams of pollution into water bodies. The main sources of pollution include wastewater from households, commercial establishments and industries (point sources), as well as run-off from urban and agricultural land (non-point sources).

Wastewater generated by households can result in the spread of pathogens and detrimental nutrient loadings in receiving waters if it is discharged without treatment. Wastewater generated by economic activities such as manufacturing industries may contain a variety of pollutants, including hazardous substances. Eliminating all inadequate disposal of waste (dumping) and minimizing the generation, use and discharge of hazardous substances are goals consistent with the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade and the Stockholm Convention on Persistent Organic Pollutants.

The focus on recycling, for example, recirculating water within an industry, and safe reuse, for example, using wastewater in agriculture, are complementary to the focus on reducing freshwater withdrawals and improving use efficiency (target 6.4).

Currently, there is only a small amount of data available on wastewater treatment at the global scale, but some sources estimate about 80 per cent of all wastewater generated globally is discharged without any treatment. Source: 2017 UN World Water Development Report, Wastewater: The Untapped Resource (UN-Water, 2017)

On-site sanitation, such as latrines, is part of the wastewater challenge.

Monitoring helps policy- and decision makers find out where to focus limited resources, for example, on improving

	on-site facilities or building treatment plants. Utilities often collect data on wastewater collection and treatment for management and regulatory purposes.

Preliminary data suggest that one third of all rivers in Africa, Asia and Latin America are affected by severe pathogenic pollution, one seventh suffer from severe organic pollution and one tenth have moderate to severe levels of salinity.
Source: **A Snapshot of the World's Water Quality: Towards a global assessment (UN Environment, 2016)**

Wastewater from industry and agriculture can be detrimental to ambient water quality.	**The monitoring of wastewater from hazardous industries and of ambient water quality enables stricter enforcement of pollution laws and discharge permits. Field measurement kits are readily available for the monitoring of the core water quality parameters needed to compute the global indicator.**

Normative interpretation of target 6.3

Target text	Normative interpretation of target text
By 2030, improve water quality by	Implies achieving adequate quality of receiving water bodies so that they do not present risks to the environment or human health
reducing pollution,	Implies minimizing the generation of pollutants at source and reducing the discharge of polluting substances, from point sources (e.g. wastewater outlets from economic activities and households) and non-point sources (e.g. urban and agricultural run-off)
eliminating dumping and	Implies ending all inadequate disposal of waste, both solid and liquid (e.g. leachates from poorly managed solid waste)
minimizing release of hazardous chemicals and materials,	Implies reducing the generation, use and discharge of hazardous substances, as defined and listed in the Basel, Rotterdam and Stockholm conventions

halving the proportion of	Implies halving the proportion of wastewater that is untreated, generated by households and all economic activities (based on International Standard Industrial Classification of All Economic Activities (ISIC)); some economic activities are particularly relevant due to high wastewater generation, including agriculture, mining and quarrying, manufacturing, power generation and sewerage
untreated	Treatment implies any process for rendering wastewater fit to meet applicable environmental standards or other quality norms
wastewater	Discarded water that is no longer required by the owner or user, including discharges to drains or sewers for treatment or direct discharges into the environment, as well as water reused by another user without further treatment
and substantially increasing recycling	Implies increasing the on-site reuse of water within the same establishment or industry
and safe	Implies water has undergone sufficient treatment combined with non-treatment barriers to protect human health, for the intended use (as described in the 2006 WHO Guidelines for the safe use of wastewater, excreta and greywater)
reuse	Implies wastewater supplied to a user for further use, with or without prior treatment (e.g. use of household wastewater in agriculture), excluding the recycling of water within the same establishment
globally	Implies increased recycling and safe reuse at the global level, enabling differentiated efforts at the national and regional levels, focusing efforts on water-scarce regions

Global indicator 6.3.1 "Proportion of wastewater safely treated"

Definition	Percentage of wastewater generated by households (sewage and faecal sludge) and economic activities (based on ISIC categories) that is safely treated. The household component of this indicator, monitored as part of the sanitary chain, is directly linked to indicator 6.2.1.
Disaggregation	Data can be disaggregated by treatment technology (primary/secondary/tertiary), performance in some countries (household/different economic activities) and recipient (freshwater/sea/soil).
Rationale and use	The inclusion of on-site facilities is critical from a public health, environment and equity perspective because approximately two thirds of the world's population use on-site facilities. For example, if only a small fraction of the population uses sewers, policy- and decision makers may achieve greater outcomes by improving on-site facilities rather than building expensive treatment plants. Monitoring wastewater generated by different economic activities, with an initial focus on hazardous industries, further helps to identify where requirements for action are the greatest, and may also prompt stricter enforcement of pollution laws and discharge permits. If a country lacks national targets for the safe treatment of wastewater, the monitoring of 6.3.1 is a good opportunity to develop these. The level of treatment needed depends on the type of recipient; for on-site facilities in particular, this calls for consideration of the distance to groundwater bodies.
Complementary indicators	To capture the full aim of the target, additional indicators on water recycling (e.g. in industries) and reuse (e.g. in agriculture and on parklands) are needed, with links to indicators 6.4.1 on water-use efficiency and 6.4.2 on water stress. Further information that can support policy- and decision makers in addressing water pollution include data on chemicals produced and used by economic activities and

	households, solid waste management and compliance with the Basel, Rotterdam and Stockholm conventions (linked to SDG 12 on consumption and production).

Data and progressive monitoring for indicator 6.3.1

Data on the household component of 6.3.1 will come from the monitoring of 6.2.1. For the economic activities component, an initial monitoring step would be to make estimations based on registers of economic activities, and to focus on hazardous industries. As the monitoring develops, increasingly accurate data can be collected by institutions or utilities – for example, by using metres – who in turn may be able to provide information on treatment compliance.

Proposed frequency of national data collection and reporting to the global level: every year.

