Food and Agriculture Organization of the United Nations

Progress on change in water-use efficiency

Mid-term status of SDG Indicator 6.4.1 and acceleration needs, with special focus on food security and climate change

2024

United Nations | UN WATER

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Rome, 2024

Required citation:
FAO & UN-Water. 2024. Progress on change in water-use efficiency – Mid-term status of SDG Indicator 6.4.1 and acceleration needs, with special focus on food security and climate change, 2024. Rome, FAO. https://doi.org/10.4060/cd2023en

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ISBN 978-92-5-139041-2 [FAO]
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Contents

Abbreviations v

FAO Foreword vi

UN-Water Foreword vii

Acknowledgements viii

Presenting the UN-Water Integrated Monitoring Initiative for SDG 6 ix

Executive summary xi

Key messages xiii

Introduction and background 1

SDG 6 progress needs acceleration 3

What is the change in water-use efficiency over time and why is it important? 4

Capacity development for SDG Target 6.4 5

Results and analysis: status and progress 7

How is the change in WUE progressing globally and across different sectors? 8

Regional and sectoral trends in WUE 10

Changes in WUE at country level 21

Challenges in addressing data gaps 23

The importance of decoupling water use from economic growth in the development agenda 23

How to determine whether an economy has decoupled growth from water use 24

Main interlinkages with other sectors of the development agenda **29**
Understanding gender linkages of SDG 6.4 30
WUE change in medium and highly water stressed countries 32
Interlinkages between WUE, food security and climate change 34

Conclusions and recommendations **36**

References **38**

Annexes **40**
Annex 1. Methodology and data collection: 40
Country-led national data-collection and AQUASTAT database aggregation 40
Calculation methodology 40
Annex 2. AQUASTAT questionnaire 43
Annex 3. SDG 6.4.1 by country 48
Annex 4. Case studies: Decoupling economic growth and water use 54
Annex 5. Analytical framework for SDG Target 6.4's gender contextualization 59
Annex 6. Assessing the extent of decoupling between economic growth and water use 66
Annex 7. SDG Target 6.4 Indicators-related basic documents and information resources 68

Figures, tables and boxes

Figures

1: 17 SDGs under the 2030 Agenda ... 2

2: SDG 6 Global Acceleration Framework action cornerstones ... 3

3: Progress in global WUE from 2015 to 2021 ... 8

4: Distribution of countries by WUE range from 2015 to 2021 ... 9

5: Regional progress in WUE from 2015 to 2021 ... 10

6: Global WUE progress 2015–2021 by main economic sector ... 12

7: Regional trends in the change of WUE in the agricultural sector (base year 2015) ... 14

8: Regional trends in the change of WUE within the industrial sector (base year 2015) ... 15

9: Regional trends in the change of WUE within the service sector (base year 2015) ... 16

10: Sectoral water withdrawals by region (2006–2021) ... 18

11: Map with WUE change (%) by country from 2015 to 2021 ... 21

12: Agricultural (a), industrial (b) and service (c) sector WUE changes at country level from 2015–2021 ... 22

13: View of decoupling levels between the economy and water use in the Eastern Asian subregion, depicted using the rate of change. Orange dots denote GVA status, while blue dots indicate total water withdrawals (water use) ... 26

14: View of decoupling levels between the economy and water use in the Latin America and the Caribbean region, depicted using the rate of change. Orange dots denote GVA status, while blue dots indicate TWW ... 27

15: Conceptual map showing the links between gender and water-related topics 31

16: Combination of water stress levels change (change in WS) and sectoral water-use efficiency changes (changes in Awe - agricultural water use efficiency, Mwe - industrial water use efficiency and Swe - services water use efficiency) in medium to critically stressed countries (2015–2021) 33

Tables

1: Change in WUE at regional and subregional levels 11

2: Changes in WUE across economic sectors from 2015 to 2021 at global level 13

3: Regional changes in WUE by sector (2015–2021) 15

4: Change (%) of water use by the three main sectors at global level, 2015–2021 16

5: Percentage change (%) in sectoral GVA at global level from 2015 to 2021 19

6: Percentage change of sectoral GVA at regional level from 2015 to 2021 20

7: Regional analysis of economic growth and water use decoupling 25

8: Sectoral analysis of economic growth and water use decoupling by sector in the Eastern Asia subregion from 2015 to 2020 27

9: Countries with high levels of water stress and low levels of WUE 32

Boxes

1: Methodological resources for the 6.4.1 Indicator calculation 6

2: Assessing the extent of decoupling between economic growth and water use 65

Abbreviations

AQUASTAT	FAO's global information system on water and agriculture
Awe	irrigated agriculture (including livestock and aquaculture) water-use efficiency [USD/m^3]
Cr	Proportion of agricultural GVA produced by rainfed agriculture
CWUE	Change in water-use efficiency
FAO	Food and Agriculture Organization of the United Nations
GVA	gross value added for all main sectors (agriculture, MIMEC, services)
GVAa	gross value added of the freshwater aquaculture sub-sector [USD]
GVAaa	gross value added of the irrigated cultivations sub-sector [USD]
GVAai	gross value added of the livestock sub-sector [USD]
GVAal	gross value added of the livestock sub-sector [USD]
GVAm	Gross value added by MIMEC (mining and quarrying; manufacturing; electricity, gas, steam and air-conditioning supply; constructions) [USD]
GVAs	Gross value added by services from ISIC sectors E and G to T [USD]
GVAa-rev	gross value added for agriculture, without rainfed subsector
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
ISIC	International Standard Industrial Classification of all Economic Activities
IWRM	Integrated Water Resources Management
MIMEC	Industrial sector including mining and quarrying; manufacturing; electricity, gas, steam and air-conditioning supply; constructions
Mwe	MIMEC water-use efficiency [USD/m^3]
OECD	Organization for Economic Co-operation and Development
Pa	Proportion of water used by the agricultural sector over the total use
Pm	Proportion of water used by the MIMEC sector over the total use
Ps	Proportion of water used by the service sector over the total use
SDG	Sustainable Development Goal
SNA	System of National Accounts
STEM	Higher education in Science, Technology, Engineering and Mathematics
Swe	services water-use efficiency [USD/m^3]
TWW	Total water withdrawals (also water use in this report)
UN	United Nations
UNSD	United Nations Statistics Division
Va	Volume of water used by the agricultural sector
Vm	Volume of water used by MIMEC (including energy)
Vs	Volume of water used by the service sector
WUE	water-use efficiency [USD/m^3]

FAO Foreword

Water sustains every aspect of sustainable development, from food security to environmental sustainability and economic development. Addressing water stress is essential for achieving Sustainable Development Goal 6, ensuring that we manage this critical resource sustainably to meet current and future needs, while preserving the livelihoods of millions of people and the ecosystems on which they depend.

Water stress levels are increasing around the world as a result of world population growth, improved living standards, changes in dietary habits, and the intensifying impacts of the climate crisis. Agriculture is both a significant contributor to and a victim of rising water stress levels. If current agrifood systems continue unchanged, future scenarios predict persistent food insecurity, degradation of natural resources including water, and unsustainable economic development.

The Food and Agriculture Organization of the United Nations (FAO) is actively engaged in monitoring and addressing water stress worldwide. Water is fully integrated into the FAO Strategic Framework 2022-31. FAO provides technical assistance, capacity building and policy support to countries facing water stress to optimize water use in agrifood systems – the largest user of freshwater resources globally. Water is included within FAO's thematic strategies on Climate Change, on Science and Innovation, and in FAO's Conceptual Framework for Integrated Land and Water Resources Management, as well as in the work of its governing bodies.

Qu Dongyu,
FAO Director-General

Additionally, FAO collaborates with international partners to improve water governance, ensuring that water resources are managed equitably and sustainably. These efforts are important for building resilience and efficiency to water stress, ensuring food security and achieving the Sustainable Development Goals.

This progress report illustrates the collective efforts towards monitoring SDG 6.4.2 "Level of water stress: freshwater withdrawal as a proportion of available freshwater resources". It presents an in-depth analysis of current trends in levels of water stress, highlights successful strategies and best practices, and identifies areas where more focused efforts are required. The data and insights of this report show the collaborative efforts of FAO, through its AQUASTAT information system, and relevant national authorities of Members.

This report is also the result of the UN collaborative efforts within the Integrated Monitoring Initiative for SDG 6 coordinated by UN-Water, which ensures a coherent monitoring framework for water and sanitation by 2030. Such a coordinated framework helps countries to achieve progress through informed decision-making on water, based on harmonized, comprehensive, timely and accurate information.

Monitoring water stress enables a better understanding of the balance between the demand for and availability of freshwater resources in a country. By tracking water stress, policymakers and partners can identify areas where water management practices need improvement, allocate resources more efficiently, and implement strategies to mitigate the impacts of over-extraction.

I believe this report will serve both as a benchmark in monitoring progress towards achieving SDG 6.4, as well as to inform a strategic roadmap for the future.

By placing water stress at the forefront of international and national agendas, world leaders can tackle critical challenges of sustainable development such as the climate crisis, and peace and food security, all of which are closely linked to water availability. Prioritizing integrated water management is essential for addressing these interconnected challenges and ensuring a better future for all.

UN-Water Foreword

We stand at a critical juncture. At the midpoint of the United Nations 2030 Agenda for Sustainable Development, we risk failing to meet the promise of SDG 6 – to ensure the availability and sustainable management of water and sanitation for all.

The 2024 series of indicator reports, published by the UN-Water Integrated Monitoring Initiative for SDG 6 (IMI-SDG6), depict a crisis with profound repercussions for many other SDGs, particularly those related to poverty, food, health, education, gender equality, sustainability and environmental integrity.

Billions of people worldwide are still living without access to safely managed drinking water and sanitation services. Water pollution levels are alarmingly high. Inefficient water use practices are common. Water scarcity is a growing problem. Degradation of water-related ecosystems continues unabated. Governance and transboundary cooperation on water resources are too weak, and every continent suffers the impacts of inadequate investment in water and sanitation infrastructure.

Despite concerted efforts and global commitments, we are compelled to acknowledge that progress so far has been insufficient to meet all eight targets of SDG 6. In some regions and countries, for some indicators, progress is even reversing.

However, over the past year, the UN-Water family has come together to develop a response that aims to accelerate progress through a more holistic and integrated approach.

After the UN 2023 Water Conference, in response to the high ambitions set by Member States, UN-Water released the Blueprint for Acceleration: SDG 6 Synthesis Report on Water and Sanitation 2023, which identifies two crucial needs: for Member States to develop a UN political process for water and for the UN system to better unify its water-related efforts to support Member States.

On the first, Member States adopted a resolution that, among other things, established two future UN water conferences – one in 2026 and one in 2028.

On the second, the resolution requested of the UN Secretary-General to present a United Nations system-wide water and sanitation strategy in consultation with Member States. The Secretary-General looked to UN-Water, under my leadership, to assist with this.

The strategy will be presented in July 2024: the middle of a year that marks a pivotal moment in our collective journey towards achieving SDG 6. It is time to redouble our efforts, recalibrate our strategies, and mobilize resources to make good on our commitments to global society and the future of our planet.

We face unprecedented challenges, but we now have unprecedented tools and political momentum. The data and insight gathered by the IMI-SDG6 must guide our prioritization of efforts and investments to the areas of greatest need, ensuring no one is left behind.

Alvaro Lario,
President of the International Fund for Agricultural Development (IFAD) and Chair of UN-Water

Acknowledgements

The SDG 6.4.1 Progress Report was prepared with technical contributions from Riccardo Biancalani, Ghaieth Ben Hamouda, Michela Marinelli, and Lucie Chocholata of the FAO Land and Water Division. We extend our sincere gratitude to Marta Rica, FAO consultant, for her support in drafting the report.

The preparation of the report was led by Patricia Mejias-Moreno, AQUASTAT Coordinator under the overall guidance of Lifeng Li, Director, and Jippe Hoogeveen, Team Leader, Data and Water Resources Assessment in the Land and Water Division.

The data presented in this report are the result of a collaborative effort between national institutions and the AQUASTAT program at FAO. We are deeply thankful to the national institutions. Their contributions have been key, and without them, this report would not have been possible.

The authors wish to acknowledge all the colleagues from the Integrated Monitoring Initiative for SDG 6 (IMI-SDG6) and its Strategic Advisory Board who provided valuable comments on the draft report, and the overall support provided by UN-Water's Senior Programme Managers.

We gratefully acknowledge the contributions of the following entities to the UN-Water Inter-Agency Trust Fund: the Austrian Development Agency, the German Federal Ministry for Economic Cooperation and Development, the European Commission, the Netherlands Ministry of Foreign Affairs, the Netherlands Ministry of Infrastructure and Water Management, the Swedish International Development Cooperation Agency and the Swiss Agency for Development and Cooperation.

This report was produced as part of a series of reports on SDG indicators 6.3.1, 6.3.2, 6.4.1, 6.4.2, 6.5.1, 6.5.2 and 6.6.1, coordinated by UN-Water through the Integrated Monitoring Initiative for SDG 6.

Presenting the UN-Water Integrated Monitoring Initiative for SDG 6

Through the UN-Water Integrated Monitoring Initiative for SDG 6 (IMI-SDG6), the United Nations seeks to support countries in monitoring water- and sanitation-related issues within the framework of the 2030 Agenda for Sustainable Development, and in compiling country data to report on global progress towards SDG 6.

IMI-SDG6 brings together the United Nations organizations that are formally mandated to compile country data on the SDG 6 global indicators, and builds on ongoing efforts such as the World Health Organization (WHO)/United Nations Children's Fund (UNICEF) Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP), the Global Environment Monitoring System for Freshwater (GEMS/Water), the Food and Agriculture Organization of the United Nations (FAO) Global Information System on Water and Agriculture (AQUASTAT) and the UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS).

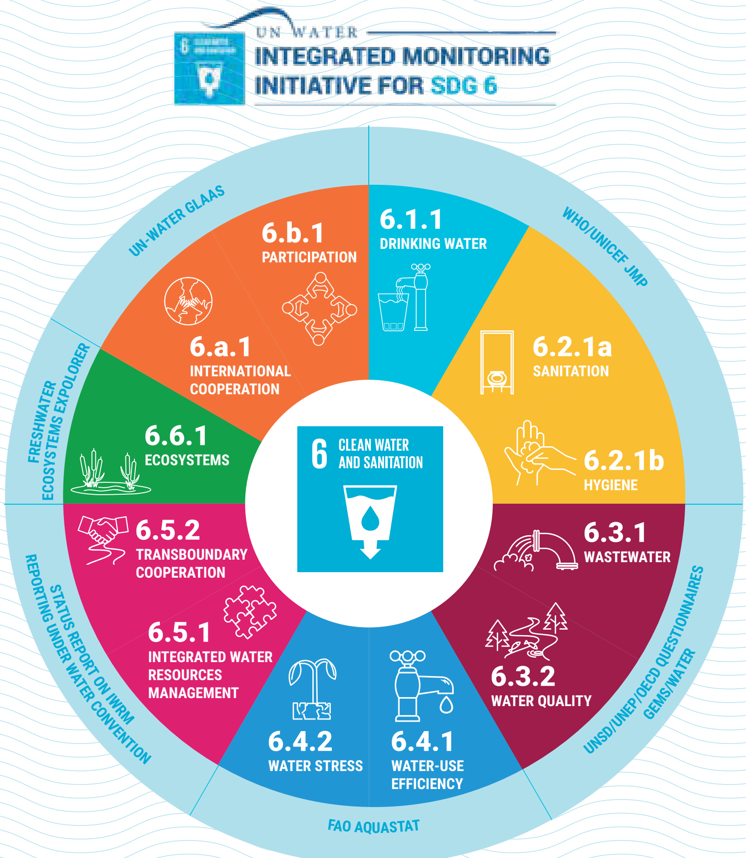
This joint effort enables synergies to be created across United Nations organizations and methodologies and requests for data to be harmonized, leading to more efficient outreach and a reduced reporting burden. At the national level, IMI-SDG6 also promotes intersectoral collaboration and consolidation of existing capacities and data across organizations.

The overarching goal of IMI-SDG6 is to accelerate the achievement of SDG 6 by increasing the availability of high-quality data for evidence-based policymaking, regulations, planning and investments at all levels. More specifically, IMI-SDG6 aims to support countries to collect, analyse and report SDG 6 data, and to support policymakers and decision makers at all levels to use these data.

- Learn more about SDG 6 monitoring and reporting and the support available: http://www.sdg6monitoring.org

- Read the latest SDG 6 progress reports, for the whole goal and by indicator: https://www.unwater.org/publication_categories/sdg6-progress-reports/

- Explore the latest SDG 6 data at the global, regional and national levels: http://www.sdg6data.org



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

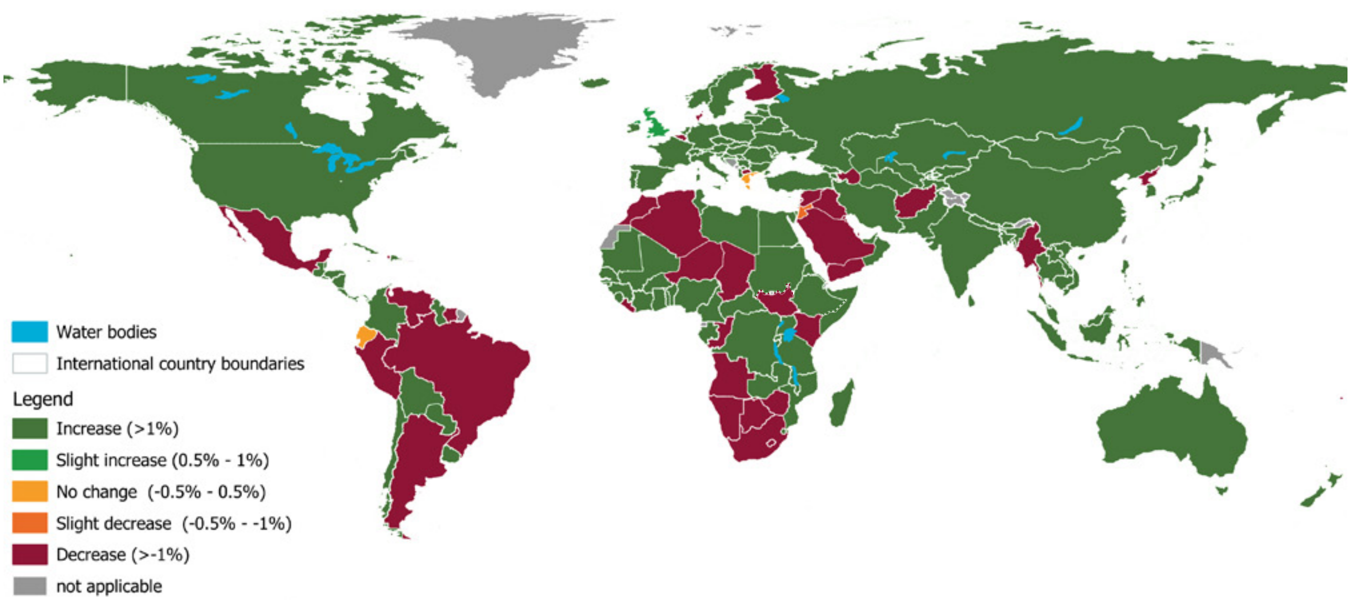
Executive summary

This report presents the most recent monitoring results of the Sustainable Development Goal (SDG) Indicator 6.4.1 focusing on the change in water-use efficiency (WUE) over time, over the period 2015–2021. The findings outlined in the report illustrate the progress being made globally towards achieving SDG Target 6.4. It also provides insights into regional and national progress while emphasizing the need for accelerated efforts to meet the target.

WUE rose from 17.4 USD/m^3 in 2015 to 20.8 USD/m^3 in 2021 worldwide, which represents a 19.3 percent efficiency increase. Globally, less water is needed to generate economic output than back in 2015.

Regional differences remain, both in absolute terms as well as in trends over time. While North America and Europe and Oceania still present the highest values, above 50 USD/m^3, the stronger increase in WUE is reported in Eastern Asia and South-eastern Asia with about 44 percent increase in the period 2015–2021. On the other side, Latin America and the Caribbean is the sole region exhibiting a decrease in WUE of nearly seven percent.

Change of WUE by country from 2015 to 2021



FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquamaps/?lang=en

Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. Final status of the Abyei area is not yet determined.

In most economies, water-reliant activities within the service sector yield higher WUE compared to those in the industrial and agricultural sectors. However, WUE has increased in all economic sectors. In particular, agriculture WUE has grown by about 40 percent since 2015. Also in sectoral trends, there are marked regional differences. In agriculture, there is wider scope for improvements in Latin America and the Caribbean, Northern America and Europe, Sub-Saharan Africa and Western Asia and Northern Africa. On the other side, Eastern Asia and South-eastern Asia reports an increase in agricultural WUE of nearly 50 percent in the analysis period.

The increase of WUE can be driven by an increase in the sectoral gross value added (GVA) and/or a reduction in sectoral water use across regions and their respective countries. Global water use data from 2015 to 2021 indicate a marginal decrease in global water withdrawals by 0.1 percent. Agricultural water use has decreased by 0.6 percent. While there are efforts to promote water-saving practices in agriculture, such as efficient irrigation methods and soil and water conservation, the overall impact on reducing water use may be offset by other factors driving increased water demand in agriculture such as intensification or expansion of irrigated areas. The fluctuations observed in sectoral water withdrawals have a similar pattern at the regional level.

Regarding the sectoral GVA data, all sectors show an increase in the GVA globally. The irrigated agricultural sector shows the highest percentage change in GVA at 35 percent, followed by the industrial sector at 22 percent and the services sector at 18 percent.

The SDG Indicator 6.4.1 quantifies the extent to which water use increases alongside increases in economic value added, highlighting the extent of a country's economic dependency on its water resources. Enhancing water-use efficiency over time may entail decoupling economic growth from water use across the main economic sectors, namely agriculture, industry, and services.

The analysis of decoupling is a novelty of this report. It shows a complex scenario, with differences among regions and also changes over time for each region. In fact, no region is definitively on the trajectory to fully decouple economic growth from water use in recent years, anyway certain subregions have made notable strides, such as Eastern Asia. On the other side, Latin America shows a scenario where economic growth and water use are interdependent (not decoupled).

Finally, this report highlights the interlinkages of water use with other sectors of the development agenda, showing in particular the interactions with gender issues, food security and climate change.

The report concludes indicating actions to be taken to increase water-use efficiency, in three areas:

- Scaling-up best practices and innovative technologies
- Governance
- Addressing data gaps

Key messages

- The change in WUE over time is a macroeconomic indicator, which yields the growth rate of the WUE (USD/m^3) as a percentage.

- The WUE rose from 17.4 USD/m^3 in 2015 to 20.8 USD/m^3 in 2021 worldwide, which represents a 19.3 percent efficiency increase. Based on the data available since 2015, there has been a trend of gradual global improvement in water-use efficiency, albeit with an exception in 2020, likely attributable to the impact of the COVID-19 pandemic crisis.

- The global values of WUE mask regional disparities. Oceania and Northern America and Europe exhibit WUE levels surpassing the world average, whereas Central Asia and Southern Asia record the lowest levels. Furthermore, Eastern Asia and South-eastern Asia and Central and Southern Asia display notable increases, whereas Latin America and the Caribbean is the sole region exhibiting a decrease in WUE of nearly seven percent.

- There has been an increase in the WUE since 2015 across all economic sectors. In 2021, the industrial sector showed a WUE equivalent to 37.2 USD/m^3, the services sector recorded 111 USD/m^3 and the irrigated agriculture sector reported 0.7 USD/m^3. The irrigated agriculture sector had the most substantial increase with a growth of 35.6 percent between 2015 and 2021, followed by the industrial sector with 30.8 percent, and the service sector with 6.3 percent.

- In the agricultural sector, all regions show positive changes since the last reporting period, although growth has been slower in Northern America and Europe. Meanwhile, WUE in industrial activities has increased in most regions, with the exceptions of Western Asia and Northern Africa and Sub-Saharan Africa. As for the service sector, WUE has generally improved except in Western Asia and Northern Africa and Latin America and the Caribbean.

- Global water use data from 2015 to 2021 indicate a marginal decrease in global water withdrawals by 0.1 percent. Specifically, there has been a 10.6 percent rise in water use within the service sector, while the use has declined by 6.5 percent in the industrial sector. Agricultural water use has decreased by 0.6 percent.

- WUE varies significantly between countries within the same region. According to 2021 data, WUE values have decreased in 44 countries, but increased in 120.

- The indicator can facilitate the formulation of targeted water policies by directing focus towards sectors or regions exhibiting minimal changes in water-use efficiency or possessing high water demands coupled with low water-use efficiency.

- Understanding the socioeconomic context, in conjunction with analysing the various components of the indicator as the sectoral GVA and trends in sectoral water withdrawals, is key to fully understanding the significance of the indicator.

Introduction and background

This report presents the most recent monitoring results of the SDG Indicator 6.4.1 focusing on the change in water-use efficiency over time. The findings outlined in the report illustrate the progress being made globally towards achieving SDG Target 6.4, which aims to, "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" (see Box 1). The report provides insights into regional and national progress while emphasizing the need for accelerated efforts to meet the target. Furthermore, the analysis included in this report depicts the challenges arising from the implementation gaps that may hinder the achievement of other SDG goals, particularly those related to food security and climate change.

The Agenda 2030, encompassing 17 SDGs and their associated 169 targets, embodies the international community's commitment to eradicate poverty, hunger and achieve sustainable development in all three dimensions (social, economic and environmental) by 2030. The SDGs are designed with a holistic approach, emphasizing the interconnection of these goals as a core principle.

Advances in one goal often influences progress across others. For instance, access to clean water and sanitation (SDG 6) is essential for achieving several other goals. Improved water and sanitation facilities are crucial for improved health outcomes (SDG 3), as they reduce the risk of waterborne diseases and improve hygiene. Water is also crucial for food security (SDG 2), as agriculture accounts for the largest share of global water use. Adopting sustainable water management practices can enhance agricultural productivity and resilience to climate change. Moreover, water availability is intimately linked to the sustainable use of terrestrial ecosystems (SDG 15), and climate action (SDG 13). Healthy aquatic ecosystems (SDG 14) provide essential ecosystem services, such as water purification and conservation, flood regulation, biodiversity habitat, and resilience against drought. Despite the critical importance of water in advancing the development agenda, water resources are increasingly threatened by pollution, overexploitation, and climate change impacts.

Figure 1. 17 SDGs under the 2030 Agenda

Source: **Department of Economic and Social Affairs.** n.d. The 17 goals. In: United Nations. New York, USA, UN. [Cited 7 November 2024]. https://sdgs.un.org/goals

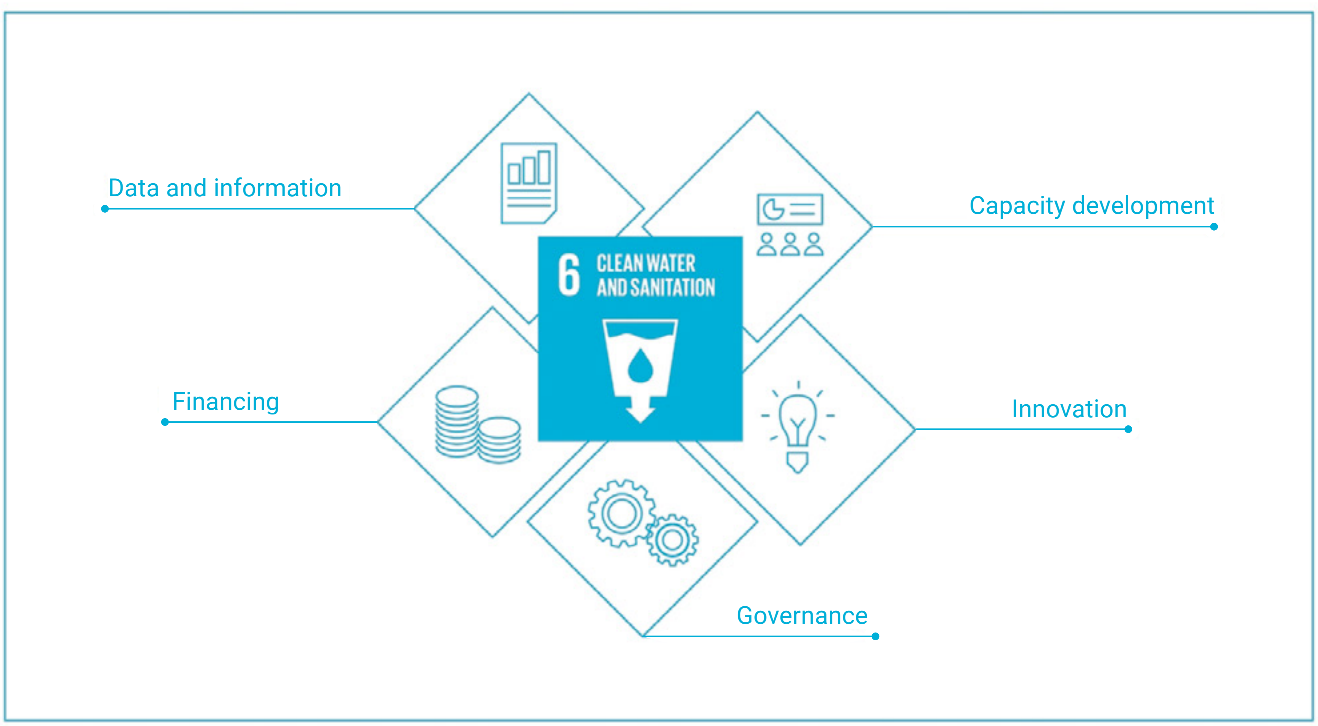
To effectively address the integrated nature of the SDGs, it is essential that governments adopt integrated and multi-sectoral approaches in policy-making, resource allocation, and the implementation of development programmes. Furthermore, national governments, supported by custodian agencies, are urged to develop robust data collection mechanisms and performance indicators, to monitor the progress of each SDG and their dependencies over time. The SDG framework enables evidence-based decision-making, fosters accountability, and promotes transparency in the implementation of sustainable development policies and programmes.

SDG 6 progress needs acceleration

The SDG 6 Synthesis Report 2018 on Water and Sanitation highlighted a concerning fact: the world is off-track to reach SDG 6 and its targets by 2030. To address this challenge, the UN launched the SDG 6 Global Acceleration Framework in 2020 as part of the United Nations Secretary-General's Decade of Action on Water and Sustainable Development 2018–2028. The framework prepares UN agencies, governments, civil society and the private sector for action relating to five cross-cutting and interdependent accelerators.

- *Financing* - Optimized financing is essential to get resources behind country plans.
- *Data and information* - Data and information targets resources and measures progress.
- *Capacity development* - A better-skilled workforce improves service levels and increases job creation and retention in the water sector.
- *Innovation* - New, smart practices and technologies will improve water and sanitation resources management and service delivery.
- *Governance* - Collaboration across boundaries and sectors will make SDG 6 of interest for everyone.

Figure 2. SDG 6 Global Acceleration Framework action cornerstones



Source: **UN-Water. 2020.** The Sustainable Development Goal 6 Global Acceleration Framework. Geneva, Switzerland. http://www.unwater.org/publications/the-sdg-6-global-acceleration-framework

Furthermore, the UN Water Conference convened in New York from 22 to 24 March 2023, and compiled new voluntary commitments and actions by governments and all stakeholders to address the global water crisis and accelerate action. Through these voluntary commitments, at small or large scale, sustained implementation, and annual reviews, the agenda aims to drive transformative change and bring successful solutions to a global scale. Stakeholders including governments, the UN system, international financial institutions, civil society, the private sector, and multi-stakeholder partnerships play vital roles in committing to action, implementing, financing and supporting the agenda's objectives (UN, 2022). To date there are approximately 840 commitments, of which 25 percent approximately are labelled as financial resources (UN, 2023). Water-related investments can yield significant economic benefits, and by acknowledging this, policymakers and stakeholders can prioritize sustainable water management strategies that promote inclusive growth and long-term prosperity.

What is the change in water-use efficiency over time and why is it important?

Two different but complementary indicators were adopted to measure the achievement of SDG Target 6.4:

- 6.4.1 Change in water-use efficiency over time, assessing the extent to which a country's economic growth is dependent on the use of water resources.
- 6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources, tracking the impact of water use in the availability of freshwater resources.

The Indicator 6.4.1 is defined as the change in the WUE over time and it is measured as the change in the ratio of the gross economic value added (GVA) generated by the irrigated agriculture, industry and services sectors relative to the volume of water used. It is an **economic indicator** which addresses the impact of economic growth on the use of water resources. Its overarching objective is to measure the extent to which a country's economic growth is decoupled from its use.

It is calculated considering the **hydrologic and economic dimensions** of water and, consequently, it is based on two different sets of data:

- Volumes of water used by the three economic sectors (irrigated agriculture, industry and services) and
- The GVA associated with these sectors.

The Indicator 6.4.1 was introduced in the SDG framework, marking a significant addition as it was not previously monitored on a global scale under the Millenium Development Goals. The introduction of this indicator has posed a significant challenge as it required the development of an entirely new methodology for its monitoring. Furthermore, the absence of pre-existing data sets to calculate the indicator required new data collection efforts through the FAO AQUASTAT (the Food and Agriculture Organization of the United Nation's global information system on water and agriculture) questionnaire.

WUE is significantly influenced by a country's economic structure and the prevalence of water intensive sectors. The indicator can facilitate the formulation of targeted water policies by directing focus towards sectors or regions exhibiting minimal changes in water-use efficiency or possessing high water demands coupled with low water-use efficiency. Such insights will guide countries in their efforts to enhance water-use efficiency and will enable the adoption of successful practices from sectors or regions with higher efficiency levels in those with lower levels.

Capacity development for SDG Target 6.4

FAO supports countries in the collection, analysis and reporting of Target 6.4 Indicators in its capacity as the custodian agency. Additionally, FAO provides support to policymakers in leveraging data to inform and enhance project development and policy formulation. Capacity- building initiatives on SDG 6.4.1 monitoring led by FAO include, among others, the development of interactive e-learning courses, and the formulation of methodological guidelines for the calculation of the indicators and their disaggregation. FAO also offers help-desk support to address queries from countries. Moreover, on request from countries or regional organizations, FAO organizes webinars and training workshops to provide direct training to relevant staff on the process of data collection, indicators reporting, methodological aspects and decision support.

The capacity-building materials are aimed mainly at, but not limited to:

- Water monitoring or water management professionals working in a ministry, government agency or relevant technical institution involved in the water resources monitoring process in the context of the SDGs.
- Environmental statistics professionals working in a national statistical office or in a technical or scientific institution relevant to the monitoring of water resources and the evaluation of the respective indicators in the SDG framework.
- Professionals in a water basin authority.
- Other professionals such as researchers and water sector students.

Box 1. Methodological resources for the 6.4.1 Indicator calculation

For further insights into the calculation methodology of Sustainable Development Goal (SDG) Indicator 6.4.1, please refer to:

Integrated Monitoring Initiative for SDG 6 (IMI-SDG 6) at FAO website

The SDG Indicator 6.4.1 website: https://www.fao.org/sustainable-development-goals-data-portal/data/indicators/641-change-in-water-use-efficiency-over-time/en

Supporting documents: SDG Indicator 6.4.1 metadata + Step-by-step monitoring methodology for SDG Indicator 6.4.1

The SDG Indicator 6.4.1 e-learning course website

Guidelines for calculation of the agriculture water-use efficiency for global reporting. The agronomic parameters in the SDG Indicator 6.4.1: yield ratio and proportion of rainfed production. Available here

Results and analysis: status and progress

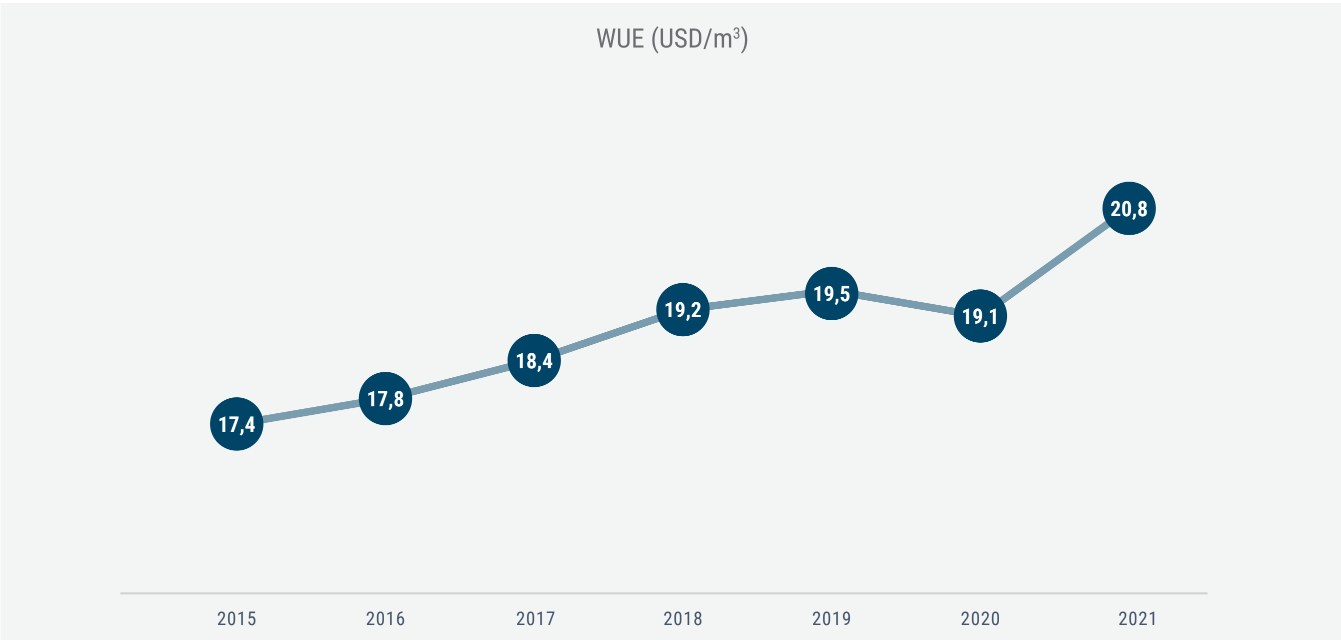
How is the change in WUE progressing globally and across different sectors?

WUE rose from 17.4 USD/m^3 in 2015 to 20.8 USD/m^3 in 2021 worldwide, which represents a 19.3 percent efficiency increase (Figure 3). Based on the data available since 2015, there has been a trend of gradual global improvement in water-use efficiency, albeit with an exception in 2020, likely attributable to the impact of the COVID-19 pandemic crisis. WUE is significantly influenced by a country's economic structure and the allocation of water use among the different economic sectors.

In 2021, estimates of WUE range from below 3 USD/m^3 in economies reliant on the agricultural sector to over 50 USD/m^3 in highly industrialized, service-oriented economies in high-income countries.

The rise in the global average of WUE since 2015 has corresponded with a slight decrease in the proportion of countries exhibiting low WUE (less than 21 USD/m^3). Approximately 57 percent of countries worldwide showed low WUE in 2021, compared to 59 percent in 2015 (see Figure 4).

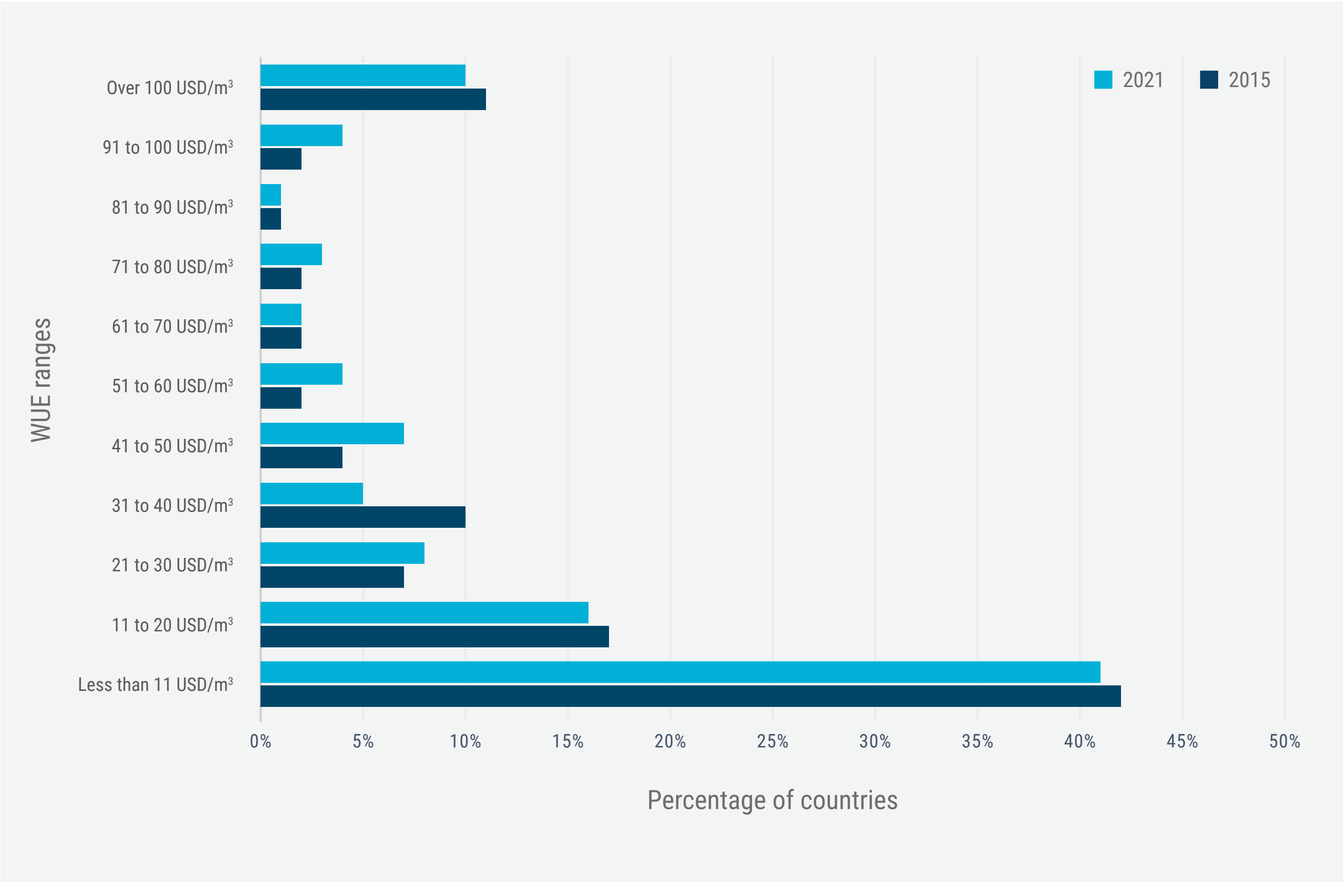
Figure 3. Progress in global WUE from 2015 to 2021



Key message: WUE rose from 17.4 USD/m^3 in 2015 to 20.8 USD/m^3 in 2021 worldwide, which represents a 19.3 percent efficiency increase. Globally, less water is needed to generate economic output than back in 2015.

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

Figure 4. Distribution of countries by WUE range from 2015 to 2021



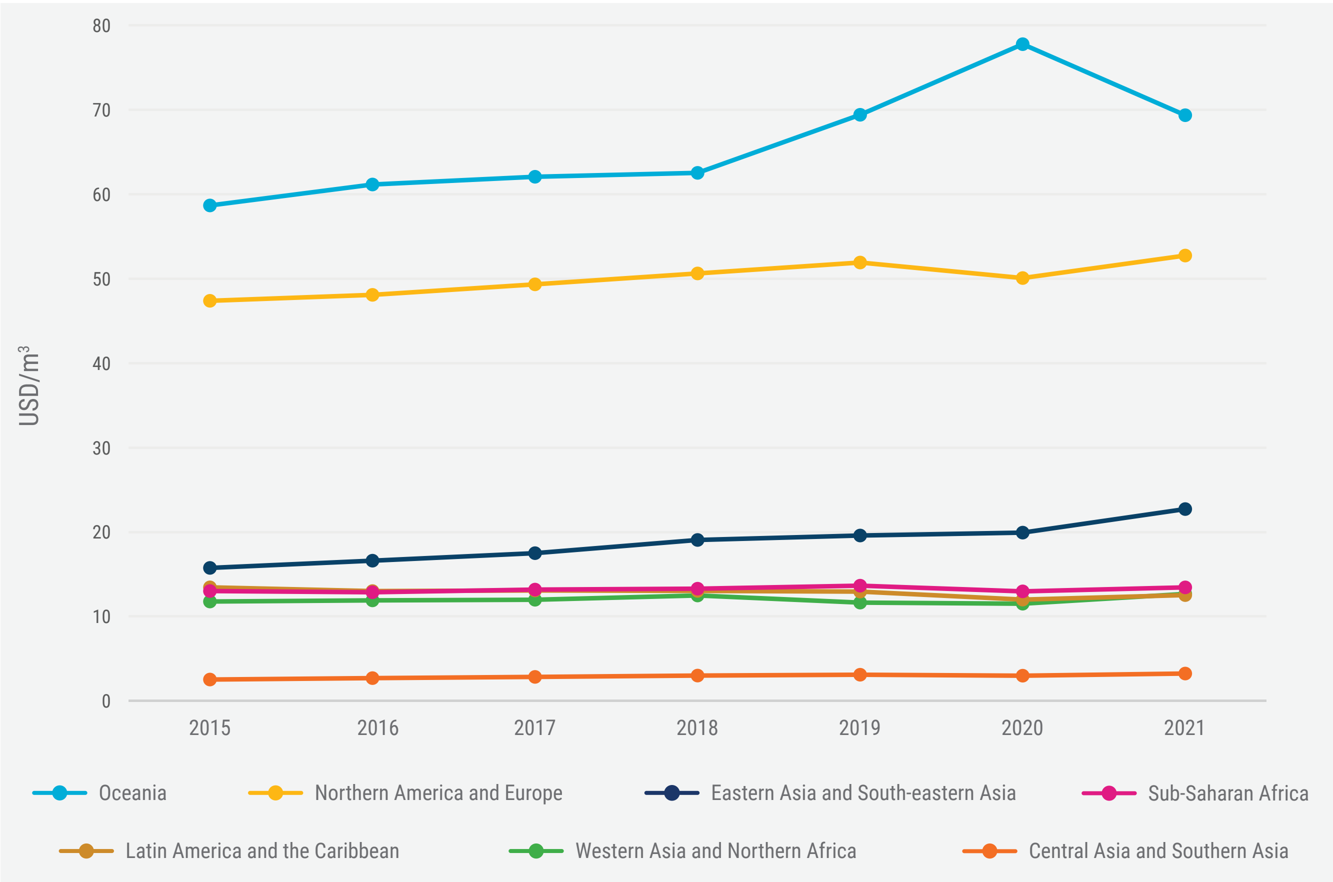
Key message: An improvement in WUE can be noted from the shift in countries moving from very low WUE classes to middle-range classes. In 2021, approximately 57 percent of countries worldwide showed low WUE, a slight improvement from 59 percent in 2015.

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

Regional and sectoral trends in WUE

The global values of WUE mask regional disparities (Figure 5). Oceania and Northern America and Europe exhibit WUE levels surpassing the world average, whereas Central Asia and Southern Asia record the lowest levels. Furthermore, analysis of the WUE growth rates between 2015 and 2021 (see Table 1), reveals that Eastern Asia and South-eastern Asia and Central and Southern Asia display notable increases, whereas Latin America and the Caribbean is the sole region exhibiting a decrease in WUE of nearly seven percent.

Figure 5. Regional progress in WUE from 2015 to 2021



Key message: High variability in WUE can be noted within regions, with a wide gap between developed and developing countries and a particularly strong increase in Eastern and South-eastern Asia.