Data sources and compilation	First step of progressive monitoring (example)	Second step of progressive monitoring (example)	Third step of progressive monitoring (example)
National sources: Line ministries and institutions (e.g. for Water, Sanitation, Environment, Health, Public Services, Planning, Housing, Infrastructure, Production), utilities and on-site service providers, National Statistical Office (NSO) for household surveys and registers of economic activities Global databases: FAO AQUASTAT, IBNET, WHO/UNICEF JMP, UNSD/UN Environment water questionnaire for non-OECD/Eurostat countries, OECD/Eurostat questionnaire for OECD countries and UNIDO statistics data portal Global compilation: WHO/UN-Habitat on behalf of UN-Water	Estimation of total wastewater generation by households from household surveys and population records Estimation of total wastewater generation by economic activities from industry inventories, focusing on a few economic activities Estimation of proportion of wastewater received and treated from institutional/utility records	Inclusion of questions on disposal/transportation in household survey instruments Household estimations backed up with field surveys and data from licensed emptying service providers Economic activities estimations backed up by institutional/utility records on agreed volumes; focus expanded to include more economic activities Improved spatial and temporal resolution of institutional/utility data Inclusion of information on treatment levels	Inclusion of information on treatment compliance and reuse, as well as operation and maintenance aspects High spatial and temporal resolution of institutional/utility data (metered volumes) Data can be fully disaggregated by treatment level (primary/secondary/tertiary), source (household/economic activity) and recipient (freshwater/sea/soil)

Global indicator 6.3.2 "Proportion of bodies of water with good ambient water quality"

Definition	Percentage of designated and monitored water bodies in a country with good ambient water quality. Overall water quality is estimated based on a core set of five parameters

	for surface water bodies and three for groundwater bodies, which inform on major water quality impairments present in many parts of the world. For surface water, these parameters are dissolved oxygen, electrical conductivity, nitrogen, phosphorus and pH and for groundwater they are electrical conductivity, nitrate and pH. The methodology is based on a comparison of in situ measurements and *ex situ* analysis of these water quality parameters, with target values set by countries at the national, reporting basin district or water body level to classify the quality of bodies of water. The monitoring data are inevitably prone to errors, resulting from the sampling, analyses and subsequent processing of data. A threshold value of 80 per cent compliance is outlined to classify water bodies as "good" quality. Therefore, a water body is classified as "good" if the values taken from the water body meet their targets at least 80 per cent of the time, or "not good" if the targets are met less than 80 per cent of the time. For the reporting of indicator 6.3.2, the results of the water body classification are aggregated to reporting basin districts – a reporting basin district consists of one or more river basins – and to the national level. "Good" indicates an ambient water quality that does not damage ecosystem function and human health according to core ambient water quality parameters.
Disaggregation	Data can be disaggregated by reporting basin district.
Rationale and use	This indicator gives an overview of the impact of certain types of pollution (including from diffuse sources not captured in indicator 6.3.1) and pollution reduction activities on ambient water quality, and is essential to describing the environmental status of freshwater systems. It enables an assessment of the impact of human development on ambient water quality, as well as the potential to obtain future ecosystem services from the water body (e.g. drinking water production and biodiversity). Monitoring 6.3.2 helps policy- and decision makers to identify water bodies at risk, and by combining water quality data with information about how the watercourse is being used, to direct interventions where they will have the greatest impact. Disaggregating the data by water quality parameters and sampling station makes it possible to track and take action on specific sources of pollution. If a country lacks national targets for water quality parameters, the monitoring of 6.3.2 is a good opportunity to develop these.
Complementary indicators	Indicator 6.3.2 supports the assessment of freshwater ecosystems in indicator 6.6.1 in terms of water quality. Additional information that can support policy- and decision makers in addressing ambient water quality includes data on wastewater discharge, agricultural practices (e.g. application of fertilizers and pesticides, soil management and distance to water bodies – linked to SDG 2 on food) and stormwater management (e.g. collection and treatment of run-off from roads and other impermeable surfaces).

Data and progressive monitoring for indicator 6.3.2

Data on water quality are likely to be collected by the Ministry of Environment or the Ministry of Water, who can start compiling data for the five core parameters at existing sampling stations. As available resources and capacity increase, more sampling stations can be added to increase the frequency of sampling. The indicator methodology requires data for five core parameters for surface water bodies and three for groundwater bodies, on the basis that most countries can monitor those specified in the methodology. If needed, additional parameters relating to

particular concerns in a given water body can be added to the indicator. Although limited to only a few water quality parameters and larger rivers and lakes, satellite-based remote sensing could support monitoring for indicator 6.3.2 in areas lacking traditional, ground-based water quality monitoring. Data on 6.3.2 feeds directly into the monitoring of 6.6.1.

Proposed frequency of national data collection: water quality measurements at least once every season and no less than four times per year for surface water bodies and once per year for groundwater bodies.

Proposed frequency of national reporting to the global level: every three to four years.

Data sources and compilation	First step of progressive monitoring (example)	Second step of progressive monitoring (example)	Third step of progressive monitoring (example)
National sources: Line ministries and institutions (e.g. for Water, Environment, Natural Resources), universities and research institutions, non-governmental organizations (NGOs) and citizens' science initiatives Global/regional databases: UN Environment GEMStat, OECD Lake and river quality and Earth observations Global compilation: UN Environment on behalf of UN-Water	Monitoring of the core water quality parameters — five for surface water bodies, three for groundwater bodies (which does not require expensive or advanced laboratory facilities; field measurement kits are readily available)	Improved spatial and temporal resolution of national data (more sampling stations and higher sampling frequencies) Inclusion of more water quality parameters according to national requirements and priorities (e.g. arsenic, heavy metals, pesticides, emerging pollutants) At this stage, additional parameters will not be included in the global reporting process	High spatial and temporal resolution of national data (more sampling stations, higher sampling frequencies and use of Earth observations) Use of more complex methods to calculate the indicator Inclusion of more water quality parameters and considerations of overall ecosystem health (e.g. presence of indicator organism/diversity of species) (jointly with the monitoring of indicator 6.6.1)

Target 6.4 Water use and scarcity

"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."

Target 6.4 addresses water scarcity, aiming to ensure there is sufficient water for the population, the economy and the environment by increasing water-use efficiency across all sectors of society. Securing environmental water requirements — that is, leaving enough water in the environment at any given moment to sustain its natural processes — is essential to maintaining ecosystem health and resilience (closely related to target 6.6 and SDG 15). A high level of water stress can result in negative effects on economic development, increasing competition and potential conflict among users, which calls for effective supply and demand management policies (linked to targets 6.3 and 6.5) and an increase in water-use efficiency.

Increasing water-use efficiency over time means decoupling a country's economic growth from its water use, for example, by reducing water losses in municipal distribution networks and water use in production processes. In this regard, some sectors, for example, agriculture, industry, energy and municipal water supply are particularly relevant due to their high water use. The use efficiency component has strong synergies 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).