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

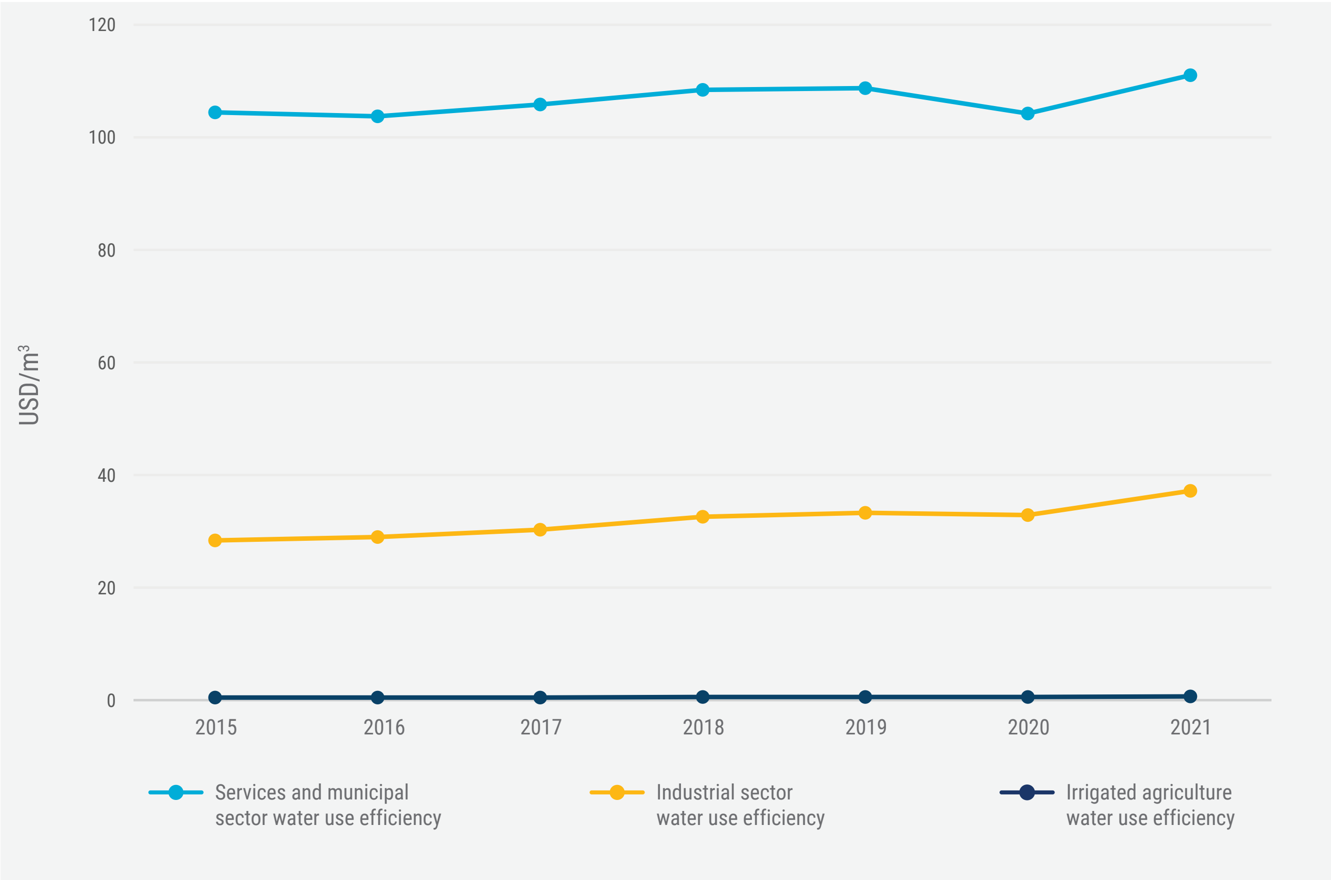
Table 1: Change in WUE at regional and subregional levels

Region		Change in WUE 2015–2021 (%)
Central Asia and Southern Asia		28.0%
Northern America and Europe		11.3%
	Northern America	12.8%
	Europe	9.9%
Western Asia and Northern Africa		7.6%
	Western Asia	3.6%
	Northern Africa	18.7%
Sub-Saharan Africa		3.3%
Latin America and the Caribbean		-6.8%
Oceania		18.2%
	Australia and New Zealand	18.6%
	Oceania exc. Australia and New Zealand	2.9%
Eastern Asia and South-eastern Asia		44.2%
	Eastern Asia	49.4%
	South-eastern Asia	19.6%
World		19.3%

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

In most economies, water-reliant activities within the service sector yield higher WUE compared to those in the industrial and agricultural sectors (see Figure 6). Understanding the socioeconomic context, in conjunction with analysing the various components of the indicator namely the sectoral GVA and sectoral water withdrawals, is key to fully understanding the indicator's importance.

Figure 6. Global WUE progress 2015–2021 by main economic sector



Key message: WUE is increasing in all sectors, with stronger growth in the industry sector.

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

There has been an increase in WUE since 2015 across all economic sectors. In 2021, the industrial sector showed a WUE equivalent to 37.2 USD/m^3, the services sector recorded 111 USD/m^3 and the irrigated agriculture sector reported 0.7 USD/m^3. Considering the percentage change, the irrigated agriculture sector exhibited the most substantial increase, followed by the industry sector.

The service sector showed a more modest change (see Table 2). The water-use efficiency indicator, which incorporates both water-use data and GVA, reflects changes driven by various factors. Increases in the indicator value may result from reductions in water usage by each sector, potentially due to enhanced distribution efficiencies. Alternatively, these increases could also stem from higher production and output levels, influenced by infrastructure improvements or favourable market conditions.

Table 2. Changes in WUE across economic sectors from 2015 to 2021 at global level

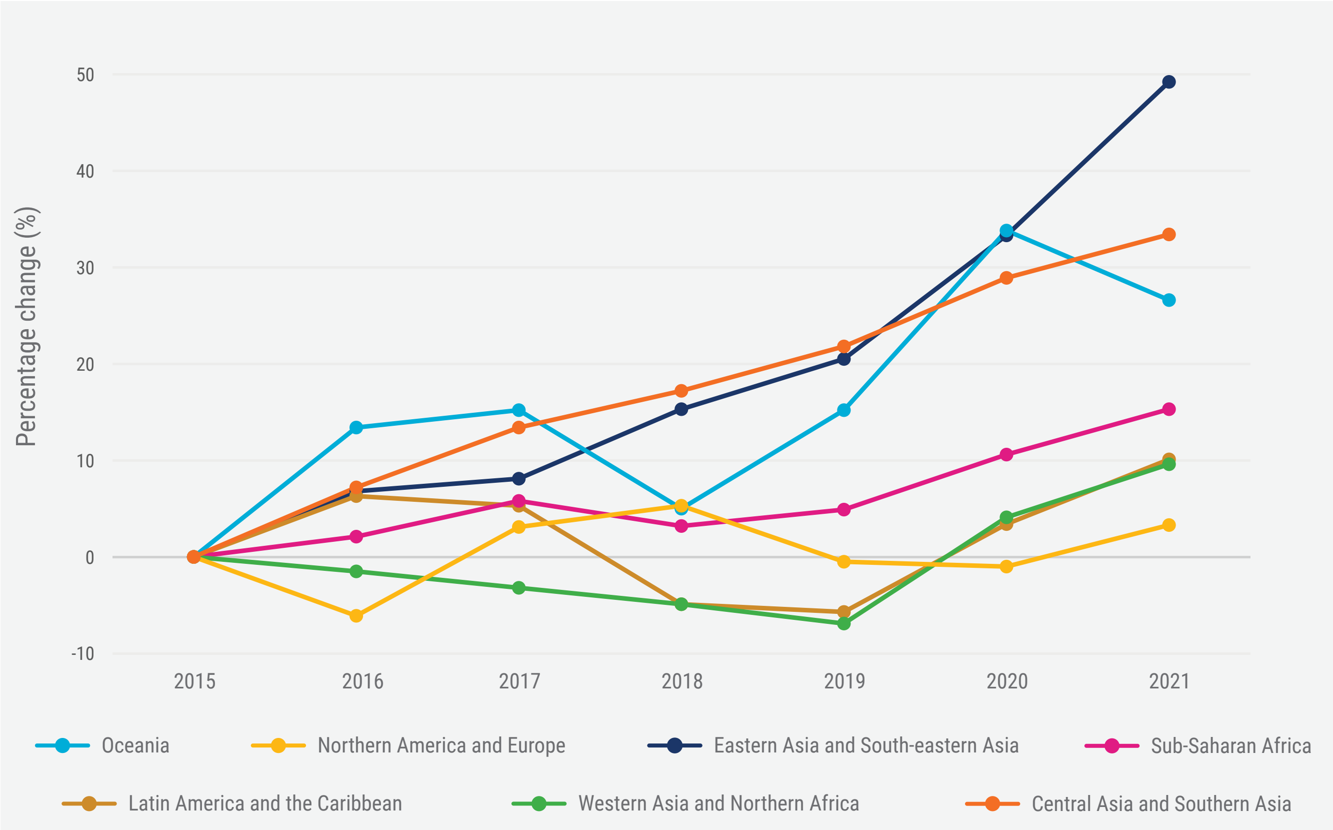
Sectoral WUE	2015	2021	Percentage change 2015–2021
WUE Irrigated agriculture (USD/m³)	0.5	0.7	35.6%
WUE Industry (USD/m³)	28.4	37.2	30.8%
WUE Services (USD/m³)	104.4	111.0	6.3%

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

At regional level, varying degrees of progress can be observed in the changes of WUE within each sector as detailed in Table 3. In the agricultural sector, all regions show positive changes since the last reporting period, although growth has been slower in Northern America and Europe (Figure 7).

Meanwhile, WUE in industrial activities has increased in most regions, with the exceptions of Western Asia and Northern Africa, and Sub-Saharan Africa. The impact of the COVID 19 pandemic in 2020 is also evident across all regions (Figure 8). As for the service sector, WUE has generally improved except in Western Asia and Northern Africa, and Latin America and the Caribbean (Figure 9).

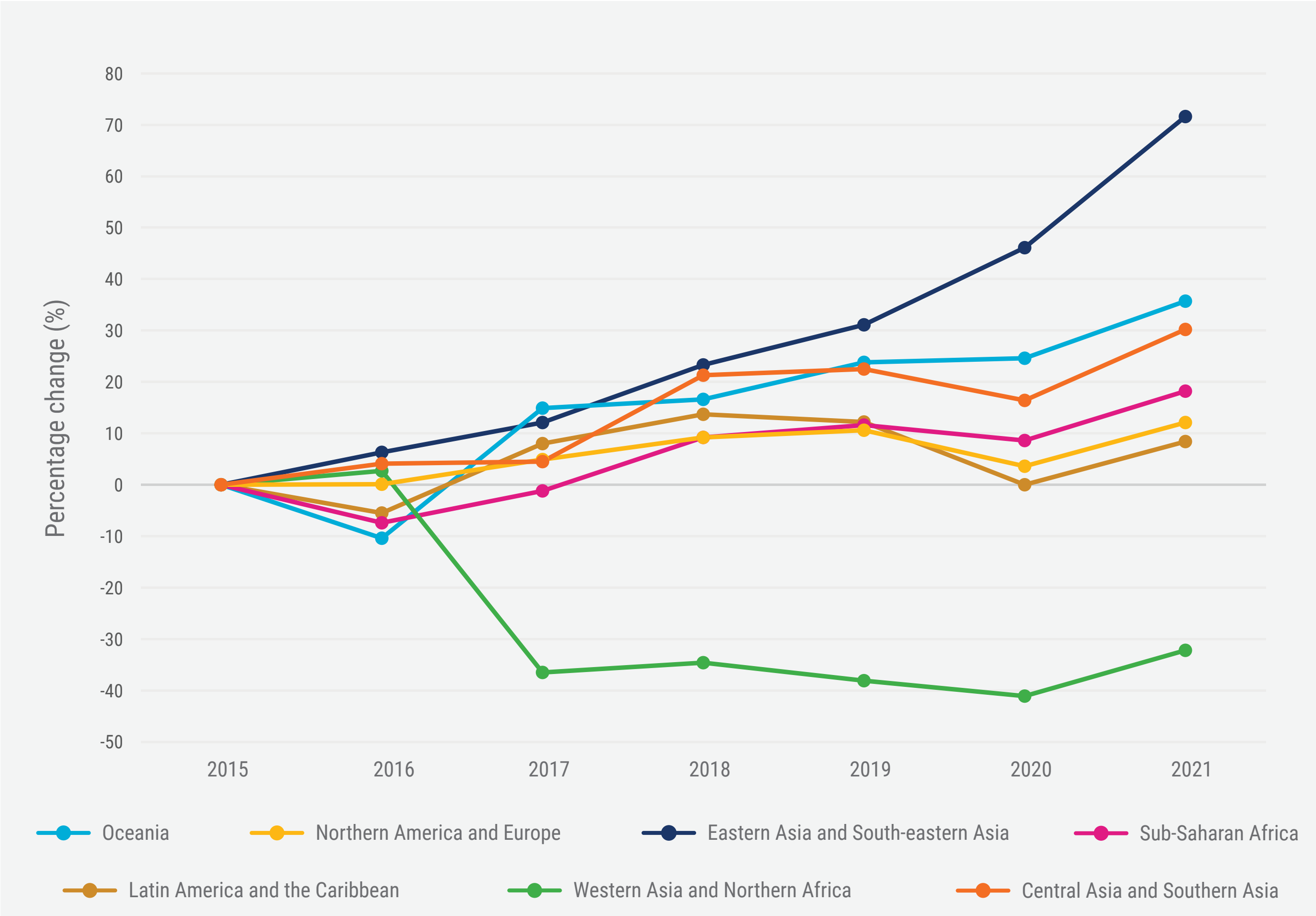
Figure 7. Regional trends in the change of WUE in the agricultural sector (base year 2015)



Key message: Although globally increasing, WUE in agriculture shows marked differences among regions, with wider scope for improvements in Latin America and the Caribbean, Northern America and Europe, Sub-Saharan Africa, and Western Asia and Northern Africa.

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

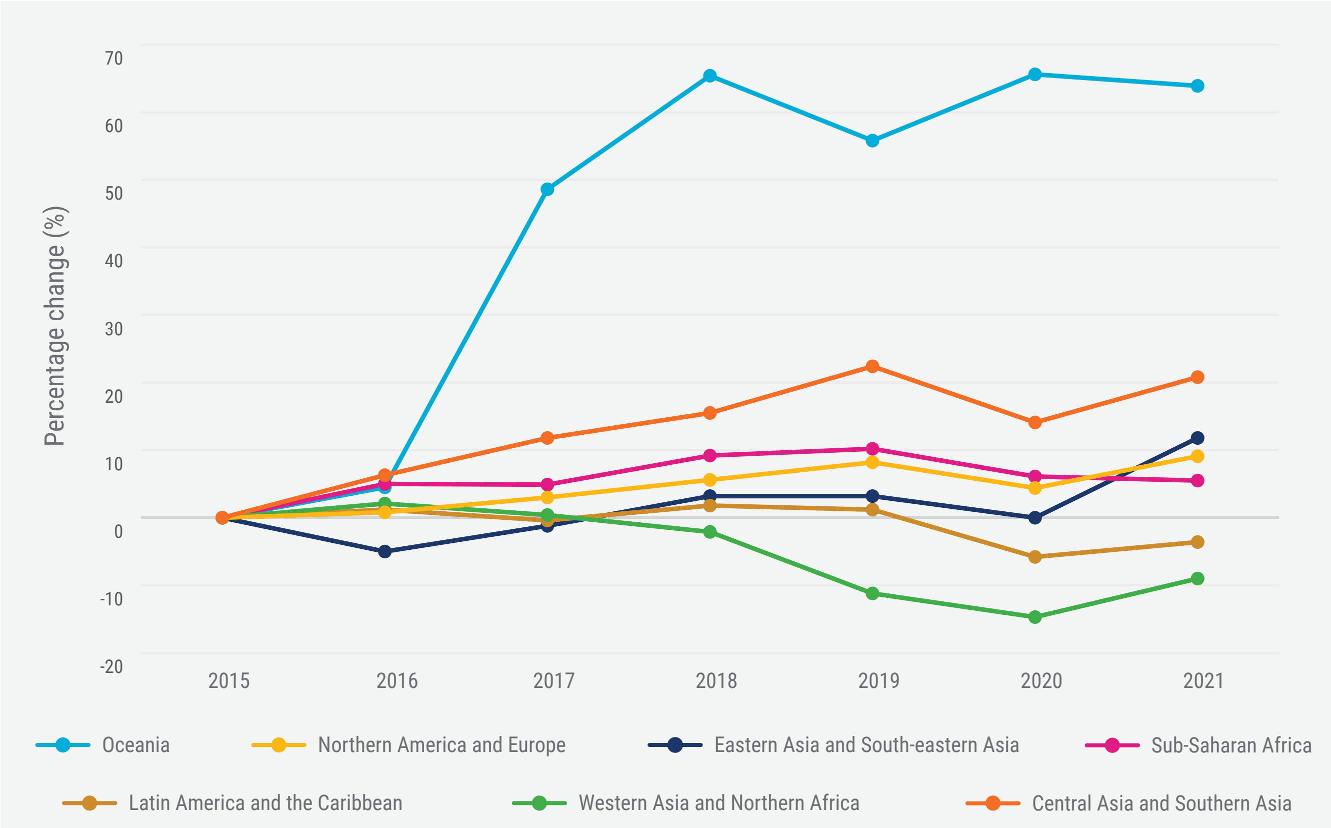
Figure 8. Regional trends in the change of WUE within the industrial sector (base year 2015)



Key message: WUE in the industrial sector is improving globally, except in Western Asia and Northern Africa, where the trend has been negative since 2017.

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

Figure 9. Regional trends in the change of WUE within the service sector (base year 2015)



Key message: Since 2015, WUE in the services sector has remained stable, fluctuating between plus and minus 10 percent, except in Central and Southern Asia, and especially Oceania, where differences have been observed.

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

Table 3. Regional changes in WUE by sector (2015–2021)

Region	Percentage change in Agricultural WUE (%)	Percentage change in Industrial WUE (%)	Percentage change in Service WUE (%)
Central Asia and Southern Asia	33.4	30.2	20.8
Northern America and Europe	3.3	12.1	9.1
Western Asia and Northern Africa	9.6	-32.2	-9.0
Sub-Saharan Africa	15.3	18.2	5.5
Latin America and the Caribbean	10.1	8.4	-3.6
Oceania	26.6	35.7	63.9
Eastern Asia and South-eastern Asia	49.2	71.6	11.8

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

Analysing relative growth trends is useful to understand the dynamics of WUE. For example, in the irrigated agriculture sector, regions like Central Asia and Southern Asia have had consistent increases in WUE. In contrast, Latin America and the Caribbean have shown erratic WUE changes, and Oceania has shown a persistent decline, although with recent signs of improvement. A similar analytical approach can be applied to assess the relative WUE changes within the industrial and service sectors.

WUE improvement can be driven by an increase in the sectoral GVA and/or a reduction in sectoral water use across regions and respective countries.

Global water use data from 2015 to 2021 indicate a marginal decrease in global water withdrawals by 0.1 percent. Specifically, there has been a 10.6 percent rise in water use within the service sector, probably driven by a global increase in urbanization and population growth while industrial water use has declined by 6.5 percent. This decline is attributed to enhanced recycling and reusing water, optimization of cooling systems, adoption of water-saving technologies, and heightened environmental regulation and awareness. Agricultural use has decreased by 0.6 percent (see Table 4). While efforts exist to promote water-saving practices in agriculture, such as efficient irrigation methods and soil and water conservation, the overall impact on reducing water use may be offset by other factors driving increased water demand in agriculture such as intensification or expansion of irrigated areas.

Table 4. Change (%) of water use by the three main sectors at global level, 2015–2021

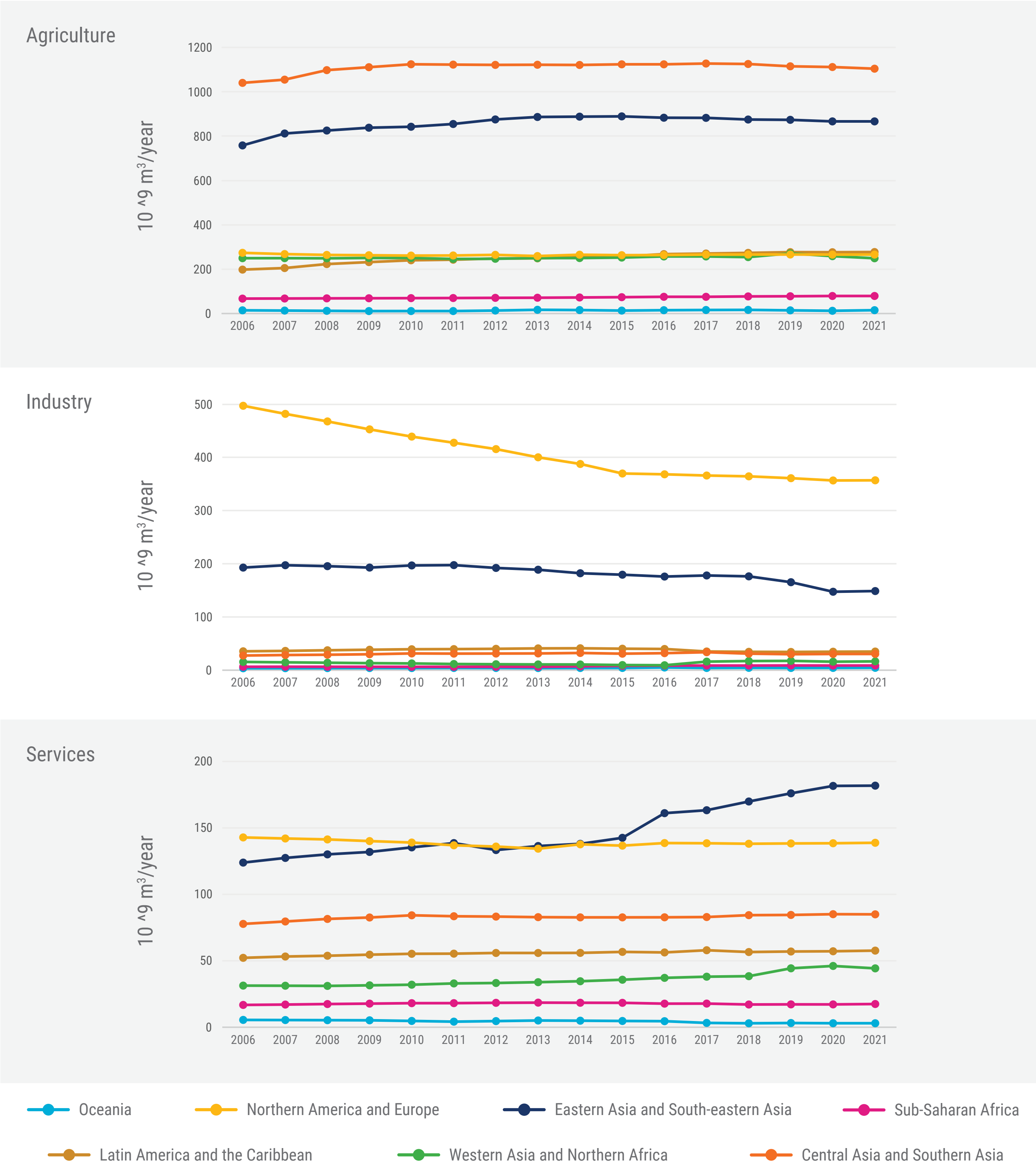
	2015	2021	Percentage change 2015–2021
Agricultural water use [10^9 m^3/year]	2871.7	2855.5	-0.6%
Industrial water use [10^9 m^3/year]	642	600.6	-6.5%
Service water use [10^9 m^3/year]	477.7	528.3	10.6%
Total water use [10^9 m^3/year]	3992.4	3990.2	-0.1%

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

The fluctuations observed in sectoral water withdrawals have a similar pattern at the regional level (Figure 10), with agricultural withdrawals showing minimal change in most regions, although showing a slight decline in Central and Southern Asia, Eastern and Southeastern Asia and Northern Africa and Western Asia.

The decline in industrial water withdrawal appears to be primarily influenced by the European and Northern America region, as well as Eastern and South-Eastern Asia. Conversely, withdrawals in the service sector have seen an upward trend in most regions in recent years, notably with a significant increase in Eastern and Southeastern Asia and Northern Africa and Western Africa.

Figure 10. Sectoral water withdrawals by region (2006–2021)



Key message: While agricultural water withdrawals remain steady, the industrial sector has seen a clear decrease, particularly in Central, Southern, Eastern, and Southeastern Asia. Conversely, water withdrawals in the service sector have increased in Eastern and Southeastern Asia, Northern Africa, and Western Asia, likely indicating a rise in urban water use.

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

Countries are adopting different strategies to enhance WUE and reduce water withdrawals. These strategies include demand and supply management measures, such as the modernization and rehabilitation of municipal water infrastructure to minimize water leakages, investment in more efficient irrigation systems and improved agricultural practices or the use of non-conventional water sources such as treated wastewater.

Furthermore, the decrease in industrial water use is indicative of improvements in water efficiency in the cooling processes of thermal power plants.

Regarding the sectoral GVA data, all sectors show an increase in the GVA globally (see Table 5). The irrigated agricultural sector shows the highest percentage change in GVA at 35 percent, followed by the industrial sector at 22 percent and the services sector at 18 percent.

Table 5. Percentage change (%) in sectoral GVA at global level from 2015 to 2021

GVA (current USD)	2015	2021	Percentage change (%) 2015–2021
GVA – Irrigated agriculture	1.42E+12	1.92E+12	34.8
GVA - Industry	1.83E+13	2.23E+13	22.3
GVA - Services	4.99E+13	5.86E+13	17.6

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

At the regional level, notable increases are observed across all regions for the three economic sectors, with the exception of the industrial GVA of Latin America and the Caribbean which has contributed to the decline in WUE in the region (Table 6). A variation is observed in the influence of irrigated agriculture on the total agricultural GVA across the regions.

Table 6. Percentage change of sectoral GVA at regional level from 2015–2021 to 2021

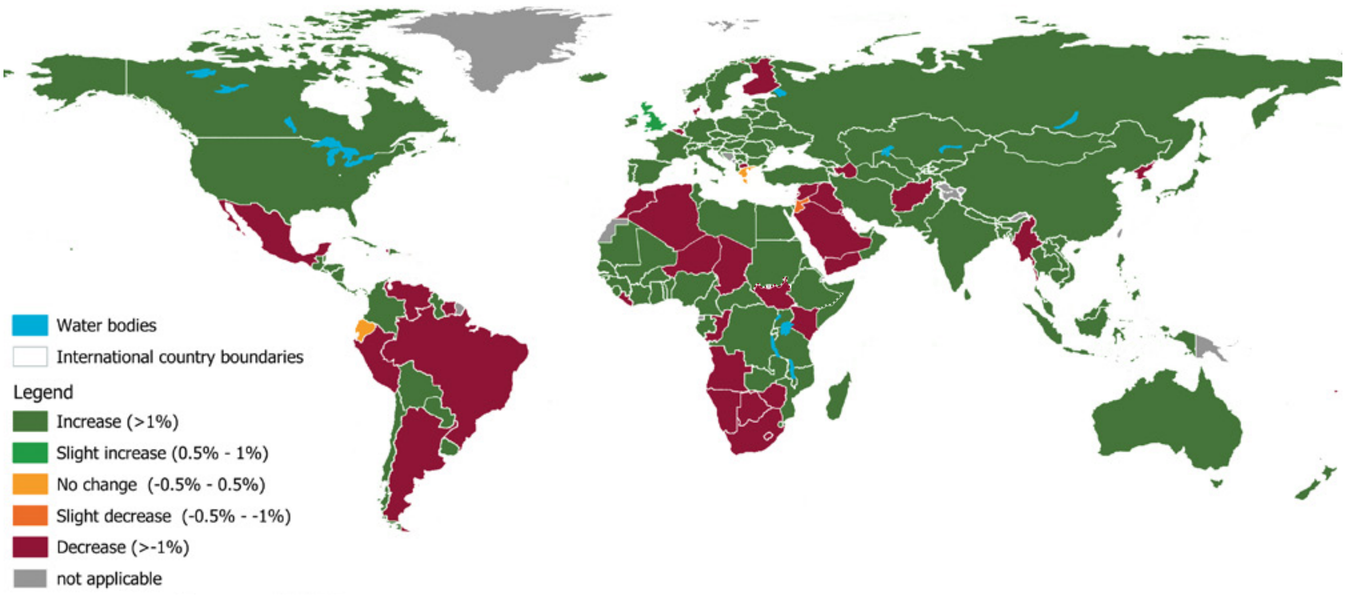
Region	Percentage of irrigated agriculture GVA in total agricultural GVA (2021)	Percentage change of irrigated agriculture GVA (2015–2021)	Percentage change of industrial GVA (2015–2021)	Percentage change of service GVA (2015–2021)
Central and Southern Asia	71.47	31.1	28.0	24.2
Northern America and Europe	15.50	4.3	8.3	10.8
Western Asia and Northern Africa	48.35	8.2	16.7	12.8
Sub-Saharan Africa	3.32	23.9	28.0	0.5
Latin America and the Caribbean	25.26	18.5	-5.9	-2.0
Oceania	30.53	44.8	43.3	5.4
Eastern Asia and Southeastern Asia	60.06	45.4	42.2	42.6

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

Changes in WUE at country level

WUE varies significantly between countries within the same region. According to 2021 data, WUE values have decreased in 44 countries, but increased in 120.

Figure 11. Map with WUE change (%) by country from 2015 to 2021



Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. Final status of the Abyei area is not yet determined.

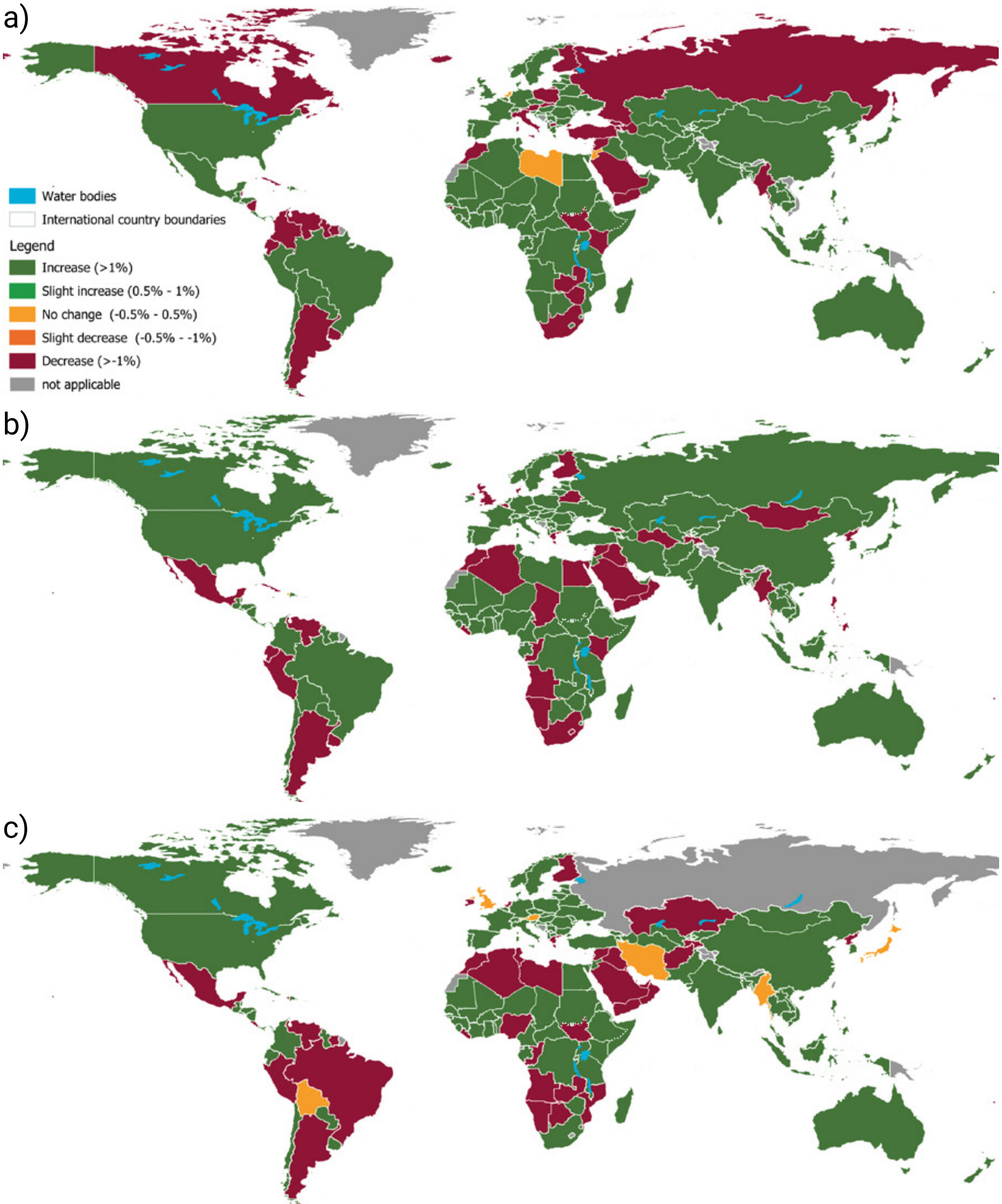
Key message: In 2021, WUE values decreased in 44 countries but increased in 120 countries.

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

Changes in WUE vary across economic sectors within each country as shown in Figure 12. In 2021, data indicate that 122 countries experienced increases in WUE in irrigated agriculture, 118 in the industrial sector, and 113 in the service sector. Positive or negative trends do not always align across sectors within the same country underscoring the need to contextualize these variations.

Differences in WUE changes may reflect differing levels of investment and focus on water management practices, as well as the relative economic importance of each sector. Implementing effective policies and initiatives that promote water conservation, innovation, and sustainable practices across all sectors is crucial for improving WUE at the national level.

Figure 12. Agricultural (a), industrial/MIMEC (b) and service (c) sector WUE changes at country level from 2015–2021



Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. Final status of the Abyei area is not yet determined.

Key message: Increasing WUE in the agricultural sector in most developing countries indicates significant potential for economically sustainable water use development in agriculture.

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

Challenges in addressing data gaps

The lack of accurate, complete and up-to-date data series in some countries remains a primary obstacle in monitoring Indicator 6.4.1 and evaluating changes in water-use efficiency. Without concerted efforts from countries to update and report data, monitoring becomes unfeasible. The data-collection and analysis process still presents significant challenges, as not all countries report on all necessary variables, and some fail to report annually as required for thorough and accurate monitoring.

Lack of data has repercussions on result analysis: in the absence of yearly updates, estimations are made through imputations from one year to the next. This compromises data accuracy, making it difficult to detect changes over time. Missing values contribute to lower aggregated values for these variables at regional or global levels. For this report, data from 166 countries was available to analyse change in WUE from 2015 to 2021.

The importance of decoupling water use from economic growth in the development agenda

The SDG Indicator 6.4.1 specifically targets the objective of "substantially increasing water-use efficiency across all sectors", by assessing the value added generated by the economy relative to the volume of water use, encompassing losses within distribution networks. Therefore, this indicator quantifies the extent to which water use increases alongside increases in economic value added, offering insights into the extent to which a country's economic growth is reliant on water resource use. It highlights the extent of a country's economic dependency on its water resources.

Enhancing water-use efficiency over time may entail decoupling economic growth from water use across the main economic sectors, namely agriculture, industry, and services. However, while data are collected and processed every year, recognizing decoupling trends requires long-term perspective. This approach allows for annual variations to be understood in the context of longer trends.

In practice, it is proposed to assess, for each year, the rate of change of both the GVA and the volume of water used. Full decoupling occurs when GVA grows while water use decreases. If the GVA increases faster than the water use, there is a partial decoupling. In this context, it is considered partial decoupling also if both GVA and water use decrease. On the other side, if water use increases while the GVA decreases, then WUE also decreases, indicating a potential problematic trend in the relationship between water use and economic development.

To visually demonstrate the concept of decoupling, graphic representation is used to illustrate the levels of decoupling (see Box 3). Inspired by the colour coding of traffic lights, this system uses red, yellow, and green indicators to categorize the relationship between economic growth and water use. Each colour represents a specific degree of decoupling, providing a straightforward and intuitive framework to interpret the relationship between the two variables. In short, the system works by considering that if both parameters move in the desired direction we have a green light, if one moves as desired and the other on the contrary we get a yellow light, and if both go in an undesired direction we have a red light. Some details on the calculation of the traffic light visual system are given in Annex 6.

How to determine whether an economy has decoupled growth from water use

Data show that there is a favourable trend in global WUE across the three sectors from 2015 to 2021. However, it is important to note that the value of the indicator alone is insufficient to address the underlying concern: Are countries progressing towards decoupling economic growth from water use?

In Table 7, a regional analysis of the decoupling between economic growth and water use is presented as a first attempt to answer the previous question. Using 2015 as a baseline, the analysis tracks the divergence between economic growth and water use across agricultural, industrial, and service sectors, following the visual model described in the paragraph above.

Regions highlighted in green are effectively progressing in terms of increasing water-use efficiency, marked by an accelerated growth in GVA and a deceleration of the rate of water use. Conversely, regions depicted in red indicate a concerning trend where water use outpaces economic growth. In yellow, we contemplate situations where the GVA grows faster than water use, but water use still increases, or situations where water use is decreasing but the rate of economic growth is also decelerating. The grey colour refers to situations where there are not enough data updates available for the analysis.

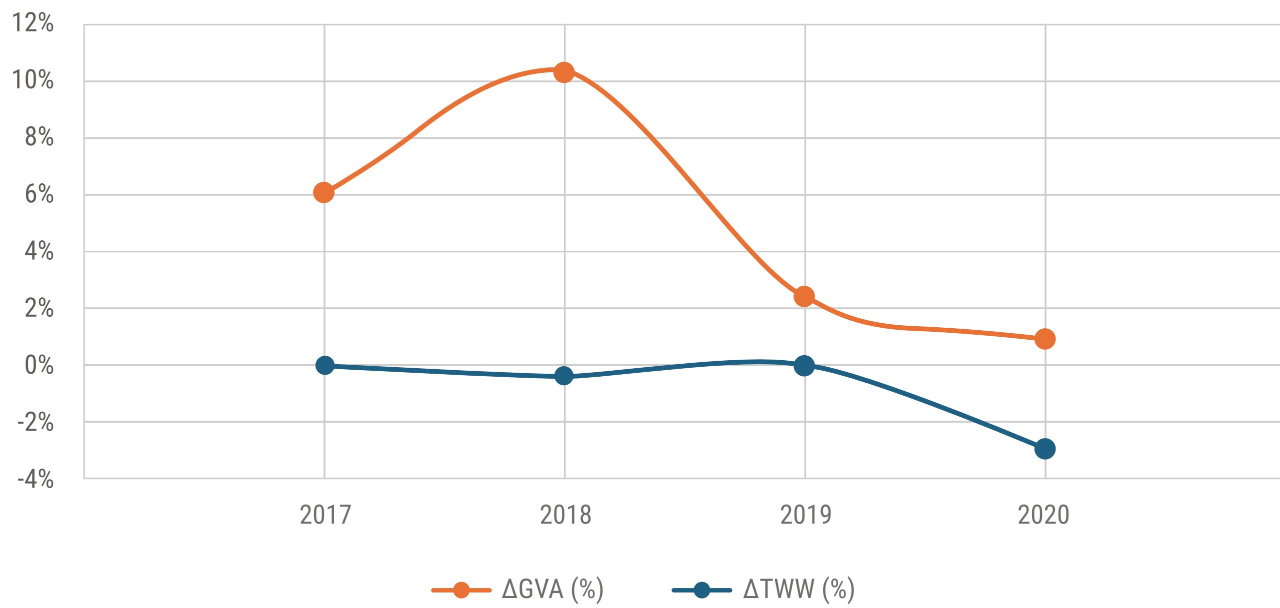
Table 7. Regional analysis of economic growth and water use decoupling

Region/subregion	2017	2018	2019	2020	2021
Central Asia and Southern Asia	Yellow	Green	Green	Yellow	Green
Central Asia	Yellow	Green	Green	Yellow	Green
Southern Asia	Grey	Grey	Grey	Grey	Grey
Northern America and Europe	Green	Green	Green	Yellow	Yellow
Northern America	Yellow	Green	Green	Yellow	Grey
Europe	Green	Yellow	Green	Yellow	Yellow
Western Asia and Northern Africa	Yellow	Green	Red	Yellow	Green
Western Asia	Yellow	Green	Red	Yellow	Green
Northern Africa	Yellow	Yellow	Green	Yellow	Grey
Sub-Saharan Africa	Yellow	Yellow	Green	Red	Yellow
Latin America and the Caribbean	Yellow	Red	Red	Red	Yellow
Oceania	Yellow	Yellow	Green	Green	Red
Australia and New Zealand	Yellow	Yellow	Green	Green	Red
Oceania exc. Australia and New Zealand	Grey	Grey	Grey	Grey	Grey
Eastern Asia and South-eastern Asia	Yellow	Green	Green	Green	Yellow
Eastern Asia	Green	Green	Green	Green	Grey
South-eastern Asia	Yellow	Yellow	Green	Red	Yellow

Source: FAO elaboration based on FAO, 2024

Table 7 shows that while no region is definitively on the trajectory to fully decouple economic growth from water use in recent years, certain subregions have made notable strides, such as Eastern Asia. Conversely, Northern America and Europe, for example, deviated from the decoupling trend they were following. Latin America and the Caribbean show the most pronounced interdependencies between water use and economic growth. Figures 13 and 14 illustrate the rate of change in the GVA or water withdrawals. Figure 13 shows a case of a full decoupling scenario in the Eastern Asian subregion, having the GVA rate of change (orange line) always above zero and also above the total water withdrawals/water use (TWW) rate of change (blue line), while the TWW rate of change is below or equal to zero. Figure 14 shows a scenario where economic growth and water use are interdependent (not decoupled) in the Latin American region, where the two lines intersect each other, and the TWW line is at times above zero and above the GVA line as well. Detailed analyses of decoupling trends for two country case studies are available in Annex 4.

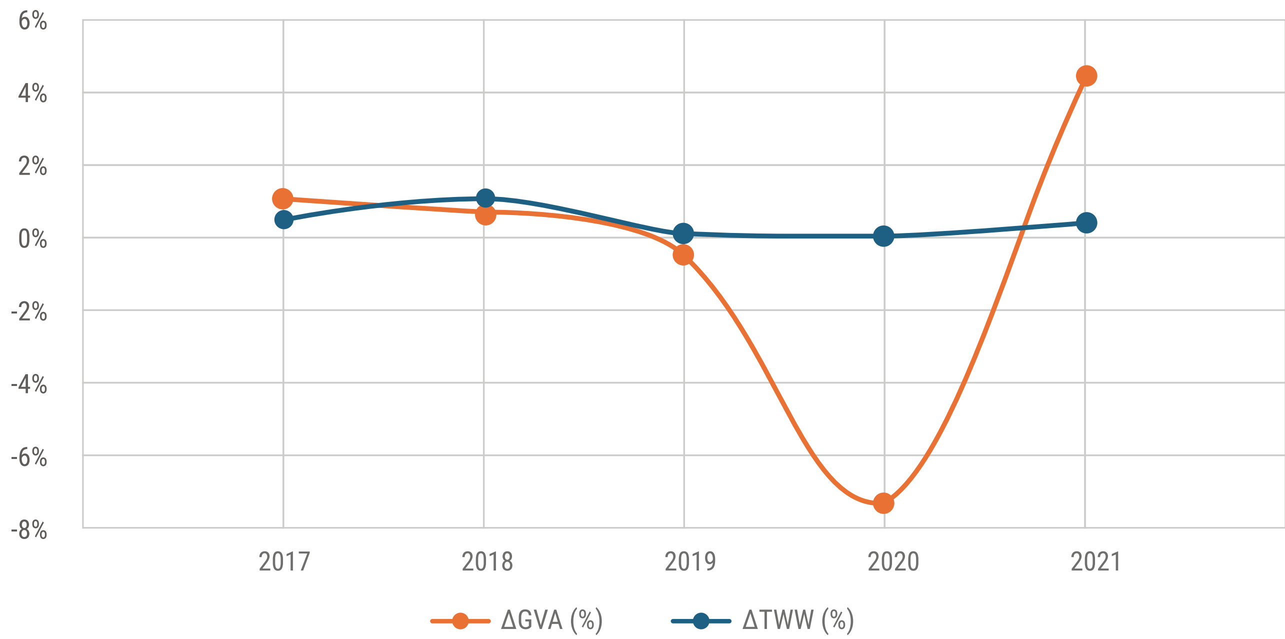
Figure 13. View of decoupling levels between the economy and water use in the Eastern Asian subregion, depicted using the rate of change. Orange dots denote GVA status, while blue dots indicate total water withdrawals (water use).



Key message: The clear separation between the two lines of water use and GVA indicates a good decoupling of economic development from water use in the Eastern Asian subregion.

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

Figure 14. View of decoupling levels between the economy and water use in the Latin America and the Caribbean region, depicted using the rate of change. Orange dots denote GVA status, while blue dots indicate TWW.



Key message: The intersecting lines indicate an interlinkage, or lack of decoupling, of economic development from water use in the Latin America and the Caribbean region.

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

Assessment of the interdependency between water use and GVA can also be conducted within each economic sector. Table 8 illustrates the development of this correlation for Eastern Asia from 2015 to 2020:

Table 8. Sectoral analysis of economic growth and water use decoupling by sector in the Eastern Asia subregion from 2015 to 2020

	2017	2018	2019	2020
Irrigated agriculture WUE				
Industrial WUE				
Service WUE				

Source: FAO elaboration based on FAO, 2024

The findings show that there is a notable consistency in decoupling the sectoral economic growth from the water use within the agricultural sector. Conversely, the services sector demonstrates a trend where the rate of increase in water use surpasses the growth in GVA.

Main interlinkages with other sectors of the development agenda

Understanding gender linkages of SDG 6.4

The social pillar represents one of the three foundations of the SDGs – defined as "*the ability of human beings of every generation to not merely survive, but to thrive*" (Magis and Shinn, 2009, p. 38). Human well-being, equity, democratic governance, and engaged civil society are social aspects that contribute to society's long-term sustainability. Gender equality, defined as follows: "*women and men, girls and boys, have equal rights, conditions, opportunities and power to shape their own lives and affect society*" (FAO and) Swedish International Development Cooperation Agency (SIDA, 2018, p. 1), is highlighted as one of the most significant aspects of a socially sustainable system that underpins well-functioning societies (Rogers *et al.*, 2012).

Women are disproportionately disadvantaged by their gender roles that limit their access and control over resources. Unequal distribution of resources and power imbalances result from the root causes of poverty and heavily impact people's capacity to adapt to changing environmental conditions. As with other natural resources, water management is intrinsically linked to gender relations and plays a critical role in determining the ways in which these resources are accessed, distributed, and utilized by men and women.