Freshwater resources are abundant worldwide, with only 9 per cent withdrawn by society. However, available resources are unevenly distributed across regions and within countries. In 2011, 41 countries experienced water stress, of which 10 withdrew more than 100 per cent of their renewable energy resources. Water scarcity – both physical and economic – is currently affecting more than 40 per cent of the global population. Source: Millennium Development Goals Report (2015)

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.

Some water-stressed cities pipe freshwater from distant sources to meet the population and the economy's requirements.

The disaggregation of data on water stress to the basin level, supported by geo-referencing, enables a more detailed analysis of water scarcity and its impact on both the economy and the population. The monitoring of environmental water requirements encourages a consideration for ecosystem health when available water resources are being allocated.

Normative interpretation of target 6.4

Target text	Normative interpretation of target text
By 2030, substantially increase water-use efficiency	Implies minimizing water use within production in the various economic sectors, thus reducing the reliance of economic growth on increasing water withdrawals, including by reducing water loss — closely related to the concept of sustainable production and consumption
across all sectors	All economic activities (based on ISIC categories) — some are particularly relevant due to high water use, including agriculture, mining and quarrying, manufacturing, electricity, and water collection, treatment and supply
and ensure sustainable withdrawals	Implies that water withdrawals do not lead to permanent depletion of water bodies, taking environmental water requirements into account
and supply of freshwater	Water occurring on the Earth's surface in glaciers, lakes and rivers (i.e. surface water) and underground in aquifers (i.e. groundwater); the key factor is a low concentration of dissolved salts
to address water scarcity	The point at which the aggregate impact of all users impinges on the supply or quality of water to the extent that, under prevailing institutional arrangements, the demand by all sectors cannot be fully satisfied, after taking into account environmental needs. Physical water scarcity prevails when more than 75 per cent of available water resources have been withdrawn; economic water scarcity prevails when malnutrition exists, even though less than 25 per cent of available water resources have been withdrawn
and substantially reduce the number of people suffering from water scarcity	Implies targeting physical and economic water scarcity to reduce its impact on people, which can result in poor sanitation and malnutrition, for example

Global indicator 6.4.1 "Change in water-use efficiency over time"

Definition	Value added in US dollars per volume of water withdrawn in cubic metres, by a given economic activity (based on ISIC categories) over time (showing the trend in water-use

	efficiency). This indicator includes water use by all economic activities, with a focus on agriculture, industry and the service sector.
Disaggregation	Data can be disaggregated by economic activity.
Rationale and use	This indicator informs on the economic component of the target – "increase water-use efficiency across all sectors" – highlighting to what extent a country's economic growth is dependent on the use of water resources. It enables policy- and decision makers to target interventions at sectors with high water use and low levels of improved water-use efficiency over time. Regional differences in climate and water availability must be considered in the interpretation of this indicator, in particular for agriculture. The indicator is multipurpose and can be used to report on targets 2.4, 8.4, 9.4, 12.2 and 12.3.
Complementary indicators	To further support policy- and decision makers in improving water-use efficiency, additional information about factors such as how much water is lost in distribution systems, how much food (calories) is produced per unit of water used in agriculture or how much energy (kWh) is produced per unit of water used for energy production, may be useful. Also see indicator 6.3.1 for complementary indicators on water recycling and reuse.

Data and progressive monitoring for indicator 6.4.1

Data on water withdrawals will come from the monitoring of 6.4.2 (see below), and data on value generation in different sectors are commonly available from the NSO, which makes the monitoring of this indicator very cost-efficient.

Proposed frequency of national data collection and reporting to the global level: every one to two years.

Data sources and compilation	First step of progressive monitoring (example)	Second step of progressive monitoring (example)	Third step of progressive monitoring (example)
National sources: NSO, line ministries and institutions (e.g. for Water, Agriculture and Environment) Global databases: FAO AQUASTAT, UNSD/UN Environment water questionnaire for non-OECD/Eurostat countries, OECD/Eurostat questionnaire for OECD countries, FAO FAOSTAT, World Bank, UNSD National Accounts Estimates of Main Aggregates, World Energy Outlook and IBNET	Estimations based on national data. If needed, data can be retrieved from international databases. The agricultural rain-fed production factor Cr is calculated following the default coefficient provided in the indicator's guidelines	Nationally produced data. The agricultural rain-fed production factor Cr is calculated following the default coefficient provided in the indicator's guidelines	Nationally produced data with high accuracy (e.g. geo-referenced and based on metered volumes). The agricultural rain-fed production factor Cr is calculated according to national studies

Global compilation: FAO on behalf of UN-Water			

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

Definition	Ratio between total freshwater withdrawn by all economic activities (based on ISIC categories) and total renewable freshwater resources, after taking into account environmental water requirements (also known as water withdrawal intensity). This indicator includes water withdrawals by all economic activities, with a focus on agriculture, manufacturing, electricity, and water collection, treatment and supply. This indicator builds on the MDG indicator – "proportion of total water resources used" – but also accounts for environmental water requirements, which are necessary to protect the basic environmental services of freshwater ecosystems (feeding into indicator 6.6.1).
Disaggregation	Data can be disaggregated geographically (water basin), by source (surface water/groundwater) and by economic activity.
Rationale and use	This indicator provides an estimate of pressure by all economic activities on the country's renewable freshwater resources, directly responding to the environmental component of the target – "ensure sustainable withdrawals and supply of freshwater". Knowledge of environmental water requirements enables a better understanding of the amount of water available for withdrawal in a sustainable way, and encourages a consideration of ecosystem health when available water resources are being allocated. The disaggregation of data to the basin level, supported by geo-referencing, enables a more detailed analysis of water scarcity and its impact on both the economy and the population, the latter being essential to cover the social component of the target – "substantially reduce the number of people suffering from water scarcity". With this information, policy- and decision makers can make better informed development decisions, for example, which sectors to expand, in which regions.
Complementary indicators	To understand the environmental impacts of a certain level of water stress, it is essential to look at the resulting ecosystem health – this is covered by indicator 6.6.1. Additional indicators that can help target water stress include information about the number of people suffering from water scarcity, water availability and use per capita and the proportion of total water use that comes from non-conventional sources (e.g. rainwater harvesting, desalination, wastewater).