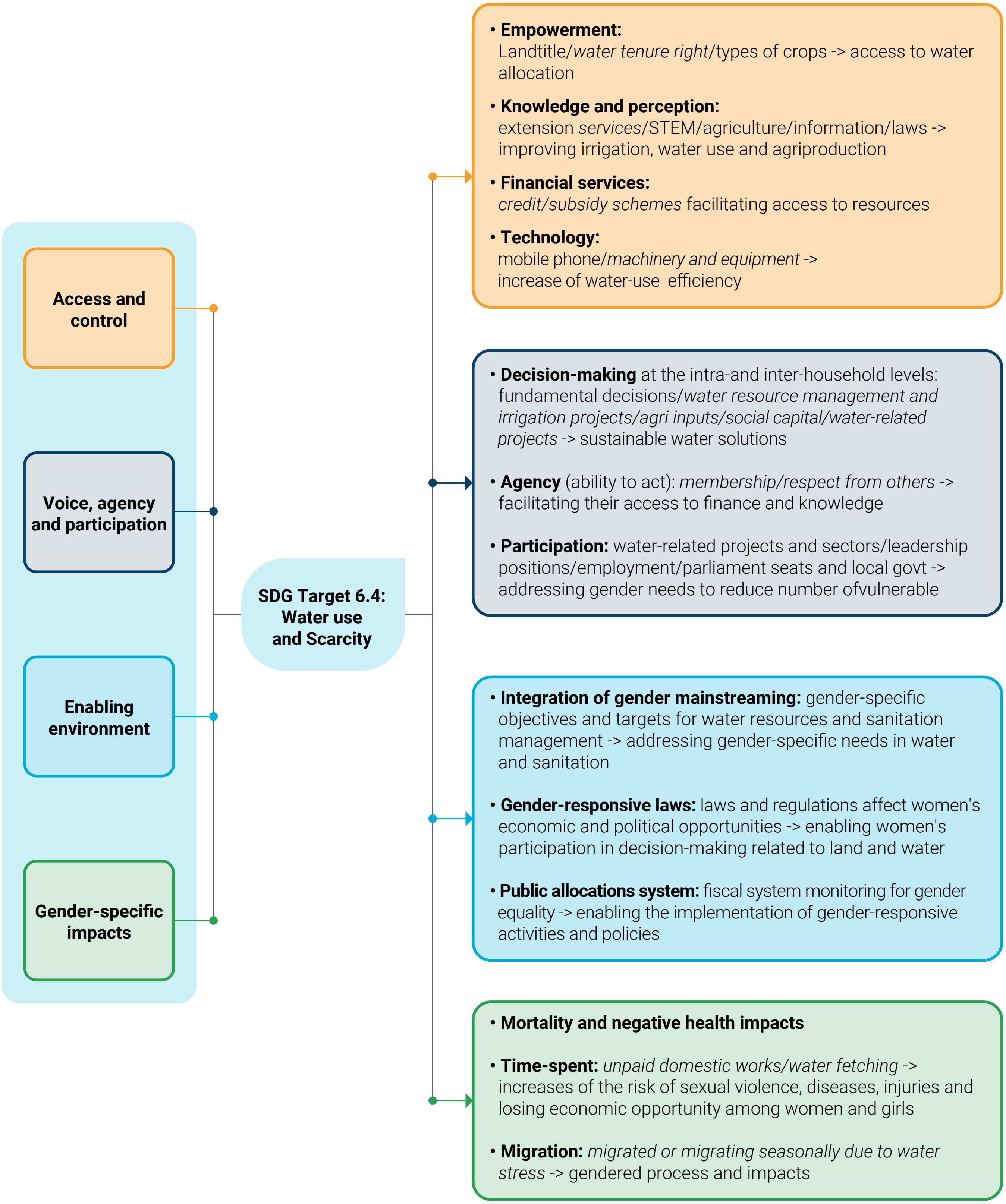
Despite the critical importance of assessing the gender-specific impacts of water-related challenges, the inclusion of gender as a dimension of inequality in SDG 6 has only been considered until now for Indicators 6.1.1 (Proportion of population using safely managed drinking water services) and 6.2.1 (Access to adequate and equitable sanitation and hygiene). This inclusion is due to the fact that the methodologies to calculate these indicators directly reference individuals. Nonetheless, there is potential to incorporate a gender perspective into other SDG 6 indicators in which data disaggregation by sex is not directly possible. This potential could be achieved through complementary analysis and/or aggregation of SDG indicator data with other relevant information, depending on the country context. With that view, the Integrated Monitoring Initiative for SDG 6 (IMI-SDG6) is developing the approach referred to as gender contextualization of SDG 6 indicators, including those of SDG Target 6.4.

The SDG 6.4 indicators primarily focus on the economic and environmental dimensions of water use, not including demographic and social variables in the indicator formulas. As a consequence, there has been minimal analysis of how Indicators 6.4.1 and 6.4.2 interact with gender issues. However, the human dimension is evident at target level, which aims to "*substantially reduce the number of people suffering from water scarcity*". Examples of a meaningful gender contextualization of SDG 6.4.2 include, among others, the assessment of factors such as accessibility technologies, and land and water tenure rights across different gender groups.

As part of the work of SDG 6.4 on gender contextualization, a conceptual map showing the main thematic areas identified and used has been developed (Figure 15). It is composed of four main thematic areas including 1) access and control; 2) voice, agency and participation; 3) enabling environment; and 4) gender-specific impacts. Under each thematic area, various themes and sub-themes draw potential linkages between gender and water-related topics. This map served as a basis for the formulation of a two-layer set of existing gender indicators, resulting in basic and advanced sets. These can be used by countries interested in exploring the linkages between SDG 6.4 indicators and gender dimensions, possibly applying the ladder approach. Both sets contain indicators with clear methodology. The basic set of indicators offers a list of those for which data are often available (see Annex 5). Meanwhile, the advanced set indicates those for which data are more sporadic, often collected under a project or a study with limited area of coverage. Further, the indicators are labelled with a three-level system showing the degree of relevant linkage to SDG 6.4 indicators. It also shows a possibility of use at either local/project level or at country level.

This methodological approach is being tested in several countries by IMI-SDG 6 team.

Figure 15. Conceptual map showing the links between gender and water-related topics



Source: Authors' own elaboration.

WUE change in medium and highly water stressed countries

Combining both Target 6.4 indicators can inform comprehensive water management strategies, especially in those areas where water stress is high or critical. If WUE is low but water stress is high, this highlights areas where interventions are needed to improve efficiency and reduce stress (see Table 9).

Monitoring both indicators over time allows for a more holistic assessment of progress towards SDG 6 targets. Progress in improving WUE should ideally lead to reductions in water stress if resources are managed sustainably.

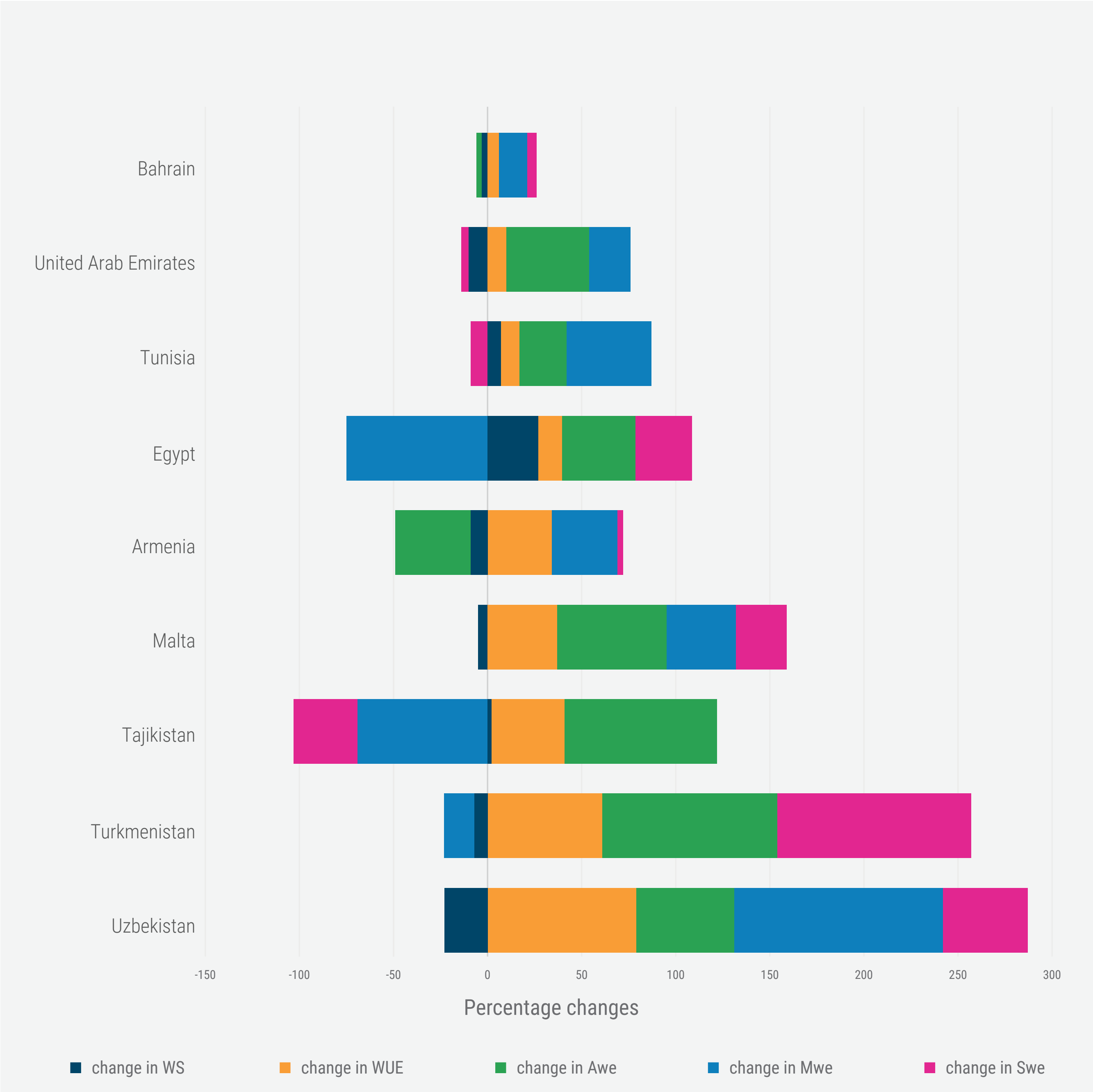
Where progress is lagging or where trade-offs exist between different sectors (for example agriculture versus industry), these indicators help policymakers prioritize actions for achieving SDG 6. In Figure 16, countries with medium to high values of water stress are analysed. Despite the high-water stress values they face, the progress made by the countries in improving water governance has been reflected in the improvement of water stress trends and, on the WUE values in the different sectors in most of the countries. Three of these countries with better results (Bahrain, Malta and Uzbekistan) are presented as acceleration examples in case study highlights.

Table 9: Countries with high levels of water stress and low levels of WUE

Country	Level of water stress (%)	WUE (US$/m^3)
Libya	817	9.98
Yemen	170	4.79
Pakistan	162	1.84
Egypt	141	5.31
Algeria	138	14.56
Turkmenistan	135	2.03
Syrian Arab Republic	124	2.03
Uzbekistan	122	2.53
Sudan	119	4.99
Tunisia	98	11.68
Sri Lanka	91	6.39
Iran (Islamic Republic of)	81	4.62
Eswatini	78	3.86

Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

Figure 16. Combination of water stress levels change (change in WS) and sectoral water-use efficiency changes (changes in Awe - agricultural water use efficiency, Mwe - industrial water use efficiency and Swe - services water use efficiency) in medium to critically stressed countries (2015–2021)



Source: FAO elaboration based on FAO, 2024

Decision-makers can combine the information from these indicators to understand how increasing water use affects the availability of water resources and to define a tipping-point target for decoupling water use from economic growth. Such information would enable countries to adequately follow-up on Target 6.4.

Interlinkages between WUE, food security and climate change

About 29.6 percent of the global population – 2.4 billion people – were moderately or severely food insecure in 2022, 391 million more than in 2019 (FAO *et al.*, 2023), largely in the developing parts of the world where agricultural systems are characterized by smallholders' farmers with limited access to resources and markets, vulnerability to climate variability or lack of diversified crops. In all regions, women are disproportionately affected by food insecurity than men. This is often accompanied by weak institutional structures, armed conflicts, or political instability (FAO, 2023a).

Water systems, essential for our agrifood systems and for ensuring food security, require conservation and sustainable management. Agriculture, as the largest user of freshwater, often operates with low water efficiency. Enhancing this efficiency not only entails more productive agriculture but also may lead to sustainable practices. These improvements are essential for ensuring adequate food supplies and advancing environmental sustainability.

Achieving water-use economic efficiency in agriculture entails striking a balance between increasing agricultural productivity to meet the food demands of a growing population and safeguarding water resources for future generations and ecosystem health. The trade-offs associated with enhancing water-use efficiency reach broader socio-economic and environmental dimensions. For instance, intensifying agricultural practices to increase yields may lead to greater water consumption and exacerbate water scarcity, thereby jeopardizing the livelihoods of rural communities and compromising ecosystem integrity (FAO, 2017).

Different factors influence the nexus between food security and water-use efficiency, including technological advancements, policy interventions, market dynamics, and socio-economic conditions (FAO and WWC, 2015). While improvements in irrigation systems, crop genetics, and agronomic practices have enhanced water-use efficiency in agriculture, other challenges not included in SDG 6.4.1, such as water pollution, land degradation, and inequitable access to water may persist, exacerbating the trade-offs between agricultural productivity and environmental sustainability. On the other hand, food insecurity can perpetuate poverty cycles and hinder economic development, potentially affecting investments in water infrastructure and technologies to improve water-use efficiency.

Implementing these targets must be done in an integrated way that uses water sustainably and efficiently, builds resilience, controls pollution, balances the competing needs of different users in an equitable way and includes protection of the environment (UN-Water, 2016). Implementing integrated water resources management (SDG 6.5.1) supports the coordinated development and management and use of water across sectors, at the same time building resilience to climate change impacts. Unfortunately, around 45 percent of countries report having limited or ad hoc management instruments for sustainable and efficient water use management (UNEP, 2024).

On the other hand, the impact of climate change is a critical challenge for improving WUE in agriculture. The sixth assessment report of the Intergovernmental Panel on Climate Change (IPCC) highlights significant projections of extreme agricultural droughts in various regions worldwide. Specifically, large areas of northern South America, the Mediterranean, western China, and high latitudes in North America and Eurasia are expected to face heightened risks. At 1.5°C global warming, these droughts are projected to be at least twice as likely, increasing to 150 percent to 200 percent at 2°C warming, and over 200 percent at 4°C. Additionally, due to the combined impacts of water availability and temperature changes, agricultural yield risks could triple at 3°C compared to 2°C warming.

Extreme climate events, including floods and droughts, pose multifaceted challenges to economic sectors, disrupting production and supply chains, increasing operational costs, reducing profitability, and impacting long-term economic resilience. Addressing and understanding these impacts is crucial for developing adaptive and resilient economic systems in the face of climate-related risks.

The agriculture sector faces substantial risks from climate change, leading to losses and damages that are steadily increasing. Post-disaster assessments from 2007 to 2022 indicate that agricultural losses accounted for an average of 23 percent of the total impact of disasters across sectors. Furthermore, over 65 percent of losses caused by droughts were experienced in the agriculture sector. Losses and damages in agrifood systems result from adverse climate impacts that exceed adaptation limits, particularly related to water availability and the adoption of climate-resilient crops (FAO, 2023b).

Climate change impacts will also influence the GVA of agriculture, impacting production, productivity, and profitability. Negative impacts on global GDP due to water-related risks are widely acknowledged, although estimates of loss magnitude vary based on model assumptions (Caretta *et al.*, 2022). Projections suggest lower global GDP due to future water-related impacts, with low- and middle-income countries facing higher losses, particularly from flooding scenarios under 1.5°C to 2°C warming (IPCC, 2022).

Irrigation expansion as an adaptation to climate change and as a response to the potential increase in food demand may face limitations. With varying levels of water stress presently observed and anticipated changes in regional water availability, alongside ongoing groundwater depletion due to excessive irrigation, certain regions such as South and Central Asia, the Middle East, and parts of North and Central America will face constraints on expanding irrigation (Grafton *et al.*, 2015; Turner *et al.*, 2019). Trade of agricultural products can be a solution to water stressed countries, since the virtual water embedded in imported food products would substitute the water withdrawn in a scenario with no food trade. According to Du *et al.* (2022), virtual water trade has eased water stress for countries with limited water resources availability but exacerbated it for nations with abundant water resources. However, other studies show that countries with high food insecurity rates are net virtual water exporters while high-income countries play a major role in importing water originated in other countries which are vulnerable in terms of water availability and governance or economic wealth (Vallino *et al.* 2021). While agricultural trade can offer opportunities to alleviate water stress and food insecurity, its effectiveness depends on a nuanced understanding of the underlying dynamics of the context.

Conclusions and recommendations

Water-use efficiency (WUE) provides an estimation of the reliance of the economic growth of a country on the use of its water resources. The change in WUE measures the capacity of the economy to grow without overexploiting its water resources.

The report shows that from 2015 to 2021, WUE has shown a positive trend both globally and across the three main economic sectors. This is the result of slight global water use decrease in global water withdrawals and the increase in the GVA in all sectors.

At country level, 72 percent of the 166 countries analysed demonstrated improvements in WUE. However, it is essential to examine the macroeconomic structure of each country to fully understand and assess the changes in each specific sector. Furthermore, the interpretation of this indicator would be enhanced by using supplementary indicators at country level, such as irrigation efficiency, municipality network efficiency and industrial and energy-cooling efficiency.

The report outlines a methodology and presents initial results to analyse the decoupling at regional level, with specific examples from various countries in the 2015–2021 period. According to the data, regions such as Central Asia and Western Asia have progressed in the decoupling between water use and economic growth in recent years. Conversely, regions like Latin America and the Caribbean have not achieved decoupling. However, interpreting the results requires caution as there is a need for more frequent updating of sector-specific economic and hydrological data to ensure accurate analysis.

The improvement of water use efficiency is particularly critical in regions facing water stress, where water availability is a limiting factor for economic growth. By optimizing water-use efficiency, protecting ecosystems, and promoting equitable access to water, sustainable agriculture contributes to resilient food systems that can meet the needs of present and future generations. Mobilizing various stakeholders, resources, and funding is essential for achieving this goal expediently. To achieve the targets, it is important for governments to improve water-use efficiency. Targeted actions must be implemented in these key areas:

Scaling up best practices and innovative technologies

- Enhance crop and irrigation technologies, such as precision irrigation systems, soil moisture monitoring or the use of climate-reliant crops.
- Improve access to markets for smallholders.
- Implement strategies to minimize food waste and losses, which indirectly conserves water resources.
- Adopt water-saving technologies in industrial processes.
- Use leak detection technologies in water distribution systems, reducing water losses.

Improving governance

- Implementing Integrated Water Resources Management (IWRM) Action Plans to improve water governance, aligning them with climate change and adaptation and mitigation strategies.
- Implementing clear and equitable water rights systems to ensure inclusive allocation of water resources and prevent over-extraction.
- Strengthening monitoring and enforcement mechanisms to ensure compliance with water use regulations and water efficiency standards.

Capacity development

- Providing farmers with education and training on efficient irrigation techniques such as drip irrigation and rainwater harvesting to produce more with less water.
- Strengthening agricultural extension services to disseminate knowledge about water-efficient practices and technologies, including soil moisture management.
- Promoting industry certifications and standards focused on water efficiency to encourage businesses to adopt sustainable water management practices.
- Strengthening capacities across country institutions related to collection, analysis and interpretation of data on water resources and water use.
- Implementing public awareness campaigns to educate consumers and businesses about the importance of water conservation and efficient water use.
- Building capacity for local governments and service providers to develop water efficiency policies and regulations.

Financing

- Providing financial support for the adoption of efficient irrigation systems to optimize water use and increase crop yields.
- Providing financial products such as crop insurance to incentivize the adoption of water-saving technologies.
- Providing financial incentives for water reuse.
- Implementing tax benefits and credits for industries that invest in water-efficient technologies and infrastructure.
- Facilitating Public-Private Partnerships to fund innovations in the water service sector.

Addressing data gaps

- Improve data collection and analysis on water withdrawals across economic sectors to enable more precise estimations of WUE.
- Perform water accounting assessments to prevent ineffective water management practices and potential negative trade-offs.
- Use supplementary indicators at national level, including efficiencies in irrigation, municipal networks, and industrial and energy sector cooling efficiencies.

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Annexes

Annex 1. Methodology and data collection:

Country-led national data-collection and AQUASTAT database aggregation

Data to calculate the indicator is collected through AQUASTAT, FAO'S global information system on water and agriculture. AQUASTAT has collected, analysed and disseminated data on national and regional water resources since 1994 enabling policymakers, researchers and stakeholders to make informed decisions and develop effective strategies for sustainable water management. The data collection process for SDG 6.4.1 relies on a network of national correspondents officially appointed by the government. Questionnaires are dispatched on an annual basis during the first semester of the year. Throughout the data collection process, national correspondents have the key role of ensuring data quality and coordination at country level. Having national coordination in place will ensure the timely and consistent collection of the data on a regular basis. Data for this indicator's components are usually collected by national ministries and institutions that have water-related thematic areas in their mandate, such as ministries of water resources, agriculture, industry, or the environment.

Countries compile their different variables in the questionnaire (see the reporting template in the Annex 2) that is sent back to FAO, which produces the regional and global aggregates. Once countries submit the data, there is a validation process by AQUASTAT to ensure the quality and consistency of the data. This validation includes a regular dialogue with national correspondents.

After the validation process, the FAO AQUASTAT database is used to provide data on water use for agriculture, industry and services. Economic data on gross value added in each of the above-mentioned three major economic sectors is acquired from national statistical departments or other relevant national government agencies and international sources, such as the World Bank, United Nations Statistics Division (UNSD) and the Organization for Economic Co-operation and Development (OECD). These data sources follow the set of concepts, definitions, classifications and accounting rules recommended in the System of National Accounts (SNA). This allows countries' data and economic performances to be compared internationally. Economic data are corrected for inflation.

Calculation methodology

Water-use efficiency (WUE) is calculated as the sum of the efficiency of the three main economic sectors, as categorized under ISIC rev4, weighted according to the proportion of water use by each sector over the total use:

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

Where:

- WUE = water-use efficiency [USD/m^3]
- A_{we} = irrigated agriculture water-use efficiency [USD/m^3]
- M_{we} = MIMEC water-use efficiency [USD/m^3]
- S_{we} = services water-use efficiency [USD/m^3]
- P_A = proportion of water used by the agriculture sector over the total use
- P_M = proportion of water used by the MIMEC sector over the total use
- P_S = proportion of water used by the services sector over the total use

The indicator measures the **change of WUE over time**. The change in water-use efficiency (CWUE) is calculated as the ratio of water-use efficiency (WUE) in time t minus water-use efficiency in time t-1, divided by WUE in time t-1 and multiplied by 100:

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

Alternatively, if the objective is to calculate the trend over a longer period of time, the following formula can be used:

$$TWUE = \frac{WUE_t - WUE_{t_0}}{WUE_{t_0}} * 100$$

Only surface water and groundwater (so-called blue water) have to be considered in calculating the indicator. This is particularly important regarding water use for the agricultural sector. For this reason, a specific parameter (Cr) has been introduced in the formula to extract the amount of agricultural production done under rainfed conditions. For the same reason, the value added of sub-sectoral productions making mainly use of non-abstracted water should not be considered to calculate the overall sectoral value added. The calculating of each sector is described below:

A_{we} **Water-use efficiency in irrigated agriculture (USD/m³)**. It is used as a proxy indicator for the WUE in agriculture sector and calculated as the agriculture value added per agricultural water use. In formula:

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

Where:

- GVA_{al} Gross value added of the livestock sub-sector [USD].
- GVA_{aa} Gross value added of the freshwater aquaculture sub-sector [USD].
- GVA_{ai} Gross value added of the irrigated cultivations sub-sector [USD].
  It should be noted that forestry and fishing values should not be included in the calculation, with the exception of forest tree nurseries and freshwater aquaculture. In ISIC coding terms, the sectors to be considered are:
  • 01 Crop and animal production, hunting and related service activities.
  • 0210 Silviculture and other forestry activities
  • 0322 Freshwater aquaculture

- The numerator of the formula therefore corresponds to the GVA by the agriculture subsectors excluding the rainfed systems and is abbreviated as GVAa_rev in this report.
- V_a Volume of water used by the agricultural sector [m³].
- It is the annual quantity of self-supplied water used for irrigation, livestock (watering, sanitation, cleaning, etc.) and aquaculture purposes. It corresponds to the ISIC sectors A [1–3] but excluding forestry and fishing. It includes water from renewable freshwater resources, as well as water from over-abstraction of renewable groundwater or abstraction of fossil groundwater, direct use of agricultural drainage water, (treated) wastewater, and desalinated water.
- C_r Proportion of agricultural GVA produced by rainfed agriculture.
- If disaggregated data on value added of rain-fed and irrigated-agriculture are not reported in national accounts, it can be calculated from the proportion of irrigated land on the total cultivated land, as follows:

$$C_r = \frac{1}{1 + \frac{A_i}{(1 - A_i) * 0.562}}$$

Where:

- Ai Proportion of irrigated land on the total cultivated land, in decimals.
- 0.562 Generic default ratio between rainfed and irrigated yields (Yri).

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

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

Where:

- GVA_m Gross value added by MIMEC (including energy) [USD].
  It is calculated by adding the value added of each of the four MIMEC divisions as defined in ISIC coding: B, C, D and F.
- V_m Volume of water used by MIMEC (including energy) [m^3].
  It is the annual quantity of water withdrawn for industrial uses. It includes water from renewable freshwater resources, as well as over-abstraction of renewable groundwater or withdrawal of fossil groundwater and potential use of desalinated water or direct use of (treated) wastewater. This sector refers to self-supplied industries not connected to the public distribution network. It includes cooling for a thermoelectric plant but does not include hydropower. However, water use for this sector should include the losses for evaporation from artificial lakes used for hydropower production. This sector corresponds to the ISIC sectors B, C, D and F.

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

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

Where:

- GVA_s Gross value added by services from ISIC sectors E and G to T [USD].
- V_s Volume of water used by the service sector [m^3].
  It is the annual quantity of water withdrawn primarily for direct use by the population. It includes water from renewable freshwater resources, as well as over-abstraction of renewable groundwater or withdrawal of fossil groundwater and the potential use of desalinated water or direct use of treated wastewater. It is usually calculated as the total water withdrawn by the public distribution network. It can include the part of the industries which is connected to the municipal distribution network. It corresponds to the ISIC sector E.

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

WUE is significantly influenced by a country's economic structure and the prevalence of water intensive sectors.
The indicator can facilitate the formulation of targeted water policies by directing focus towards sectors or regions exhibiting minimal changes in water-use efficiency or possessing high water demands coupled with low WUE. Such insights will guide countries in their efforts to enhance water-use efficiency and will enable the adoption of successful practices from sectors or regions with higher efficiency levels to those with lower levels.

It is important to acknowledge that if a country's overall development becomes uneven due to its water resources use, other SDG indicators will highlight issues and indicate the necessity of adjustments. For instance, the imbalance in water use could threaten food security and livelihoods, especially in countries where agriculture is focused on subsistence farming. Although this particular indicator may not directly capture such nuances, related indicators would reflect these challenges.

Annex 2. AQUASTAT questionnaire

The primary scope of the questionnaire is to obtain a comprehensive picture of water resources and uses at the national level, along with a description of their major characteristics, trends, constraints and perspectives, with particular focus on the agricultural sector, through systematic data collection, harmonized definitions and metadata. The questionnaire is also designed to collect a selection of SDG-related data on water resources, water use and irrigation in a standardized manner on an annual basis. Reporting time for the countries was kept in mind throughout the design of this questionnaire, which is purposefully short (35 variables).

The questionnaire is composed of:

- Three introductory sections: Cover page, Instructions, Definitions
- One data reporting section, including national data on water withdrawal, dam capacity, municipal wastewater, irrigation and drainage
- Two supplementary information sections: Metadata, Feedback

The questionnaire is available in three languages: English, French and Spanish.

In addition to the annual data collection, a more complete questionnaire will be sent every 5 years to populate other AQUASTAT databases.

In parallel and to support the change in data collection method, the AQUASTAT team organized workshops for the national correspondents to develop national capabilities for water monitoring.

NATIONAL DATA

	Water Resources	Unit	2019	2020	2021
	Total Renewable Water Resources (Long-term average)	10^9 m^3/year			

I	Water withdrawals				
I.1.	**Water withdrawals by sector**	**Unit**	**2019**	**2020**	**2021**
	Total water withdrawal	10^9 m^3/year			
	Agricultural water withdrawal: total				
	Water withdrawal for irrigation				
	Water withdrawal for livestock (watering and cleaning)				
	Water withdrawal for aquaculture				
	Municipal water withdrawal				
	Industrial water withdrawal (incl. water for cooling of thermoelectric plants)				
	Water withdrawal for cooling of thermoelectric plants				
	Environmental flow requirements (stable over time)				
I.2.	**Water withdrawals by source**	**Unit**	**2019**	**2020**	**2021**
	Total surface water and groundwater withdrawal (freshwater)	10^9 m^3/year			
	Surface water withdrawal				
	Groundwater withdrawal				
	Desalinated water produced				
	Direct use of treated municipal wastewater				
	Direct use of agricultural drainage water				

II	Municipal wastewater	Unit	2019	2020	2021
	Produced municpal wastewater	10^9 m^3/year			
	Collected municipal wastewater				
	Treated municipal wastewater				

III	Irrigation and drainage				
III.1.	**Area under agricultural water management**	**Unit**	**2019**	**2020**	**2021**
	Total agricultural water managed area	1000 ha			
	Area equipped for irrigation: total				
	Area equipped for irrigation: part actually irrigated				
	Area equipped for full control irrigation: total				
	Area equipped for full control irrigation: part actually irrigated				
	Area equipped for full control irrigation: surface irrigation				
	Area equipped for full control irrigation: sprinkler irrigation				
	Area equipped for full control irrigation: localized irrigation				
	Area equipped for irrigation: equipped lowland areas				
	Area equipped for irrigation: spate irrigation				
	Cultivated wetlands and inland valley bottoms non-equipped				
	Flood recession cropping area non-equipped				
III.2.	**Irrigated production**				
	Total harvested irrigated crop area (full control irrigation only)	1000 ha			

III.3.	Drainage				
	Area equipped for irrigation drained	1000 ha			

IV	Environment	Unit	2019	2020	2021
	Area salinized by irrigation	1000 ha			

SDG INDICATOR 6.4.1 ON WATER USE EFFICIENCY - COMPUTATION (in USD/m^3)

This worksheet is a tool to automatically calculate the SDG Indicator 6.4.1 on water use efficiency. Please do not touch: no compilation is required. It is automatically filled in based on the data you provided in the “National Data” worksheet and some additional data (see table below). If the indicator is not calculated, too many variables are missing: please check if you can fill in more variables in the “National data” worksheet. Bright blue cells are calculated based on the automatically filled in gray blue cells.

Year:	#N/D

IRRIGATED AGRICULTURE WATER USE EFFICIENCY (Awe)			UNIT	CALCULATION RULES
Ratio between rainfed and irrigated yields	[1]	0.000	decimals	AQUASTAT data (below) used if no data is entered
Proportion of irrigated land on the total arable land (Ai)	[2]	#N/D	decimals	=[3]/[4]
Irrigated land	[3]	#N/D	1000 ha	
Cultivated land	[4]	#N/D	1000 ha	
Proportion of agricultural GVA produced by rainfed agriculture (Cr)	[5]	#N/D	decimals	=(1/(1+([2]/((1-[2])*[1]))))
Gross value added by agriculture (excluding river and marine fisheries and forestry)	[6]	#N/D	USD (2015 price)	
Volume of water used by the agricultural sector (including irrigation, livestock and aquaculture)	[7]	#N/D	10^9 m³	
Irrigated Agriculture Water Use Efficiency	[8]	#N/D	USD/m³	=([7]*(1-[5]))/([6]*1000000000)
MIMEC WATER USE EFFICIENCY (Mwe)				
Gross value added by MIMEC sector (including energy)	[9]	#N/D	USD (2015 price)	
Volume of water used by the MIMEC sector (including energy)	[10]	#N/D	10^9 m³	
MIMEC sector Water Use Efficiency	[11]	#N/D	USD/m³	=[9]/([10]*1000000000)
SERVICES WATER USE EFFICIENCY (Swe)				
Gross value added by services	[12]	#N/D	USD (2015 price)	
Volume of water used by the services	[13]	#N/D	10^9 m³	
Services Water Use Efficiency	[14]	#N/D	USD/m³	=[12]/([13]*1000000000)
SERVICES WATER USE EFFICIENCY (Swe)				
Proportion of water used by the agricultural sector over the total water use	[15]	#N/D	decimals	=[6]/([6]+[10]+[13])
Proportion of water used by the MIMEC sector over the total water use	[16]	#N/D	decimals	=[10]/([6]+[10]+[13])
Proportion of water used by the service sector over the total water use	[16]	#N/D	decimals	=[13]/([6]+[10]+[13])
Water Use Efficiency	[17]	#N/D	USD/m³	=[12]/([13]*1000000000)

Additional data used in the computation of the SDG 6.4.1:

Source	Variable	Unit	2019	2020	2021
UNSD	Agriculture, value added to GDP	US$ current	0	0	0
	Industry, value added to GDP (MIMEC)	US$ current	0	0	0
	Services, value added to GDP	US$ current	0	0	0
FAOSTAT	GDP Deflator (2015)	-	0	0	
	Cultivated land (Arable land + Permanent crop)	1000 ha	0	0	0
AQUASTAT	Ratio between rainfed and irrigated yields	%			0.000

SDG INDICATOR 6.4.2 ON WATER STRESS - COMPUTATION (in %)

This worksheet is a tool to automatically calculate the SDG Indicator 6.4.1 on water use efficiency. Please do not touch: no compilation is required. It is automatically filled in based on the data you provided in the "National Data" worksheet and some additional data (see table below). If the indicator is not calculated, too many variables are missing: please check if you can fill in more variables in the "National data" worksheet. Bright blue cells are calculated based on the automatically filled in gray blue cells.

Year: **#N/D**

WATER STRESS			UNIT	CALCULATION RULES
Total freshwater withdrawal (surface + groundwater)	[1]	**#N/D**	10^9 m³	=[2]-[3]-[4]-[5] if missing from "National data"
Total water withdrawal	[2]	#N/D	10^9 m³	**#N/D**
Desalinated water produced	[3]	#N/D	10^9 m³	
Direct use of treated municipal wastewater	[4]	#N/D	10^9 m³	
Direct use of agricultural drainage water	[5]	#N/D	10^9 m³	
Total renewable freshwater resources	[6]	**0.000**	10^9 m³	AQUASTAT data (below) used if no data is entered
Environmental flow requirements (volume)	[7]	**0.000**	10^9 m³	FAO-IMWI data (below) used if no data is entered
Water Stress	[8]	**#N/D**	%	=[1]/([6]-([7]/100))

Additional data used in the computation of the SDG 6.4.2:

Source	Variable	Unit	2019	2020	2021
AQUASTAT	Total renewable freshwater resources	10^9 m³/yr			0
FAO & IWM	Environmental flow requirements	10^9 m³/yr			0

Annex 3. SDG 6.4.1 by country

Country	2015 (USD/m³)				2021 (USD/m³)				Percentage change 2015–2021 (%)			
	WUE	Awe	Mwe	Swe	WUE	Awe	Mwe	Swe	CWUE	Cawe	Cmwe	Cswe
Afghanistan	0.73	0.11	9.75	54.53	0.60	0.12	12.20	38.30	-17.9%	10.8%	25.1%	-29.8%
Albania	9.55	1.62	15.59	20.42	13.08	1.71	250.26	31.27	37.0%	5.7%	1505.6%	53.1%
Algeria	15.37	0.84	473.48	26.47	14.56	0.89	349.84	22.09	-5.3%	6.2%	-26.1%	-16.5%
Angola	149.21	0.35	200.89	178.81	118.84	0.36	185.38	123.34	-20.4%	2.7%	-7.7%	-31.0%
Antigua and Barbuda	100.60	1.54	65.47	137.56	99.07	2.13	90.52	126.28	-1.5%	38.1%	38.3%	-8.2%
Argentina	13.54	0.08	35.38	62.86	12.64	0.07	31.38	59.83	-6.7%	-12.3%	-11.3%	-4.8%
Armenia	2.62	0.29	20.01	11.48	3.51	0.17	26.93	11.76	34.1%	-39.5%	34.6%	2.5%
Australia	65.29	0.42	89.31	219.26	77.73	0.50	122.44	393.45	19.1%	18.6%	37.1%	79.4%
Austria	103.29	2.19	36.15	325.55	113.89	1.87	42.71	326.30	10.3%	-14.9%	18.2%	0.2%
Azerbaijan	4.07	0.24	39.62	48.54	3.74	0.18	42.61	51.15	-8.2%	-25.9%	7.6%	5.4%
Bahamas				300.42				284.15				-5.4%
Bahrain	71.81	0.66	846.50	67.29	76.47	0.64	973.10	70.41	6.5%	-2.8%	15.0%	4.6%
Bangladesh	5.98	0.81	85.80	34.21	8.90	0.98	141.39	49.83	48.7%	21.7%	64.8%	45.6%
Barbados	51.30	0.60	85.81	179.54	43.83	0.60	74.70	152.71	-14.6%	0.0%	-13.0%	-14.9%
Belarus	31.40	0.05	53.45	41.08	33.90	0.07	39.96	51.93	8.0%	27.7%	-25.2%	26.4%
Belgium	102.88	1.26	25.02	447.27	99.42	1.34	23.57	478.90	-3.4%	6.0%	-5.8%	7.1%
Belize	16.96	0.19	12.61	125.66	17.95	0.16	15.30	129.68	5.9%	-16.4%	21.3%	3.2%
Benin	29.75	0.51	57.11	35.30	42.21	0.77	82.20	50.80	41.9%	49.8%	43.9%	43.9%
Bermuda			219.51	774.18			262.26	765.65			19.5%	-1.1%
Bhutan	5.07	0.28	185.38	62.88	5.32	0.35	158.72	71.28	5.0%	26.3%	-14.4%	13.4%
Bolivia (Plurinational State of)	11.06	0.20	238.78	77.02	13.32	0.48	278.16	77.32	20.4%	144.4%	16.5%	0.4%
Bosnia and Herzegovina			47.83	28.81			64.54	37.86			35.0%	31.4%
Botswana	68.05	0.06	157.26	89.10	65.85	0.06	170.89	83.32	-3.2%	7.8%	8.7%	-6.5%
Brazil	23.29	0.44	24.20	70.44	21.66	0.63	30.47	69.72	-7.0%	43.8%	25.9%	-1.0%
Brunei Darussalam		5.45		34.37		6.34		33.70		16.4%		-1.9%
Bulgaria	7.44	0.11	2.54	35.43	9.96	0.18	2.75	47.47	33.8%	56.5%	8.2%	34.0%
Burkina Faso	9.90	0.06	128.23	14.08	14.83	0.06	233.62	18.73	49.9%	6.6%	82.2%	33.0%
Burundi	5.95	0.05	27.78	28.71	6.87	0.06	36.76	31.53	15.5%	15.8%	32.3%	9.8%
Cabo Verde	6.35	0.18	94.03	8.16	5.63	0.07	68.40	7.41	-11.4%	-60.5%	-27.3%	-9.2%
Cambodia	5.91	0.35	148.39	74.38	7.96	0.40	257.89	82.25	34.6%	12.2%	73.8%	10.6%
Cameroon	22.11	0.05	71.97	66.85	26.99	0.07	83.93	83.25	22.0%	21.2%	16.6%	24.5%

Country	2015 (USD/m³)				2021 (USD/m³)				Percentage change 2015–2021 (%)			
	WUE	Awe	Mwe	Swe	WUE	Awe	Mwe	Swe	CWUE	Cawe	Cmwe	Cswe
Canada	40.49	0.37	12.40	215.39	45.56	0.25	14.67	240.35	12.5%	-33.2%	18.3%	11.6%
Central African Republic	15.28	0.11	30.25	12.39	17.77	0.13	34.01	14.64	16.3%	20.1%	12.4%	18.2%
Chad	10.39	0.06	53.35	34.45	8.43	0.09	29.69	41.23	-18.9%	65.2%	-44.3%	19.7%
Chile	6.73	0.21	33.23	115.26	7.54	0.21	48.67	121.86	12.1%	1.7%	46.4%	5.7%
China	17.86	1.51	32.05	73.33	31.21	2.51	66.99	88.28	74.7%	66.1%	109.0%	20.4%
Colombia	9.41	0.13	21.14	43.49	10.43	0.10	245.25	62.93	10.8%	-22.2%	1059.9%	44.7%
Comoros	63.62	0.08	195.89	112.06	71.01	0.12	194.80	127.53	11.6%	51.8%	-0.6%	13.8%
Congo	115.20	0.21	231.20	78.71	88.82	0.23	160.03	67.56	-22.9%	10.4%	-30.8%	-14.2%
Costa Rica	15.70	0.38	40.49	60.74	17.13	0.46	49.61	41.42	9.1%	21.5%	22.5%	-31.8%
Côte d'Ivoire	29.36	0.22	35.28	79.55	41.13	0.34	49.59	111.21	40.1%	58.4%	40.6%	39.8%
Croatia	36.98	0.41	15.45	68.42	47.38	0.70	20.14	85.52	28.1%	70.5%	30.4%	25.0%
Cuba	12.05	0.20	24.55	38.11	12.54	0.10	20.25	42.26	4.1%	-48.0%	-17.5%	10.9%
Cyprus	58.41	0.59	263.38	156.33	76.67	0.80	169.09	175.59	31.3%	34.3%	-35.8%	12.3%
Czechia	103.27	1.21	59.91	177.98	139.28	1.62	81.98	210.01	34.9%	34.0%	36.8%	18.0%
Democratic People's Republic of Korea	1.74	0.35	5.92	6.62	1.59	0.35	5.04	6.26	-8.7%	1.2%	-14.9%	-5.5%
Democratic Republic of the Congo	41.53	0.31	99.16	29.70	54.34	0.42	127.40	39.60	30.8%	36.3%	28.5%	33.3%
Denmark	320.35	0.78	1548.70	528.38	301.60	0.91	1211.72	586.48	-5.9%	17.5%	-21.8%	11.0%
Djibouti		9.47		129.37		13.32		166.36		40.6%		28.6%
Dominica		0.00		17.86		0.01		15.65		15.0%		-12.4%
Dominican Republic	7.00	0.16	28.57	50.82	9.18	0.23	44.28	61.28	31.2%	40.1%	55.0%	20.6%
Ecuador	8.88	0.67	54.89	40.62	8.85	0.63	52.57	41.63	-0.3%	-5.6%	-4.2%	2.5%
Egypt	4.35	0.58	91.20	17.00	5.31	0.81	23.14	22.05	22.0%	38.9%	-74.6%	29.8%
El Salvador	15.33	0.08	23.87	39.47	19.60	0.10	25.42	42.39	27.8%	23.5%	6.5%	7.4%
Equatorial Guinea		0.00	2563.53	332.33		0.00	1689.64	277.19			-34.1%	-16.6%
Eritrea	2.93	0.02	602.74	35.18	3.27	0.02	674.98	39.20	11.6%	12.0%	12.0%	11.4%
Estonia	12.14	0.48	3.08	248.93	24.74	0.58	6.02	266.03	103.7%	19.6%	95.5%	6.9%
Eswatini	3.37	0.11	68.08	50.21	3.86	0.12	70.39	61.62	14.6%	4.0%	3.4%	22.7%
Ethiopia	3.60	0.13	193.49	32.15	5.52	0.20	398.96	44.33	53.1%	55.2%	106.2%	37.9%
Finland	83.30	0.09	30.21	372.24	61.86	0.02	27.92	321.27	-25.7%	-79.5%	-7.6%	-13.7%
France	76.39	1.48	19.11	338.71	91.13	1.96	22.67	351.20	19.3%	32.3%	18.6%	3.7%

Country	2015 (USD/m³)				2021 (USD/m³)				Percentage change 2015–2021 (%)			
	WUE	Awe	Mwe	Swe	WUE	Awe	Mwe	Swe	CWUE	Cawe	Cmwe	Cswe
Gabon	91.37	0.20	479.49	70.14	99.04	0.31	507.10	78.09	8.4%	53.6%	5.8%	11.3%
Gambia	9.41	0.11	9.99	17.95	12.26	0.15	12.44	23.68	30.3%	28.9%	24.5%	31.9%
Georgia	7.63	0.40	11.03	11.12	9.38	0.33	10.50	21.39	22.8%	-17.1%	-4.8%	92.4%
Germany	100.47	1.55	45.49	202.66	123.55	2.07	61.00	217.52	23.0%	33.1%	34.1%	7.3%
Ghana	25.02	0.14	150.73	71.84	34.07	0.18	186.07	106.90	36.2%	29.3%	23.4%	48.8%
Greece	17.03	0.42	167.09	96.21	17.04	0.50	74.18	86.62	0.1%	18.0%	-55.6%	-10.0%
Grenada		2.76		58.20		1.99		59.72		-27.9%		2.6%
Guatemala	16.21	0.82	21.00	47.53	19.58	0.93	24.86	57.91	20.8%	13.8%	18.4%	21.8%
Guinea	7.78	0.03	38.21	18.40	9.62	0.06	60.10	21.39	23.6%	79.1%	57.3%	16.2%
Guinea-Bissau	2.78	0.12	10.25	11.38	4.87	0.11	14.41	21.63	75.3%	-11.0%	40.6%	90.1%
Guyana	2.13	0.10	47.88	32.12	5.38	0.01	233.82	48.71	152.4%	-86.9%	388.3%	51.7%
Haiti	7.87	0.21	68.10	40.49	7.72	0.25	68.18	39.09	-1.9%	19.0%	0.1%	-3.5%
Honduras	11.19	0.21	42.70	40.81	13.14	0.23	50.18	48.03	17.5%	7.5%	17.5%	17.7%
Hungary	23.42	0.34	9.47	117.16	26.34	0.46	9.78	134.90	12.5%	35.8%	3.3%	15.1%
Iceland	53.25	0.91	13.86	150.94	61.92	0.90	16.80	173.82	16.3%	-1.4%	21.2%	15.2%
India	2.45	0.37	31.46	19.25	3.13	0.49	38.31	24.84	27.7%	34.8%	21.8%	29.0%
Indonesia	3.48	0.27	31.71	16.73	4.24	0.33	45.11	19.70	21.6%	20.2%	42.2%	17.8%
Iran (Islamic Republic of)	4.14	0.25	108.04	39.62	4.62	0.34	142.20	39.57	11.6%	35.4%	31.6%	-0.1%
Iraq	4.74	0.14	37.92	81.58	4.22	0.14	19.79	12.66	-10.9%	2.4%	-47.8%	-84.5%
Ireland		0.00	276.96	257.20		0.00	311.66	249.42			12.5%	-3.0%
Israel	125.82	1.95	478.06	236.34	128.94	2.06	599.19	272.40	2.5%	5.7%	25.3%	15.3%
Italy	47.63	0.94	44.26	134.02	48.61	0.85	47.50	137.88	2.1%	-9.6%	7.3%	2.9%
Jamaica	14.20	1.49	4.86	43.72	24.62	3.33	56.32	25.46	73.3%	123.8%	1058.3%	-41.8%
Japan	55.12	0.63	101.56	218.19	56.13	0.65	111.06	217.34	1.8%	2.6%	9.4%	-0.4%
Jordan	33.49	1.54	245.20	52.24	33.29	1.54	254.50	53.31	-0.6%	0.3%	3.8%	2.0%
Kazakhstan	7.70	0.05	8.71	48.78	8.00	0.06	16.28	26.33	3.8%	7.1%	86.9%	-46.0%
Kenya	16.47	0.22	91.39	34.70	16.22	0.20	44.93	103.35	-1.5%	-12.1%	-50.8%	197.9%
Kuwait	113.59	0.90	2606.76	156.86	96.16	0.58	2369.16	143.97	-15.3%	-34.9%	-9.1%	-8.2%
Kyrgyzstan	0.78	0.11	4.61	16.11	0.88	0.13	5.42	18.03	13.5%	13.1%	17.5%	11.9%
Lao People's Democratic Republic	1.43	0.12	17.46	56.72	2.10	0.17	25.40	76.05	46.3%	42.5%	45.5%	34.1%
Latvia	130.42	0.01	126.41	201.23	144.28	0.03	144.98	233.99	10.6%	91.8%	14.7%	16.3%
Lebanon	25.15	2.27	7.44	158.33	17.39	1.81	2.52	118.54	-30.9%	-20.2%	-66.1%	-25.1%
Lesotho	45.94	0.01	33.79	66.81	42.34	0.01	26.41	66.32	-7.8%	5.0%	-21.9%	-0.7%