Data and progressive monitoring for indicator 6.4.2

Data on water withdrawals and total water resources available are commonly collected by ministries/institutions related to water, agriculture and/or environment. In terms of progressive monitoring, national aggregates can be estimated based on data that is internationally available or through modelling, and then continuously refined with nationally generated data, for example, through metering, enabling disaggregation by water basin and by sector. Countries can use the MDG indicator as a starting point, and gradually incorporate increasingly accurate information about the environmental water requirements (also see 6.6.1 below on ecosystem health). Data on 6.4.2 feeds directly into the monitoring of 6.4.1.

Proposed frequency of national data collection and reporting to the global level: every three years.

Data sources and compilation	First step of progressive monitoring (example)	Second step of progressive monitoring (example)	Third step of progressive monitoring (example)
National sources: NSO, line ministries and institutions (e.g. for Water, Agriculture and Environment) Global databases: FAO AQUASTAT, UNSD/UN Environment water questionnaire for non-OECD/Eurostat countries, OECD/Eurostat questionnaire for OECD countries and WMO WHOS Global compilation: FAO on behalf of UN-Water	Estimations based on internationally available data on water availability and withdrawals by different sectors, including data available through modelling	Estimations based on nationally produced data. Inclusion of estimations of environmental water requirements, based on values available in literature Data can be disaggregated to the subnational level	High spatial and temporal resolution of national data (geo-referenced, metered volumes) Estimations of environmental water requirements supported by field measurements (also see 6.6.1 below) Data can be fully disaggregated by source and use

Target 6.5 Water resources management

"By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate."

As previously discussed, many different sectors are dependent on water. As a result, where water resources are limited, conflicts over use arise. The commonly fragmented management of water resources is particularly inept at solving such conflicts and ensuring sustainable use of the resource. In response to this, target 6.5 aims for the implementation of integrated water resources management (IWRM) at all levels. IWRM promotes the coordinated development and management of water- and land-related resources, in order to maximize economic and social welfare in an equitable manner without compromising the sustainability of ecosystems. Target 6.5 builds on the Johannesburg Plan of Implementation (2002) arising from the United Nations Conference on Environment and Development (1992).

Water resources are naturally confined to water basins so from an ecological perspective, it would be most appropriate to manage these resources at this scale. However, water basins often cut across administrative borders, calling for coordination and cooperation between several administrative units, including at the transboundary level. In target 6.5, this is reflected in the wording "at all levels"; the explicit mention of the transboundary level relates to the fact that most of the world's freshwater resources are transboundary, and that coordination and cooperation across national borders, while necessary, can be especially challenging.

By bringing together stakeholders from different sectors and regions, IWRM provides a framework to balance the need for drinking water and sanitation services for all (targets 6.1 and 6.2) and the demand for water by all economic sectors, with the sustainable management of water, wastewater and ecosystems resources in general (targets 6.3, 6.4 and 6.6). IWRM also serves to improve overall resilience to water-related disasters (target 11.5) and climate change (SDG 13). IWRM is not an end but a means of achieving sustainable management of water resources, through aspects such as international cooperation and capacity-building and stakeholder participation (targets 6.a and 6.b).

In the 2012 UN-Water Status Report on the Application of Integrated Approaches to Water Resources Management for Rio+20, 65 per cent of participating countries reported on plans for IWRM in place at the national level, and in more than 50 per cent of these countries, the implementation was already advanced. Some 54 per cent of the countries reported on engagement in the implementation of transboundary agreements for specific basins.

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.**

Regular communication and coordinated planning between countries sharing water bodies are examples of transboundary cooperation.	**Most of the world's water resources are shared. The development and management of water resources has an impact across transboundary basins, so cooperation is required. Specific agreements or other arrangements between co-riparian countries are a key precondition to ensuring long-term, sustainable cooperation. Importantly, the methodology includes groundwater to draw policy- and decision makers' attention of to this physically hidden resource.**

Normative interpretation of target 6.5

Target text	Normative interpretation of target text
By 2030, implement	Refers to the Johannesburg Plan of Implementation (2002) objective to develop IWRM and water efficiency plans
integrated water resources management	Process that promotes coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems, taking into account hydrological and technical aspects, as well as socioeconomic, political and environmental dimensions
at all levels,	Refers primarily to vertical levels of governance, from national government to local government, basin authorities and stakeholder participation
including through transboundary	Implies surface water or groundwater basins (aquifers) that cross or are located on boundaries between two or more countries — refers to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) (Helsinki, 1992) and the Convention on the Law of the Non-navigational Uses of International Watercourses (New York, 1997)
cooperation as appropriate	Customary international water law requires countries to cooperate in managing transboundary waters, with the main principles contained in the above-mentioned United Nations conventions. Apart from island countries without a terrestrial border or countries without transboundary waters, transboundary water cooperation is thus relevant

Global indicator 6.5.1 "Degree of integrated water resources management implementation (0-100)"

Definition	The degree to which IWRM is implemented, assessed by the four key components of IWRM: enabling environment, institutions and participation, management instruments and financing. It takes into account the various users and uses of water, with the aim of promoting positive social, economic and environmental impacts at all levels, including the transboundary level, where appropriate. The survey instrument is a questionnaire with questions relating to each of the four components.
Disaggregation	Although the responses to each individual question are aggregated into one national value for the purpose of global reporting, the strength of this indicator lies in maintaining and assessing the responses to the individual questions.
Rationale and use	The method builds on official United Nations IWRM status reporting as specified in the Johannesburg Plan of Implementation (2002). This indicator supports policy- and decision-making at the national level by enabling countries to identify barriers to progress and ways in which these can be addressed, feeding directly into the means of implementation indicators 6.a.1 and 6.b.1. The indicator also facilitates coherence between the various water- and sanitation-related targets by supporting monitoring, planning and evaluation, as well as associated capacity-building. A further strength of the monitoring of 6.5.1 is that it 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.
Complementary indicators	IWRM is a means of ensuring availability and sustainable management of water and sanitation for all. A high level of IWRM is expected to yield good results with regard to the other targets and indicators under SDG 6, for example, good ambient water quality and a positive change in the extent of water-related ecosystems. Indicator 6.5.1 should thus be analysed in the context of all other indicators under SDG 6. See also indicators 6.a.1 and 6.b.1, directly complementing 6.5.1.

Data and progressive monitoring for indicator 6.5.1

Data is collected through a questionnaire and responses are consolidated through consultations between relevant stakeholders, such as national and subnational line ministries and institutions involved in water resources management (e.g. Ministries of Water, Sanitation, Environment, Meteorology, Hydrology, Geology, Food, Agriculture, Irrigation, Health, Public Services, Planning, Housing, Infrastructure, Production, Energy, Natural Resources, Mines, Industry and Finance) and other stakeholders such as NGOs, academia and business. As the monitoring process develops, we anticipate the consultation process will become increasingly inclusive and formalized, and the results will be applied more often in IWRM planning.

Proposed frequency of national data collection and reporting to the global level: every three years.

Data sources and compilation	First step of progressive monitoring (example)	Second step of progressive monitoring (example)	Third step of progressive monitoring (example)
National sources: Line ministries and institutions, NGOs, academia and business Global database: IWRM Data Portal Global compilation: UN Environment on behalf of UN-Water	Survey response consolidated by ad hoc consultations between stakeholders	Survey response consolidated by formal consultations between stakeholders	Survey response used as a diagnostic tool for national IWRM planning, including all relevant stakeholders

Global indicator 6.5.2 "Proportion of transboundary basin area with an operational arrangement for water cooperation"

Definition	Percentage of transboundary basin area within a country that has an operational arrangement for water cooperation. This indicator is reported at the national level by adding up the areas of transboundary basins that are covered by an operational arrangement and dividing the result by the total area of all transboundary basins within the country. For the purpose of this indicator, "basin area" is defined for surface water as the extent of the catchment, and for groundwater as the extent of the aquifer. An "arrangement for water cooperation" is a bilateral or multilateral treaty, convention, agreement or other formal arrangement between riparian countries that provides a framework for cooperation on transboundary water management. The criteria for the arrangement to be considered "operational" are based on key aspects of substantive cooperation in water management: the existence of a joint body, regular, formal communication between riparian countries (at least once a year), joint or coordinated management plans or objectives and a regular exchange of data and information (at least once a year).
Disaggregation	Data can be disaggregated geographically (water basin), by type of water (surface water/groundwater) and by operational criteria.
Rationale and use	Most of the world's water resources are shared. The development and management of water resources has an impact across transboundary basins, so cooperation is required. By

	tracking progress on the degree to which transboundary surface water and groundwater are covered by operational cooperation arrangements, this indicator responds directly to the 6.5 target component – "including through transboundary cooperation as appropriate". The rationale for indicator 6.5.2 is that specific agreements or other arrangements between co-riparian countries are a key precondition to ensuring long-term, sustainable cooperation. Importantly, the methodology includes groundwater to draw policy- and decision makers' attention of to this physically hidden resource. For a transboundary basin to count towards indicator 6.5.2, all four criteria for an "operational arrangement" must be fulfilled (either a fully operational arrangement for the basin is in place, or the respective area does not count). By analysing progress towards each individual criterion for each basin, policy- and decision makers can target interventions to improve transboundary cooperation.
Complementary indicators	-

Data and progressive monitoring for indicator 6.5.2

Data are collected by UNECE and UNESCO through a template from the ministries responsible for transboundary waters, from all countries sharing such waters. The template has been combined with a questionnaire developed by Member States within the framework of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention), enabling the indicator (reported as a percentage) to be complemented by substantiating information that gives a more detailed picture of water cooperation. Although the point of reference for indicator 6.5.2 is transboundary basins, the indicator is reported at the national level. In principle, the status of any given transboundary basin should be identical for all countries sharing that basin, which calls for coordination between these countries.

Proposed frequency of national data collection and reporting on the indicator: every three years.

Data sources and compilation	First step of progressive monitoring (example)	Second step of progressive monitoring (example)	Third step of progressive monitoring (example)
National sources: Line ministries and institutions (e.g. for Water, Environment, Natural Resources, Hydrology, Geology) In the absence of national data, sources such as the following could be referred to: UNESCO ISARM (for aquifers), GEF TWAP (for surface water basins), OSU Atlas of International Freshwater Agreements	-	-	-

(for agreements and joint bodies) Global compilation: UNECE/UNESCO on behalf of UN-Water			

Target 6.6 Water-related ecosystems

"By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes."

Ultimately, it is water-related ecosystems that provide water services to society. They are important for improving water quantity, because they can capture and store water, water quality, because they can decompose and/or absorb water pollutants, and for other purposes such as providing fish and construction materials. Target 6.6 seeks to halt the degradation and destruction of these ecosystems, and to assist the recovery of those already degraded. The target includes water-related ecosystems such as vegetated wetlands, rivers, lakes, reservoirs and groundwater, as well as those occurring in mountains and forests, which play a special role in storing freshwater and maintaining water quality.

Target 6.6 directly contributes to wider improvements in ecosystem health, both marine (SDG 14) and terrestrial (SDG 15), and it builds on the Aichi Biodiversity Targets of the Strategic Plan for Biodiversity 2011-2020 (reflected in the target year of 2020), the Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat (Convention on Wetlands) and the United Nations Convention to Combat Desertification.

Scientific studies show that 64 per cent of the world's wetlands have disappeared since 1900; measured against 1700, an estimated 87 per cent have been lost. Source: Wetlands: why should I care? (Ramsar, Fact Sheet 1)

Ecosystems replenish and purify water resources and need to be protected in order 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. Data on ecosystems are collected by a wide variety of stakeholders, including engaged citizens who care about their community and space agencies.**

Normative interpretation of target 6.6

Target text	Normative interpretation of target text
By 2020,	Refers to the Aichi Biodiversity Targets to be reached by 2020
protect and	Implies a reduction in or eradication of the loss or degradation of ecosystems

restore	Implies a reversal of loss or degradation – assisting the recovery of degraded, damaged or destroyed ecosystems by re-establishing structural characteristics, species composition and ecological processes
water-related ecosystems,	Whereas all ecosystems depend on water, some ecosystems (as specified below) play a more prominent role in the provision of water-related services to society
including mountains,	Most of the world's rivers are fed from mountain sources and more than half of humanity depends on mountains for water
forests,	Large areas of land covered with trees or other woody vegetation, covering about 30 per cent of the world's land area and accounting for 75 per cent of gross primary production. Forests are important for safeguarding water quantity and quality
wetlands,	Swamp, pond, peat or water, natural or artificial, permanent or temporary, stagnant or flowing water, including estuaries and marine waters down to six metres below the low-tide mark (definition by the Convention on Wetlands)
rivers,	Channels where water flows continuously or periodically
aquifers and	Underground zones that contain sufficient saturated permeable material to yield significant quantities of water for wells and springs
lakes	Depressions in the Earth's surface occupied by bodies of standing water, including small and shallow water bodies such as ponds and lagoons; artificial reservoirs are also included, although should be considered separately because of the large volume of water they contain