Country	2015 (USD/m³)				2021 (USD/m³)				Percentage change 2015–2021 (%)			
	WUE	Awe	Mwe	Swe	WUE	Awe	Mwe	Swe	CWUE	Cawe	Cmwe	Cswe
Liberia	4.79	0.04	4.28	5.85	4.22	0.04	3.55	5.31	-11.9%	9.7%	-17.1%	-9.3%
Libya	9.11	0.17	54.86	52.72	9.98	0.17	90.11	45.88	9.6%	0.0%	64.3%	-13.0%
Liechtenstein				459.17				424.98				-7.4%
Lithuania	91.18	0.04	52.95	197.04	172.59	0.05	192.35	235.90	89.3%	41.1%	263.3%	19.7%
Luxembourg		0.00	3094.77	1152.04				1166.86				1.3%
Madagascar	0.68	0.10	12.61	14.82	0.78	0.11	16.24	16.43	14.2%	6.6%	28.8%	10.9%
Malawi	4.19	0.05	25.63	30.80	5.63	0.07	37.26	40.41	34.4%	46.6%	45.4%	31.2%
Malaysia	50.16	1.07	65.66	122.85	58.40	1.47	75.78	143.43	16.4%	36.6%	15.4%	16.8%
Maldives		0.00	1240.98	542.69		0.00	1199.42	676.07			-3.3%	24.6%
Mali	1.46	0.04	581.63	47.26	2.04	0.05	931.58	61.69	39.6%	31.1%	60.2%	30.5%
Malta	157.17	2.00	1181.27	239.58	215.24	3.16	1613.58	304.43	36.9%	57.7%	36.6%	27.1%
Fiji	39.11	0.28	66.24	105.55	34.41	0.46	63.57	90.44	-12.0%	61.6%	-4.0%	-14.3%
Mauritania	3.40	0.26	38.41	31.95	4.29	0.29	72.33	32.97	26.2%	8.5%	88.3%	3.2%
Mauritius	16.81	0.33	147.33	31.81	17.44	0.38	227.40	28.44	3.7%	15.3%	54.3%	-10.6%
Mexico	12.63	0.24	42.52	58.82	12.28	0.27	40.96	55.28	-2.8%	14.1%	-3.7%	-6.0%
Monaco				1031.48				1309.63				27.0%
Mongolia	21.21	0.33	37.64	75.29	22.96	0.44	28.60	126.99	8.2%	35.1%	-24.0%	68.7%
Montenegro	18.84	4.34	5.80	27.59	21.27	3.84	7.31	30.67	12.9%	-11.6%	26.1%	11.2%
Morocco	8.60	0.42	119.02	57.10	7.29	0.36	100.10	48.48	-15.3%	-13.4%	-15.9%	-15.1%
Mozambique	7.13	0.05	96.44	21.62	7.79	0.07	140.59	21.18	9.2%	38.3%	45.8%	-2.0%
Myanmar	1.57	0.19	41.58	7.84	1.53	0.18	39.94	7.83	-2.6%	-8.8%	-4.0%	-0.2%
Namibia	33.70	0.06	209.03	92.68	30.86	0.08	165.99	89.71	-8.4%	32.2%	-20.6%	-3.2%
Nepal	2.19	0.61	92.96	83.56	2.68	0.63	105.84	111.39	22.5%	3.3%	13.9%	33.3%
Netherlands (Kingdom of the)	80.61	25.11	17.81	444.20	91.83	25.12	23.30	292.16	13.9%	0.0%	30.8%	-34.2%
New Zealand	33.60	2.95	27.30	241.94	40.19	4.31	31.63	291.32	19.6%	46.1%	15.8%	20.4%
Nicaragua	6.97	0.17	105.50	29.41	8.24	0.16	5446.00	36.64	18.2%	-6.4%	5062.3%	24.6%
Niger	3.43	0.00	60.54	23.69	2.87	0.00	63.32	25.71	-16.3%	30.3%	4.6%	8.5%
Nigeria	31.13	0.21	49.04	58.16	31.46	0.25	79.75	46.88	1.1%	19.1%	62.6%	-19.4%
North Macedonia	18.19	1.89	40.10	22.74	5.56	0.45	84.54	29.91	-69.4%	-76.0%	110.8%	31.6%
Norway	124.44	0.29	103.44	284.11	139.70	0.34	125.65	322.10	12.3%	14.0%	21.5%	13.4%
Oman	44.13	0.88	195.56	405.99	44.62	1.13	166.68	338.61	1.1%	28.9%	-14.8%	-16.6%
Pakistan	1.45	0.32	35.95	16.64	1.84	0.40	45.06	21.30	27.1%	26.0%	25.3%	28.0%
Palestine	32.22	5.18	79.56	50.90	28.54	3.11	65.58	37.52	-11.4%	-40.0%	-17.6%	-26.3%
Panama	40.49	0.33	2195.76	45.70	46.98	0.35	2507.00	54.29	16.0%	4.7%	14.2%	18.8%
Paraguay	12.60	0.14	60.68	57.44	14.69	0.18	77.96	63.82	16.6%	29.0%	28.5%	11.1%

Country	2015 (USD/m^3)				2021 (USD/m^3)				Percentage change 2015–2021 (%)			
	WUE	Awe	Mwe	Swe	WUE	Awe	Mwe	Swe	CWUE	Cawe	Cmwe	Cswe
Peru	5.53	0.27	21.59	62.78	4.99	0.29	20.08	50.17	-9.9%	5.6%	-7.0%	-20.1%
Philippines	3.29	0.17	8.43	22.17	3.98	0.20	8.09	26.56	20.9%	15.2%	-4.0%	19.8%
Poland	39.30	0.19	16.73	140.51	51.69	0.11	22.91	173.14	31.5%	-43.5%	37.0%	23.2%
Portugal	25.68	0.41	17.74	155.88	29.90	0.55	19.81	164.33	16.4%	35.8%	11.7%	5.4%
Puerto Rico	31.29	2.68	21.38	64.82	28.24	1.93	19.17	58.92	-9.8%	-27.9%	-10.3%	-9.1%
Qatar	206.35	1.13	801.57	161.51	184.28	1.57	2408.01	128.52	-10.7%	38.6%	200.4%	-20.4%
Republic of Korea	49.39	1.04	104.19	129.97	56.55	1.07	116.86	149.05	14.5%	3.2%	12.2%	14.7%
Republic of Moldova	7.15	3.29	2.32	29.64	9.37	3.43	2.90	35.01	31.1%	4.4%	25.1%	18.1%
Romania	22.99	0.20	11.53	97.34	24.21	0.26	12.36	109.38	5.3%	27.7%	7.2%	12.4%
Russian Federation	18.78	0.06	12.91	49.02	19.81	0.06	15.51	48.55	5.5%	-7.4%	20.2%	-1.0%
Rwanda	11.58	0.23	105.52	23.94	13.63	0.46	226.30	25.58	17.7%	96.9%	114.5%	6.8%
Saint Kitts and Nevis		0.35		40.39		0.55		38.34		56.5%		-5.1%
Saint Lucia		0.00		111.30		0.00		103.85		-18.6%		-6.7%
Saint Vincent and the Grenadines			44864.44	63.17			41884.68	65.29			-6.6%	3.4%
Sao Tome and Principe				15.66	8.20	0.38	73.17	19.15				22.3%
Saudi Arabia	26.31	0.82	293.33	115.54	24.44	0.73	212.15	95.17	-7.1%	-10.9%	-27.7%	-17.6%
Senegal	5.52	0.07	422.64	37.98	6.03	0.08	3802.11	48.31	9.3%	15.9%	799.6%	27.2%
Serbia	6.50	0.13	2.48	33.70	7.40	0.20	2.74	39.37	13.8%	56.5%	10.5%	16.8%
Seychelles	82.21	3.41	41.74	107.17	90.61	4.67	39.56	120.76	10.2%	37.2%	-5.2%	12.7%
Sierra Leone	8.36	3.17	3.23	13.07	10.21	3.80	5.33	15.29	22.1%	19.9%	65.3%	17.0%
Singapore		0.00	208.25	734.65		0.00	255.24	857.22			22.6%	16.7%
Slovakia	141.33	1.73	103.22	186.90	152.76	1.71	106.11	205.23	8.1%	-1.5%	2.8%	9.8%
Slovenia	40.54	4.53	14.72	155.82	48.30	9.11	17.73	182.42	19.1%	101.2%	20.4%	17.1%
Somalia	0.68	0.11	168.38	101.92	0.87	0.14	215.60	130.20	27.8%	27.7%	28.0%	27.7%
South Africa	16.40	0.15	20.41	61.94	15.84	0.13	18.42	67.95	-3.4%	-10.1%	-9.7%	9.7%
South Sudan	8.96	0.02	11.46	17.15	8.83	0.02	13.20	14.68	-1.4%	-4.5%	15.2%	-14.4%
Spain	33.71	0.44	32.90	180.32	37.78	0.50	37.87	192.70	12.1%	11.6%	15.1%	6.9%
Sri Lanka	5.52	0.29	25.34	58.50	6.39	0.36	29.95	66.71	15.8%	25.8%	18.2%	14.0%
Sudan	2.35	0.24	178.59	46.02	4.99	0.28	461.82	97.41	112.4%	16.6%	158.6%	111.7%
Suriname	7.67	1.24	9.59	58.67	6.81	0.92	11.30	46.06	-11.2%	-26.0%	17.8%	-21.5%

Country	2015 (USD/m³)				2021 (USD/m³)				Percentage change 2015–2021 (%)			
	WUE	Awe	Mwe	Swe	WUE	Awe	Mwe	Swe	CWUE	Cawe	Cmwe	Cswe
Sweden	186.12	3.46	73.18	359.52	239.19	3.59	87.30	548.87	28.5%	3.6%	19.3%	52.7%
Switzerland	389.92	5.15	246.71	554.60	432.42	5.95	284.08	611.43	10.9%	15.5%	15.1%	10.2%
Syrian Arab Republic	1.05	0.11	9.57	6.75	0.90	0.10	8.23	5.78	-14.3%	-14.6%	-14.0%	-14.4%
Tajikistan	0.78	0.19	5.51	9.07	1.08	0.33	1.70	6.03	38.6%	80.7%	-69.1%	-33.5%
Thailand	6.71	0.36	48.09	84.76	7.34	0.38	50.39	95.37	9.5%	5.3%	4.8%	12.5%
Timor-Leste	1.18	0.08	145.53	10.25	1.60	0.09	256.11	12.81	35.3%	18.3%	76.0%	25.0%
Togo	18.58	0.01	173.37	21.68	23.72	0.02	192.23	28.99	27.7%	30.2%	10.9%	33.7%
Trinidad and Tobago	67.65	2.75	69.49	71.21	54.43	2.18	64.32	52.75	-19.5%	-20.8%	-7.4%	-25.9%
Tunisia	10.65	0.26	117.67	41.27	11.68	0.32	170.85	37.37	9.7%	24.6%	45.2%	-9.5%
Türkiye	12.83	0.25	131.99	84.06	16.37	0.17	277.02	90.48	27.6%	-31.1%	109.9%	7.6%
Turkmenistan	1.26	0.13	22.09	17.82	2.03	0.24	18.59	36.11	60.7%	92.6%	-15.9%	102.6%
Uganda	34.13	0.03	144.73	44.19	41.40	0.04	180.06	52.91	21.3%	34.9%	24.4%	19.7%
Ukraine	6.89	0.06	4.08	19.81	7.77	0.11	4.96	20.34	12.8%	89.7%	21.6%	2.7%
United Arab Emirates	72.63	1.07	3621.87	87.91	79.61	1.53	4435.97	84.78	9.6%	43.6%	22.5%	-3.6%
United Kingdom	318.64	0.55	479.96	360.42	320.90	0.85	453.73	360.16	0.7%	54.8%	-5.5%	-0.1%
United Republic of Tanzania	6.24	0.17	448.26	38.65	9.10	0.23	794.77	49.77	45.9%	41.1%	77.3%	28.8%
United States of America	40.66	0.21	14.73	255.83	45.88	0.21	15.86	291.53	12.9%	1.6%	7.7%	14.0%
Uruguay	12.98	0.20	123.79	90.14	13.28	0.20	112.43	95.13	2.4%	-3.0%	-9.2%	5.5%
Uzbekistan	1.42	0.47	9.18	14.99	2.53	0.72	19.37	21.81	79.1%	52.3%	111.0%	45.5%
Venezuela (Bolivarian Republic of)	13.84	0.34	199.31	29.16	3.99	0.12	56.80	8.45	-71.2%	-66.0%	-71.5%	-71.0%
Viet Nam	2.51	0.30	23.86	90.87	3.62	0.30	37.28	131.41	43.8%	0.5%	56.3%	44.6%
Yemen	6.31	0.75	72.28	58.00	4.79	0.62	57.20	42.88	-24.1%	-17.9%	-20.9%	-26.1%
Zambia	12.19	0.05	49.36	43.71	14.44	0.04	78.76	42.82	18.5%	-33.0%	59.6%	-2.0%
Zimbabwe	4.80	0.05	47.78	19.46	3.66	0.04	67.38	22.53	-23.7%	-19.3%	41.0%	15.8%

Annex 4. Case studies: Decoupling economic growth and water use

Case study: Uzbekistan

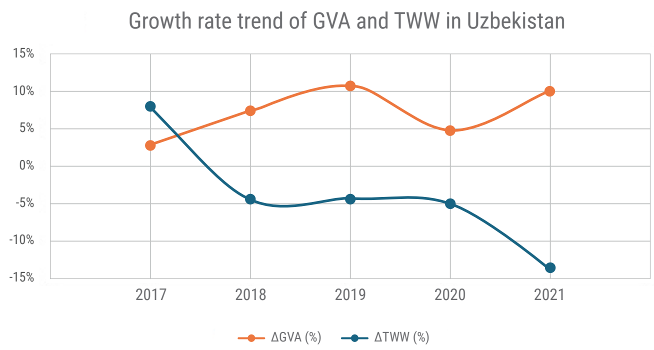
2015–2021	Water Stress trend	Water-use efficiency in agriculture	Water-use efficiency MIMEC	Water-use efficiency in the service sector
Uzbekistan	23 percent change ⇩	52 percent change ⇧	111 percent change ⇧	45 percent change ⇧

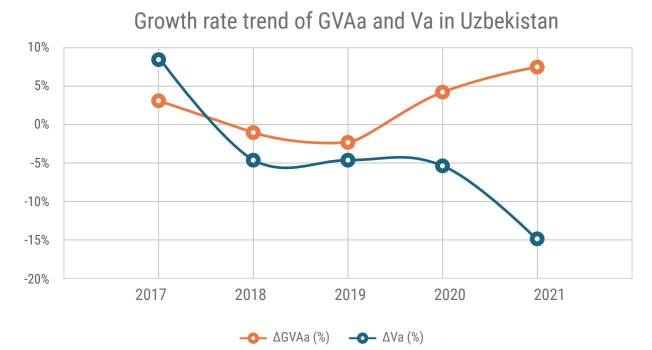
Uzbekistan is a landlocked country in Central Asia, with a total area of 447,400 km^2. It has three main physiographical zones: 60 percent of the country is desert, steppe and semi-arid; it has fertile valleys surrounding the main rivers; and mountainous areas in the east. The climate of Uzbekistan is arid and sharply continental, with hot and dry summers and short, cold winters. The annual amount of precipitation in the flat area ranges from 80–200 mm, and in mountainous areas reaches 600–800 mm. The drying up of the Aral Sea brought as a consequence an increase in heat and aridity in the summer, not only in Uzbekistan but in Central Asia.

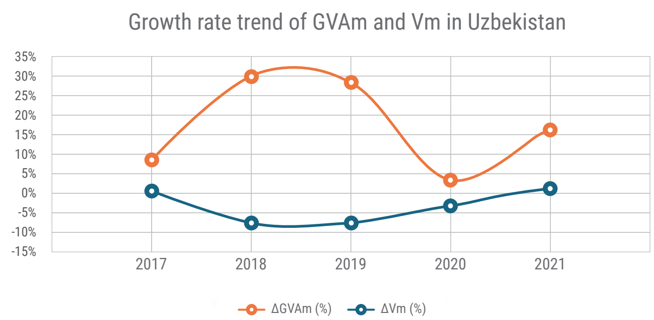
Categorized as a lower-middle income country, it has a population of around 35.5 million people. Agriculture is crucially important to Uzbekistan, contributing 28 percent to national GDP and providing employment for about a quarter of the population. Large-scale farming of wheat and cotton, the main staple of Uzbekistan, and smaller-scale farming of fruit and vegetables, along with livestock rearing, represent the country's three major value chains. Agricultural production is almost entirely dependent on irrigation, and only about 18 percent of arable land is rainfed.

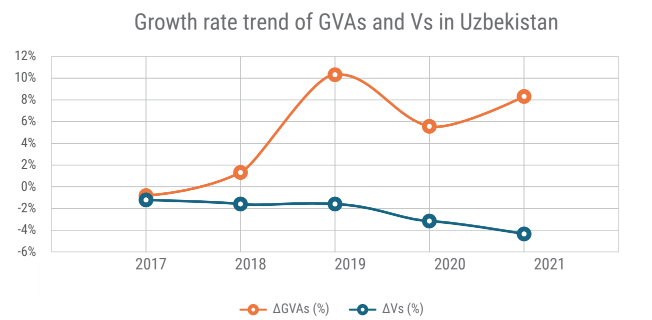
According to SDG Indicator 6.4.2 thresholds, Uzbekistan is a critically water stressed country. This means that their freshwater withdrawals surpass their renewable water resources, leading to unsustainable water use of (transboundary) surface and groundwater sources. However, in the last ten years the country has experienced a remarkable improvement in water stress levels. From 2015 to 2021, water stress has decreased about 23 percent, and it has been reflected in an increase in the WUE of the three main sectors of the economy.

Is economic growth decoupling form water use in Uzbekistan? According to the results shown in the charts below, it seems that Uzbekistan is en route to reduce dependency of economic growth on water use. The overall GVA of the economy is increasing faster than total withdrawals reductions, which is an indicator of decoupling. The agricultural and services sectors contribute to this trend, while the industrial sector´s related economic growth is still linked to the increase of water resources use.









Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

These improvements have come after the country has paid greater attention to reduce water pollution, safe treatment and reuse of wastewater and mainstream measures to improve the efficiency of irrigation systems, especially in cotton and horticulture. Strategic development plans, such as the Water Sector Development Concept of the Republic of Uzbekistan 2020–2030 or the Agricultural Development Strategy until 2030, aligned with Agenda 2030, are expected to improve the positive trend. Funds of international organizations and funds such as the World Bank, the European Bank for Reconstruction and Development, and the Islamic Development Bank have resulted in an increase in the degree of integrated water resources management implementation in Uzbekistan.

According to FAO *et al.* (2023), less than 2.5 percent of the total population in Uzbekistan is undernourished, however around 26.1 percent of the population faced moderate to severe food insecurity in 2021. As part of their strategic development, there are measures to increase the incomes of rural residents and ensure affordability of healthy nutrition for all segments of the population and overcome this challenge.

Other challenges being addressed are the improvement of access to services, knowledge, markets, resources and finance for small agricultural producers and family farms in order to increase their productivity and incomes, infrastructure modernization and water service development; conservation and rational use of water resources for sustainable development, ensuring accessibility of these and development of sanitation (Ministry of Economy and Finance of the Republic of Uzbekistan *et al.*, 2023).

Case study: Bahrain

2015–2021	Water Stress trend	Water-use efficiency in agriculture	Water-use efficiency MIMEC	Water-use efficiency in the service sector
Bahrain	3 percent change ⇩	3 percent change ⇩	15 percent change ⇧	5 percent change ⇧

The Kingdom of Bahrain is an archipelago of 40 islands located in the Arabian Gulf; only 9 percent of the country's total surface area is land (the rest is ocean). Bahrain has both a high population density (among the 10 highest in the world) and a high gross domestic product per capita (among the 25 highest in the world). The country is located in a tropical region and has a dry climate, with very hot summers and only 80 mm of rainfall per year, which is why dry and salty sand dunes dominate the landscape. The northern and north-western coast of Bahrain Island is characterized by fertile and agricultural land, thanks to natural springs and freshwater springs in the sea.

Bahrain is a critically water-stressed country (water stress is over 100 percent). Groundwater and surface water are complemented with non-conventional water resources, such as desalinated seawater, to meet drinking water needs. Treated wastewater is also used in the agricultural and municipal sectors. Levels of water stress dropped around 3 percent between 2015 and 2021, following the decreasing trend of water stress of the previous years. Since 2015, the country experienced an increase in water-use efficiency, with a 15 percent increase in the industry sector (MIMEC), 5 percent increase in the service sector but around a 3 percent decrease in agriculture.

The reduction in water stress was possible thanks to a growing supply of non-conventional water resources, mainly desalinated seawater and treated wastewater. At the same time, the agricultural sector widely adopted greenhouses, hydroponic systems and modern irrigation technologies, allowing for more efficient use of existing water resources. Bahrain has also seen an overall decline in its agricultural sector, not only in terms of farmers and cultivated land but also its relative importance for the economy. This decline, propelled by an increasingly dry climate as well as the loss of agricultural land to urban growth, is also likely to have eased the pressure on existing freshwater resources.

Bahrain imports around 90 percent of its food supplies, which makes them food secure but not self-sufficient. The COVID-19 pandemic and the geopolitical tensions pose a threat to food security. However, Bahrain has long emphasized the importance of diversifying its supply chain in food items, maintaining the subsidized prices of certain food, exempting essential food items from value-added tax (VAT), offering consumer protection services, supporting local farmers and fisheries, utilizing technology to grow crops and strengthening international collaborations.

Bahrain is making progress towards sustainable development through its development strategy Economic Vision 2030 for Bahrain, which was launched in 2008 and later translated into the comprehensive National Economic Strategy 2009–2014. Both initiatives are aligned with the 2030 Agenda for Sustainable Development, which has also resulted in the adoption of the short-term Government Action Plan 2015–2018, and the establishment of a National Information Committee.

A challenge for the Kingdom of Bahrain lies in stimulating the agricultural sector against the backdrop of two main hurdles: climate change and limited space. It has good potential for fish farming considering the advantages offered by the climate, location, coastal area, and market.

Sources: Bahrain´s Ministry of Sustainable Development (2023) and FAO and UN-Water (2023)

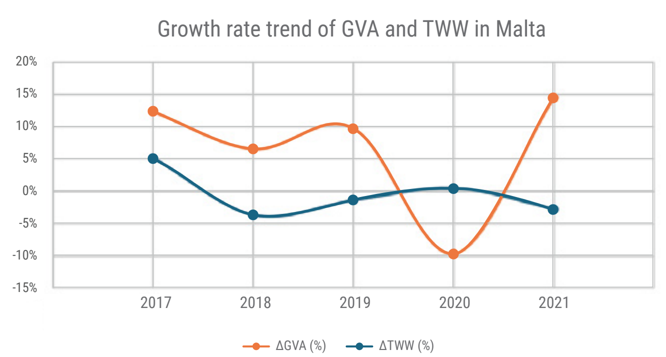
Case study: Malta

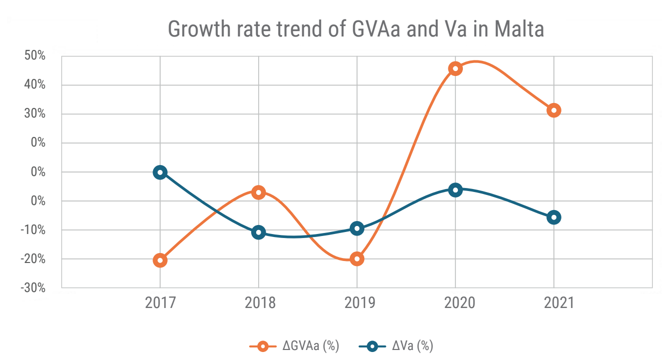
2015–2021	Water Stress trend	Water-use efficiency in agriculture	Water-use efficiency MIMEC	Water-use efficiency in the service sector
Malta	5 percent change ⇩	58 percent change ⇧	37 percent change ⇧	27 percent change ⇧

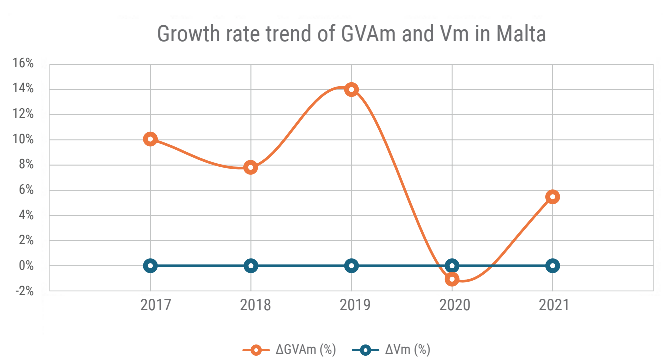
The Republic of Malta is a small archipelago in southern Europe, approximately 316 km² in size and densely populated. With a Mediterranean semi-arid climate, rainfall is highly variable from year to year with an average of approximately 474 mm, and mostly concentrated from October to March, with consequent dry summers, affected by frequent droughts. Malta has a service sector-oriented economy, with a majority urban population.