Global indicator 6.6.1 "Change in the extent of water-related ecosystems over time"

Definition	Changes over time in: (1) the spatial extent of water-related ecosystems (such as swamps, marshes and peat, mangroves, swamp forests and even rice paddies) and inland open waters (rivers, floodplains and estuaries, lakes and reservoirs), (2) the quantity of water in ecosystems (rivers, lakes and groundwater) and (3) the quality of water in ecosystems (linked to indicator 6.3.2). By assessing changes over time, the subcomponent values can be aggregated. The point of reference for "change over time" is the natural condition, i.e. before large-scale impacts were experienced by the ecosystem. If information about the natural condition is not available, an estimate can be made based on extrapolation of data from neighbouring pristine sites, historical data, models and expert judgement. The indicator also recommends that countries incorporate a component on ecosystem health in their ecosystem monitoring programme, although this was not included in the computation of indicator 6.6.1 for the first reporting in 2017. Ecosystem health is commonly measured through biological indicators, but no single method is recommended since the choice is determined by local ecological conditions.
Disaggregation	This indicator can be disaggregated by sub-indicator, time, the type of ecosystem and spatial area.
Rationale and use	This indicator highlights the ability of ecosystems to provide services to society. Ecosystem health refers to the system's ability to maintain its structure and function over time and under external stress, and factors in all of the aforementioned subcomponents. Monitoring 6.6.1 thus enables an assessment of past and present impact of human development on ecosystems, as well as the potential to obtain future ecosystem services from them. Expanding 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. Well disaggregated data helps to identify ecosystems at risk and to direct interventions where they will have the greatest impact. This indicator can support reporting on targets 11.5, 11.6, 11.7, 12.2, 13.1, 14.2, 14.5, 15.1, 15.3 and 15.5.
Complementary indicators	In order to quantify the combined impact of all the pressures on ecosystems, it is essential to incorporate an ecosystem health component in national monitoring programmes. Information about environmental water requirements (from indicator 6.4.2) helps policy- and decision makers to set objectives for ecosystem management. To capture the full scope of target 6.6, indicator 6.6.1 is complemented by additional indicators under SDG 15 that focus on mountains (15.4.1) and forests (15.1.1), land degradation (15.3.1) and ecosystem protection (15.1.2 and 15.5.1).

Data and progressive monitoring for indicator 6.6.1

Data for indicator 6.6.1 are likely collected by the Ministry of Environment or Water, but also by NGOs and in academia, and in the case of Earth observations, by space agencies. Data on the quality component will come from the monitoring of 6.3.2. In terms of progressive monitoring, countries can initially focus on surface water-related ecosystems, for example, vegetated wetlands and open water bodies, measuring the spatial extent, quantity and quality of water. Over time, countries can expand to also cover groundwater bodies and increasingly ground-based verification and interpretation of the Earth observations that formed part of the spatial extent assessment. The monitoring of ecosystem health, such as looking at macroinvertebrates or fish species, would also follow as country capacity and resources increase.

Proposed frequency of national data collection and reporting to the global level: every three to four years.

Data sources and compilation	First step of progressive monitoring (example)	Second step of progressive monitoring (example)	Third step of progressive monitoring (example)
National sources: Line ministries and institutions (e.g. for Environment, Water, Natural Resources), universities and research institutions, NGOs and citizens' science initiatives (ground-based surveys), space agencies (Earth observations) Global databases (selection): Ramsar Convention on Wetlands, Global Runoff Database at GRDC, Global Groundwater Information System of IGRAC, GlobWetland II, Hydroweb from LEGOS	Monitoring of surface water-related ecosystems (e.g. vegetated wetlands, rivers and open water bodies)	Inclusion of groundwater bodies Ground-based verification and interpretation of Earth observation data Ground-based assessment of spatial extent, including classification of wetland type	Monitoring of ecosystem health, for example, through assessments of benthic macroinvertebrates or fish in rivers

Global compilation: UN Environment on behalf of UN-Water			

Target 6.a International cooperation and capacity-building

"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."

Although the implementation of SDG 6 is expected to generate benefits that greatly exceed the costs of doing so, hundreds of billions of dollars still need to be raised to fund it. Needs are greatest in developing countries, and this calls for an increased mobilization of domestic funds, but also a significant scaling-up of external support to cover interim gaps while national capacity and resources are under development. In this regard, target 6.a seeks to expand international cooperation and capacity-building support to developing countries. For the purpose of monitoring this target, international cooperation refers to external aid in the form of grants or loans, including official development assistance (ODA). Capacity-building includes strengthening the skills, competencies and abilities in developing countries with regard to water governance and management.

Creating an enabling environment is an essential first step towards successfully implementing any management response. Target 6.a supports the implementation of all SDG 6 targets (6.1-6.6 and 6.b) by promoting the provision of finance and capacity-building in developing countries. The "means of implementation" targets 6.a and 6.b are complementary to target 6.5 on IWRM and the dedicated means of implementation goal (SDG 17) and its 19 targets, which focus on finance, technology, capacity-building, trade and systemic issues.

In 2015, US $8.6 billion was disbursed as ODA, specifically targeted towards the water sector (including water supply and sanitation, agricultural water resources, flood protection and hydroelectric power), constituting about 5 per cent of the total ODA disbursed that year (Source: OECD). However, over 80 per cent of countries participating in the 2016-2017 GLAAS survey responded that they had insufficient funding (less than 75 per cent of the sum needed) to reach national targets on drinking water and sanitation.

Human and financial resources are needed to implement SDG 6, and international cooperation is essential to making it happen.	**The monitoring of the government budget for water and sanitation will result in transparency and a better understanding of the financial flows in the sector, which in turn can increase efficiency and stimulate further internal and external funding.**

Normative interpretation of target 6.a

Target text	Normative interpretation of target text
By 2030, expand international cooperation	Implies aid in the form of grants or loans from external support agencies
and capacity-building support to developing countries	Implies strengthening the skills, competencies and abilities of people and communities
in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies	Practices, processes and technologies that support progress towards water- and sanitation-related targets. The monitoring of water and sanitation, including observation networks and databases for surface water and groundwater, is also important

Global indicator 6.a.1 "Amount of water- and sanitation-related official development assistance that is part of a government-coordinated spending plan"

Definition	Amount and percentage of ODA that is included in a government-coordinated spending plan, whether: (1) on treasury or (2) on budget. ODA flows are official financing with a primary objective of promoting economic development and welfare in developing countries. They are concessional by nature, with a grant element of at least 25 per cent. Conventionally, ODA flows comprise contributions from donor government agencies at all levels, to developing countries, either bilaterally or through multilateral institutions. A government-coordinated spending plan is defined as a financing plan/budget at the national or subnational level, clearly assessing the financial resources available and the strategies for financing future requirements. A low value of this indicator (near 0 per cent) would suggest that international donors are investing in water- and sanitation-related activities and programmes in the country without the knowledge of the country government. A high value (near 100 per cent) would indicate that donors are aligned with government and national/subnational policies and plans for water and sanitation.
Disaggregation	This indicator can be disaggregated by type of water and sanitation activity/programme (according to the OECD Creditor Reporting System purpose codes).
Rationale and use	It is essential to assess ODA flows to a country in relation to how much is included in the government-coordinated spending plan, to better understand how dependent the country is on external support and to what extent ODA flows are coordinated by the government. By requesting data on the government budget for water and sanitation, the monitoring of this indicator will result in transparency and a better understanding of the financial flows in the sector, which in turn can increase efficiency and stimulate further internal and external funding.

Complementary indicators	ODA is a quantifiable proxy for "international cooperation and capacity-building support", but it does not capture all types of support in this regard. Additional information about public and private funds and expenses, including user fees and collection rates, procurement processes and financial audits, further supports policy- and decision-making related to finance. Indicators related to capacity-building are essential to capturing the full aim of target 6.a. See also indicator 6.5.1, which directly complements 6.a.1. Indicator 6.a.1 is aligned with the Sanitation and Water for All (SWA) Collaborative Behaviours indicator for "sustainable financing for WASH". The four collaborative behaviours identified by SWA partners, if adopted by countries and their partners, can improve the way they work together to enhance the long-term sector performance needed to deliver sanitation, hygiene and water for all. Together, the collaborative behaviours provide a more comprehensive picture of international cooperation and support to developing countries beyond the ODA flows, and cover multiple aspects of means of implementation as defined in SDG 17, such as policy and institutional coherence, multi-stakeholder partnerships, data, monitoring and accountability and finance.

Data and progressive monitoring for indicator 6.a.1

Data on ODA are already available from the OECD and can be used as a starting point to report on this indicator. Collecting information on the national budget for water and sanitation is a cross-sectoral exercise involving several national ministries and institutions. The data-collection process can be combined with that of indicator 6.5.1 on IWRM. For reporting at the global level, data will be compiled through a questionnaire, as part of the more comprehensive reporting of the UN-Water GLAAS. In addition, more comprehensive data on national and subnational financial flows can be obtained through the GLAAS TrackFin Initiative, for those countries implementing the methodology.

Proposed frequency of national data collection and reporting to the global level: every two to three years.

Data sources and compilation	First step of progressive monitoring (example)	Second step of progressive monitoring (example)	Third step of progressive monitoring (example)
National sources: Line ministries and institutions (e.g. for Water, Sanitation, Environment, Health, Public Services, Planning, Finance), NSO, TrackFin Global databases: OECD Creditor Reporting System and UN-Water GLAAS Global compilation: WHO/UN Environment/OECD on behalf of UN-Water	Information on the amount of ODA received	Inclusion of information on the government-coordinated spending plan for WASH (through the GLAAS TrackFin Initiative)	Expanding information on the government-coordinated spending plan to also cover water resources management and other components of SDG 6

Target 6.b Stakeholder participation

"Support and strengthen the participation of local communities in improving water and sanitation management."

Target 6.b aims for the participation of local communities in water and sanitation planning and management, which is essential to ensuring that the needs of local users are being met and that the impact of development decisions is fully understood by local communities. The involvement of all relevant stakeholders is necessary to ensure that technical and administrative solutions are adapted to the local context and to encourage local ownership, which in turn promotes long-term sustainability. Target 6.b thus supports the implementation of all other SDG 6 targets (6.1-6.6 and 6.a) and, with stakeholder participation as a central component of IWRM, is directly linked to target 6.5.

In the 2016-2017 GLAAS survey, 81 per cent of participating countries reported that, on average, procedures for stakeholder participation in WASH planning programmes were clearly defined in policy or law, but that the extent of high user participation was low – less than a quarter of countries reported a high level of participation. Similarly, in the IWRM Status Report (2012), 86 per cent of countries responded that they had a mechanism for stakeholder participation in place, but only 38 per cent could report on an "advanced stage" of implementation.

Defining the procedures for participation of local communities in water and sanitation planning and management in policy or law, 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.	**Collecting information about stakeholder participation is a cross-sectoral exercise involving several national ministries and institutions.**

Normative interpretation of target 6.b

Target text	Normative interpretation of target text
Support and strengthen the participation of	Participation implies a mechanism by which individuals and communities can meaningfully contribute to decisions and directions on water and sanitation planning that affect them or can be affected by them
local communities	Groups of interacting people living in a common location

in improving water and sanitation management	Implies improving the management of all aspects of water and sanitation

Global indicator 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"

Definition	Percentage of local administrative units within a country with established and operational policies and procedures for participation of local communities in water and sanitation management. Local administrative units refer to non-overlapping subdistricts, municipalities, communes or other local community-level units covering both urban and rural areas to be defined by the government. Policies and procedures for participation of local communities in water and sanitation management define a mechanism by which individuals and communities can meaningfully contribute to decisions and directions on water and sanitation management.
Disaggregation	Data can be disaggregated by subnational regions as well as by urban/rural regions (for countries that have categorized their local administrative units in this way), providing information on equity.
Rationale and use	Defining the procedures for participation of local communities in policy or law is vital to ensuring that the needs of everyone in the community are met, including the most vulnerable. It is also essential to ensuring the long-term sustainability of water and sanitation solutions, i.e. the choice of appropriate solutions for a given social and economic context based on a full understanding of the impact of a certain development decision and on local ownership of solutions. This indicator, by assessing the degree of participation of local communities, thus informs on the sustainability of water and sanitation management in a country.
Complementary indicators	See indicator 6.5.1, which feeds into 6.b.1.

Data and progressive monitoring for indicator 6.b.1

Collecting information about stakeholder participation is a cross-sectoral exercise involving several national ministries and institutions. The data-collection process can be combined with that of indicator 6.5.1 on IWRM. For reporting at the global level, data will be compiled through a questionnaire, as part of the more comprehensive reporting of the UN-Water GLAAS. In terms of progressive monitoring, countries can start with a qualitative estimation and gradually move towards more accurate quantitative estimations and assessments of the degree of stakeholder participation at the subnational level. In addition, starting in 2018, the OECD Water Governance Initiative (WGI) will collect information on stakeholder participation through the Water Governance indicators.

Proposed frequency of national data collection and reporting to the global level: every two to three years.

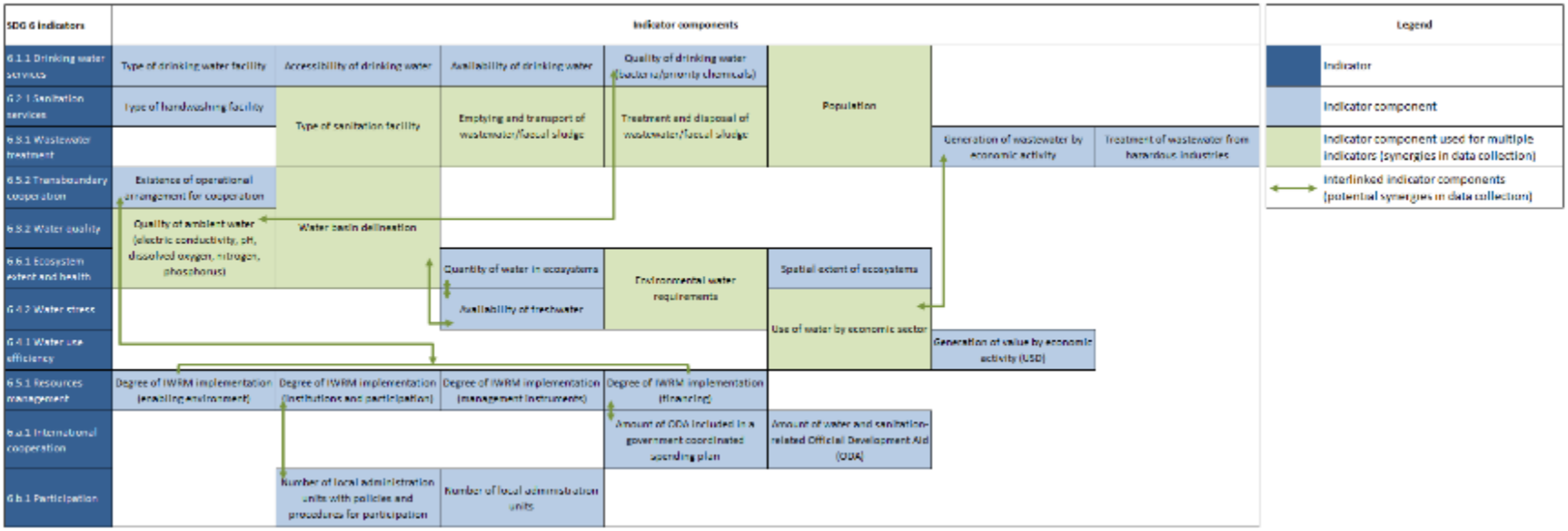
Data sources and compilation	First step of progressive monitoring (example)	Second step of progressive monitoring (example)	Third step of progressive monitoring (example)
National sources: Line ministries and institutions (e.g. for Water, Sanitation, Environment, Health, Public Services, Planning, Finance)	Qualitative estimation of degree of stakeholder participation at the national level	Quantitative estimation of the total number of local administrative units and qualitative estimation of the degree of stakeholder participation in each of them	Quantitative assessment of the degree of stakeholder participation

Global databases: UN-Water GLAAS, IWRM Data Portal, OECD WGI Global compilation: WHO/UN Environment/OECD on behalf of UN-Water			

Synergies across the SDG 6 global indicators

As detailed in the previous chapters, the SDG 6 global indicators comprise multiple components and data on each component are necessary to compute the indicator. It is important to note that some components are the same across several indicators, and as such, represent a synergy when it comes to data collection, since one set of data can be used for the computation of multiple indicators. For example, data on water withdrawals are used to compute both indicator 6.4.1 on water-use efficiency and 6.4.2 on the level of water stress. In some cases, indicator components are interlinked, for example, by having similar data-collection processes and/or involving the same stakeholders – this presents a *potential* for data-collection synergies. One such example is the interlinkages between indicators 6.5.1, 6.a.1 and 6.b.1. An overview of all the indicator components and their interlinkages is given below in Table 1.

Table 1. Overview of indicator components and their interlinkages



Key messages

This publication has briefly introduced SDG 6 on water and sanitation, with a specific focus on the 11 indicators that will be used to track progress towards it at the global level.

SDG 6 expands the MDG focus on drinking water and basic sanitation to include the management of water, wastewater and ecosystem resources more holistically, 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, thus making it a major step towards a sustainable water future.

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

The shift from the MDGs to the SDGs is a game changer for water and sanitation, and for monitoring. Where the MDGs included only three indicators on water and sanitation, the SDGs include 11 and where the MDG indicators were monitored primarily through household surveys, SDG 6 monitoring will inevitably involve many national authorities from different sectors. There is thus a real need to strengthen national capacity and resources for monitoring, and to generate political support to do so. To enable a comprehensive assessment and analysis of the state of water resources and possible development paths, a key objective of the monitoring effort is to collate all the information, in support of an integrated management approach that helps reduce institutional fragmentation.

The UN-Water Integrated Monitoring Initiative for SDG 6 seeks to support countries in monitoring SDG 6, focusing on institutional capacity and the integration of data collection and analysis across sectors, regions and administrative levels. The monitoring methodologies presented in this publication are recommendations on how to monitor the SDG 6 global indicators in a standardized manner, but they should still allow for some flexibility to reflect national circumstances and requirements. The concept of progressive monitoring was developed to enable as many countries as possible to engage in SDG 6 monitoring, starting at a relatively simple and inexpensive level and becoming progressively more ambitious over time, as country capacity and resource availability improve.

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About us

Through the UN-Water Integrated Monitoring Initiative for 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 in an integrated manner, and in compiling country data to report on global progress towards SDG 6. The Initiative brings together the United Nations agencies who are formally mandated to compile country data for the purpose of global reporting on SDG 6.

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 or contact one of our focal points.

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www.unwater.org

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