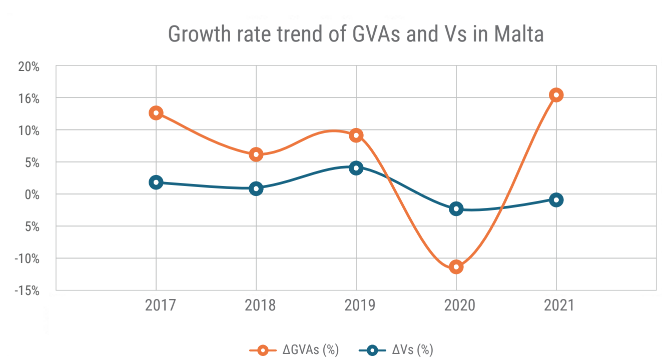
Malta's freshwater resources consist mainly of groundwater resources and rainwater harvesting, since there are no lakes or permanent rivers. This fact, together with a high water demand exacerbated by tourist activity, makes Malta a highly water-stressed country, with 78 percent of its available water resources withdrawn in 2021. Nevertheless, data shows that Malta has improved water stress values in recent years, with a 5 percent reduction in water stress which has also been reflected in an increase in water-use efficiency across the three main economic sectors.

Is economic growth decoupling form water use in Malta? The answer to the question can be deduced by looking at how the GVA growth rates and volumes of water used by economic sectors change over time. Despite improvements shown by both indicators, economic growth and water use in Malta seem not to be decoupled yet, though they are on the right track. Despite the last points in the charts below, they show positive results for the overall economy and the agricultural and services sectors. More data points are needed in order to determine whether there is decoupling of water use and economic growth or not.









Source: FAO. 2024. AQUASTAT Core Database. Food and Agriculture Organization of the United Nations. Database accessed on 1 March 2024. https://data.apps.fao.org/aquastat/?lang=en

The National Agricultural Policy in Malta is shaped by the European Union Common Agricultural Policy and related regulations and focuses on enhancing competitiveness, supporting young farmers, promoting sustainability, and preserving farmland for agricultural use. Governance of water resources is in a similar way shaped by the European Water Framework Directive, with cyclic River Basin Management Plans with a programme of measures. Their strategy was a focus on water demand management and water supply increase measures to comprehensively address the national demand whilst ensuring sustainable use of natural water resources. Wastewater reuse has been one cornerstone in Malta´s "New Water" strategy, to be used in agriculture, landscaping, industry, and aquifer recharge.

On the demand side, Malta launched the National Water Conservation Awareness Centre to raise awareness of the need for water conservation and management, and also an initiative to improve the efficiency of water use in public buildings and structures.

Malta´s strategy to apply conjunctive use of groundwater with other non-conventional sources such as desalination, treated sewage effluent, and storm water will have to be integrated within their climate change adaptation strategy. Prolonged droughts and reduced rainfall, predicted under current climate change scenarios, can progressively alter the natural water balance due to reduced groundwater recharge.

Annex 5. Analytical framework for SDG Target 6.4's gender contextualization

Two sets of gender indicators – basic and advanced – were included in the analytical framework developed under the work of SDG Target 6.4's gender contextualization. All indicators/parameters are categorized into themes and sub-themes under each thematic area as defined in the Conceptual map, showing possible connections (logical pathways) of gender equality in different water management and governance circumstances. Both frameworks share similar structures, indicating logical pathways, proposed gender-sensitive indicators/parameters for Indicators 6.4.1 and 6.4.2, the recommended scale of monitoring and reporting, and degrees of relevance to both SDG indicators and the target audience. The indicators/parameters listed in the basic set are primarily available in open-source databases such as that of the World Bank or the UN Women's SDG Dashboard. However, the advanced framework (not shown here) offers additional recommended indicators/parameters which are at present partially or wholly available, but which would provide a more comprehensive understanding of the gender dynamics of the indicators.

Analytical framework: basic set of gender indicators

Degrees of relevance to each indicator/parameter

Direct linkages to changes in water-use efficiency and water stress or scarcity

Partial linkages to changes in water-use efficiency and water stress or scarcity

Indirect linkages to changes in water-use efficiency and water stress or scarcity

Theme	Sub-theme	Connection with 6.4.1	Connection with 6.4.2	Indicators/ parameters	Level	Relevance to 6.4.1	Relevance to 6.4.2	Source	Target audience
A. Access and Control									
Economic empowerment	Land ownership and land title	• Access to land can increase access to water resources and options for productive and efficient use of resources with the link to direct access to food production link). • Women typically control less land – often of poorer quality – than men, and are less likely than men to use modern inputs such as improved seeds, pest control measures, and mechanical tools. • In some contexts, land ownership may not guarantee the right to water allocation. However, women's access to land/land rights can increase their capacity to participate in irrigation management.	• An increase in land access can also increase access to water resources. • More women participate in irrigation management through their access to land, enhancing sustainable water management and mitigating water scarcity impacts. • On the other hand, men tend to have more access to better-quality land. • They may thus increase pressures on land degradation and water scarcity on a larger scale if they do not manage water and land in sustainable ways. • In some contexts, land ownership may not guarantee the right to water allocation; however, women's access to land/land rights can increase their capacity to participate in irrigation management.	1. Proportion of people with secure tenure rights to land out of total adult population, by sex (%) (SDG 1.4.2).	Country			SDG Dashboard UN Women	Department of Land and Resources, National Statistics Authority
				2. Proportion of people with legally recognized documentation of their rights to land out of total adult population, by sex (%) (SDG 1.4.2).	Country			SDG Dashboard UN Women	Department of Land and Resources, National Statistics Authority
				3. Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (b) share of women among owners or rights-bearers of agricultural land, by type of tenure (SDG 5.a1).	Country			SDG Dashboard UN Women	Ministry of Agriculture, National Statistics Authority
				4. Share of women among owners or rights-bearers of agricultural land, by type of tenure (SDG 5.a.1 b).	Country			SDG Dashboard UN Women	Department of Land and Resources, National Statistics Authority
				5. Land titles owned by women, percentage of agricultural holdings headed by women.	Country			OECD	Department of Land and Resources, National Statistics Authority
	Crops and other agricultural activities	• Women and men have different degrees of access to land and crop patterns. • Men prefer cash crops, while women's preference is for food crops for consumption that require watering at a different time than the (main) staple crop cultivated by men or communally. • Decisions on the irrigation system are largely taken by men. • By addressing women's and men's specific water needs, women can improve household food security and agricultural productivity.	• Women and men have different degrees of access to land and crop patterns. • Men prefer cash crops, while women's preference is for food crops for consumption that require watering at a different time than the (main) staple crop cultivated by men or communally. • Decisions on the irrigation system are largely taken by men. • By addressing women's and men's specific water needs, women can mitigate the negative consequences resulting from water scarcity.	6. Average income of small-scale food producers, by sex and indigenous status (SDG 2.3.2).	Country			FAOSTAT	Department of Land and Resources, National Statistics Authority, Ministry of Women and Child Affairs
	Accessibility to water, water tenure rights, and water permits	• Access to water resources (ease of accessi-bility, water supply reliability, water rights, water permits) will increase women's rights and say on water allocation. • Access also increases the option of productively using water resources (including income generation).	• Women's rights to community water resources can enable women's participation in decision-making on water resource management, enhancing sustainable water management practices, and mitigating water scarcity impact.	7. Women's rights to community waters (countries' abilities to support women in exercising control over community water resources, for example national laws recognize women's rights to participate in community level governance).	Local			Whose Water Project, Rights and Resources Initiative (RRI) & Environmental Law Institute (ELI)	Ministry of Natural Resource Management, Academics, Non-Governmental Organizations (NGOs)
				8. Percentage of agricultural holdings with irrigation managed by women.	Country			AQUASTAT	Irrigation Department, NGOs
				9. Percentage of the area equipped for irrigation managed by women.	Country			AQUASTAT	Irrigation Department, NGOs

Theme	Sub-theme	Connection with 6.4.1	Connection with 6.4.2	Indicators/ parameters	Level	Relevance to 6.4.1	Relevance to 6.4.2	Source	Target audience
Knowledge and perception	Extension service	• Access to training opportunities allows women to gain more knowledge of modern technologies and practices, thus increasing the likely adoption of marketable farming and water-related businesses.	• Access to information results in increasing knowledge of environmental management, including water conservation practices and how to mitigate the impacts of water scarcity.	10. Percentage of women's participation in extension services.	Local			Farmer Innovation Fund Impact Evaluation 2012, Midline Survey - Ethiopia, 2012 (World Bank)	Ministry of Agriculture, National Statistics Authority, NGOs
	Higher education in Science, Technology, Engineering and Mathematics (STEM) and agriculture	• Access to knowledge and technology provides an opportunity to gain more technical expertise in improving WUE and increasing productivity.	• Access to knowledge and technology allows women to gain more technical knowledge to improve mitigation solutions for WS/water scarcity.	11. Female share of graduates from STEM programmes, tertiary (%).	Country			Gender Data Portal – World Bank/ International Labour Organization (ILO)	Ministry of Education, National Statistics
				12. Female share of graduates in Agriculture, Forestry, Fisheries and Veterinary programmes, tertiary (%).	Country			Gender Data Portal – World Bank /ILO	Ministry of Education, National Statistics
	Perception of law	• Access to knowledge of land rights provides an understanding of water rights which will help marginalized people to negotiate rights to manage water resources.	• Access to knowledge of land rights provides an understanding of water rights which will help marginalized people to negotiate rights to manage water resources.	13. Women's perceptions, legal knowledge (legal knowledge specific to *mailo*[1] land through scenario-based questions and hypothetical examples).	Local			Impact Evaluation of the Improvement of Land Governance to Increase Productivity of Small-Scale Farmers on Mailo-Land 2017, Uganda (World Bank)	Ministry of Agriculture, Authority, NGOs
Financial services	Credit	• Access to resources such as land, water, fertilizers, and technology can improve productive capacity, education, market access, and income generation. • Having access to those resources also increases decision-making power and confidence, resulting in more significant roles in water project meetings/public activities.	• Access to resources such as land, water, fertilizers, and technology can improve productive capacity, education, market access, and income generation. • Having access to those resources also increases decision-making power and confidence, resulting in more significant roles in water (scarcity) project meetings/ public activities.	14. Access to and decisions on financial services.	Local			Women's Empowerment in Agriculture Index (pro-WEAI), International Food Policy Research Institute (IFPRI)	Academic, NGOs
Technology	Access to mobile phones	• Access to relevant data tools for monitoring and communicating for water management at individual and collective levels offers the potential to expand production and use water resources in the agricultural sector more efficiently.	• Access to information allows people to access knowledge and information related to water and form groups – both formal and informal – which can advocate for their rights and improve access to water resources and lands.	15. Proportion of individuals who own a mobile telephone, by sex (SDG 5.b.1).	Country			SDG Dashboard UN Women	National Statistics

1 *Mailo* refers to one of the land tenure systems in Uganda, established in the 1900s. It is estimated that approximately 10 percent of Uganda's land is held under mailo tenure. This continues to be governed by Buganda law and custom, including land being passed exclusively to male descendants (Ali and Duponchel, 2018).

Theme	Sub-theme	Connection with 6.4.1	Connection with 6.4.2	Indicators/ parameters	Level	Relevance to 6.4.1	Relevance to 6.4.2	Source	Target audience
B. Voice, Agency and Participation									
Decision-making	Fundamental decisions – reproductive health, mobility and finance	• The ability to make decisions at household level encourages women to use their voice at intra- and inter-household levels. • It empowers other women to be actively involved through formal and informal groups. • Women gaining confidence and acting with agency can result in meaningful participation in water-related projects in which they can contribute their knowledge to enhance agricultural inputs and access to water allocation.	• The ability to make decisions at household level encourages women to use their voice at intra- and inter-household levels. • It empowers other women to be actively involved through formal and informal groups. • Women gaining confidence and acting with agency can result in meaningful participation in water management and water-related projects designed to mitigate water scarcity.	16. Married women participating in decisions on three levels (their own health care, major household purchases, and visits to family or relatives).	Country			United States Agency for International Development (USAID): Demographic and Health Surveys (DHS) survey	Ministry of Women and Child Affairs, National Statistics Authority
	Agricultural inputs	• Women's knowledge and skills can increase agricultural production and water-use efficiency.	• Women's knowledge and skills can lead them to be part of strategies to tackle water shortage/scarcity impacts.	17. Percentage of women's inputs in productive decisions.	Local			Women's Empowerment in Agriculture Index (pro-WEAI), International Food Policy Research Institute (IFPRI)	Ministry of Agriculture, Authority, NGOs, Academic
	Social capital	• Active participation in social capital in the form of groups and engagement in off-farm and on-farm activities can stimulate/ facilitate women's participation in crop production activities.	• Accessibility to social capital in the form of groups and engagement in off-farm activities stimulates women's participation in water management, contributing solutions and strategies to water shortage/ scarcity impacts.	18. Decision-making, bargaining, and women's social capital (involvement and belonging to groups such as religious, farmers, cooperatives, and the frequency of involvement in such groups). It also covers decision-making on a number of household levels).	Local			Impact Evaluation of the Improvement of Land Governance to Increase Productivity of Small-Scale Farmers on Mailo-Land 2017, Uganda (World Bank)	Ministry of Agriculture, Authority, NGOs, Academic
	Water-related projects (irrigation and water resource management)	• Involving women in informed decision-making on irrigation projects can help address women's specific needs in water use and contribute knowledge in water resource management.	• Involving women in informed decision-making on irrigation projects enables women to be part of sustainable WS/water scarcity solutions. • It increases understanding gained from using technology and increases awareness, resulting in meaningful participation and more effective decision-making.	19. Percentage of female and male farmers reporting participating to some degree in decision-making on irrigation projects.	Local			Adapted from Climate-Smart Monitoring Framework - Tackling uptake of CSA options and perceived outcomes at household and farm level by CGIAR	Irrigation Department, NGOs, Academic
Agency	Group membership	• Group membership can create individual and collective agency and empower women through access to information, resources, and connections with others, improving their access to water and land, credit, and other resources.	• Group membership can create individual and collective agency and empower women through new access to information, resources, and connections with others, thus improving their access to water and land, credit, and other resources, and participate in solutions and strategies for water shortage/scarcity impacts.	20. Membership in influential groups.	Local			Women's Empowerment in Agriculture Index (pro-WEAI), International Food Policy Research Institute (IFPRI)	NGOs, Academic, International Organization
	Respect from others	• Respect among household members is considered as an intrinsic agency ("power within"), increasing self-esteem, raising awareness and consciousness, and building confidence. • As a result, women confidently participate in activities at intra-and inter-household levels, including water-related projects.	• Respect among household members is considered as an intrinsic agency ("power within"), increasing self-esteem, raising awareness and building confidence and consciousness. As a result, women confidently participate in activities at intra-and inter-household levels which can include water-related projects (solutions to water scarcity).	21. Respect among household members.	Local			Women's Empowerment in Agriculture Index (pro-WEAI), International Food Policy Research Institute (IFPRI)	NGOs, Academic, International Organization

Theme	Sub-theme	Connection with 6.4.1	Connection with 6.4.2	Indicators/ parameters	Level	Relevance to 6.4.1	Relevance to 6.4.2	Source	Target audience
Participation	Employment	• Women participate in employment in water-related sectors, contributing their knowledge and skills, benefitting water utilities and use.	• Women participate in employment in water-related sectors, contributing their knowledge and skills, which can help generate solutions for water shortage/ scarcity, including gender-specific needs.	22. Employment in agriculture, female (percentage of female employment) (modelled International Labour Organization [ILO] estimate).	Country			Gender Data Portal – World Bank/ILO	Department of Labour and Employment, National Statistics Authority
				23. Employment in industry, female (percentage of female employment) (modelled ILO estimate).	Country			Gender Data Portal – World Bank/ILO	Department of Labour and Employment, National Statistics Authority
				24. Employment in services, female (percentage of female employment) (modelled ILO estimate).	Country			Gender Data Portal – World Bank/ILO	Department of Labour and Employment, National Statistics Authority
	Managerial and leadership positions	• Women in managerial positions can increase their participation in important decision-making opportunities in the water sector. • Equal access to parliament can be a crucial driver of women's opportunities in political and public life, gender equality rights, water, and land rights that are gender-sensitive, enabling them to manage natural resources, including water resource management, which can address their specific needs and improve WUE	• Women in managerial positions can increase their contribution to finding sustainable water solutions and knowledge-building on water resource management. • Equal access to parliament can be a crucial aspect of women's opportunities in political and public life, gender equality rights, water and land rights that are gender-sensitive, enabling them to manage natural resources, including water management, which can address women's specific needs, mitigate negative impacts from WS/water scarcity and protect water resources.	25. Firms with female top management (percentage of firms).	Country			Gender Data Portal – World Bank/ILO	Department of Labour and Employment, National Statistics Authority
				26. Firms with female participation in ownership (percentage of firms).	Country			Gender Data Portal – World Bank/ILO	Department of Labour and Employment, National Statistics Authority
				27. Proportion of seats held by women in (a) national parliaments (SDG 5.5.1a).	Country			SDG Dashboard UN Women	National Statistics Authority
				28. Proportion of seats held by women in (b) local governments (SDG 5.5.1b).	Country			SDG Dashboard UN Women	National Statistics Authority, Ministry of Women and Child Affairs
C. Enabling Environment									
Integration of gender mainstreaming	Gender-specific objectives and measures	• Taking gender concerns into account in policy formulation can enable women's participation in water-related issues and create equity and equality in water and sanitation management.	• Taking gender concerns into account in policy formulation can enable women's participation in water-related issues and reduce the number of people suffering from water scarcity.	29. Degree of implementation of gender-specific objectives for water resource management.	Country			Africa Water Sector and Sanitation Monitoring and Reporting	Ministry of Natural Resource Management, Ministry of Agriculture, Ministry of Women and Child Affairs
				30. Percentage of countries with measures targeting vulnerable groups for sanitation: (i) in policies and plans; (ii) monitoring service provision; and, (iii) financing plans, which are then consistently applied.	Country			UN-Water Global Analysis and Assessment of Sanitation and Drinking Water (GLASS)	Ministry of Women and Child Affairs, Ministry of Public Health, Academic

Theme	Sub-theme	Connection with 6.4.1	Connection with 6.4.2	Indicators/ parameters	Level	Relevance to 6.4.1	Relevance to 6.4.2	Source	Target audience
Gender-responsive laws	Laws and regulations affect women's economic opportunity, including the anti-domestic violence act, workplace, mobility, entrepreneurship, and asset ownership	• Law enforcement affects women's decisions and participation at all levels. • Gender-responsive laws can encourage and enable women's participation in decision-making related to lands and water.	• Law enforcement affects women's decisions and participation at all levels. • Gender-responsive laws can encourage and enable women's participation in decision-making related to WS solutions.	31. Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex (SDG 5.1.1).	Country			SDG Dashboard UN Women	Ministry of Women and Child Affairs
				32. Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control (SDG 5.a.2).	Country			SDG Dashboard UN Women	Ministry of Women and Child Affairs
				33. Domestic violence legislation.	Country			Progress of the World's Women	Ministry of Justice, Ministry of Women and Child Affairs
				34. Women, business and the law: index score.	Country			Women, Business & the Law – World Bank	Ministry of Justice, Ministry of Women and Child Affairs
				35. Women, Business and the Law (WBL): mobility.	Country			Women, Business & the Law – World Bank	Ministry of Justice, Ministry of Women and Child Affairs
				36. WBL: asset.	Country			Women, Business & the Law – World Bank	Ministry of Justice, Ministry of Women and Child Affairs
				37. WBL: workplace.	Country			Women, Business & the Law – World Bank	Ministry of Justice, Ministry of Women and Child Affairs
				38. WBL: pay.	Country			Women, Business & the Law – World Bank	Ministry of Justice, Ministry of Women and Child Affairs
				39. WBL: entrepreneurship.	Country			Women, Business & the Law – World Bank	Ministry of Justice, Ministry of Women and Child Affairs
Tracking public allocations system	Fiscal system monitoring	• Adequate quantity or quality of finance allocated for gender equality and women's empowerment enables the implementation of gender-responsive laws and policies such as women's participation.	• Adequate quantity or quality of finance allocated for gender equality and women's empowerment enables the implementation of gender-responsive laws and policies such as women's participation.	40. Proportion of countries with systems to track and make public allocations for gender equality and women's empowerment (SDG 5.c.1).	Country			SDG Dashboard UN Women	Ministry of Women and Child Affairs

Theme	Sub-theme	Connection with 6.4.1	Connection with 6.4.2	Indicators/ parameters	Level	Relevance to 6.4.1	Relevance to 6.4.2	Source	Target audience
D. Gender-specific impacts									
Mortality and negative health impacts	Mortality and negative health impacts	• Negative health impacts from diseases associated with water limit ability; to be active in decision-making activities at intra-and inter-household levels, including natural resource management.	• Women, girls, and newborns are at risk of unsafe water and inadequate sanitation facilities when they face water scarcity, resulting in more demand for care and low water quality for menstrual hygiene management.	41. Mortality rate attributed to unsafe water, unsafe sanitation and lack of female hygiene (per 100 000 female population).	Country			Gender Data Portal – World Bank	National Statistics Authority, Ministry of Public Health
				42. Maternal mortality ratio (modelled estimate, per 100 000 live births).	Country			Gender Data Portal – World Bank	National Statistics Authority, Ministry of Public Health
				43. Mortality rate, infant (per 1000 live births).	Country			Gender Data Portal – World Bank	National Statistics Authority, Ministry of Public Health
Expenditure of time	Fetching water	• Limited education and economic opportunities adversely affect the chance to gain knowledge and productive activity. • Lack of education opportunities results in inability to engage in income-generating. • Having adequate knowledge and education in water-related business can improve the productivity of an existing water-related business/activity and natural resource management.	• Women's and girls'/children's roles are often assigned to ensure household water supply without infrastructure. • Walking for longer distances due to water scarcity/depletion of resources is likely to increase the risk of sexual violence, diseases, injuries, and economic opportunity loss.	44. Percentage of households with women water carriers.	Local			Water Poverty Index	National Statistics Authority, Ministry of Public Health
				45. Percentage of households with water a 30-minute round trip or more away.	Local/Country			Water Poverty Index (Local level) USAID: DHS Survey (Country level)	National Statistics, District/Provincial Administrative Organization, Provincial Waterworks Authority, NGOs
				46. Average volume per trip (litres).	Local			Water Poverty Index	National Statistics, District/Provincial Administrative Organization, Provincial Waterworks Authority, NGOs
				47. Average number of trips per person per day.	Local			Water Poverty Index	National Statistics, District/Provincial Administrative Organization, Provincial Waterworks Authority, NGOs
	Unpaid domestic work	• Limited education and economic opportunity adversely affect chances to gain knowledge and productive activity. • A lack of education opportunities results in an inability to generate income. • Having adequate knowledge and education in a water-related business can improve the productivity of an existing water-related business/activity and natural resource management.	• Women's and girls'/children's roles are often assigned to ensure the household water supply without infrastructure. • Walking longer distances due to water scarcity/depletion of resources is likely to increase the risk of sexual violence, diseases, injuries, and economic opportunity loss.	48. Proportion of time spent on unpaid domestic chores and care work, by sex, age and location (percentages) (SDG 5.4.1).	Country			SDG Dashboard UN Women	Ministry of Women and Child Affairs, National Statistics Authority
				49. Proportion of time spent on unpaid domestic and care work, female (percentage of 24-hour day).	Country			Gender Data Portal – World Bank	Ministry of Women and Child Affairs, National Statistics Authority

Annex 6. Assessing the extent of decoupling between economic growth and water use

The decoupling analysis starts with the calculation of the percentage changes in GVA and water use (V) over time, using 2015 as the base year:

$$\Delta X = \frac{X_{current\ year} - X_{2015}}{X_{2015}} \times 100\% \quad \text{(Equation 1)}$$

Where ΔX is the percentage change in GVA or water use from the base year 2015 to the current year. The choice of 2015 as the reference year aligns with the baseline year of the SDG framework.

Subsequently, the year-on-year rate of change is determined to evaluate the rate of variation:

$$\Delta_2 X = \Delta X_{current\ year} - \Delta X_{previous\ year} \quad \text{(Equation 2)}$$

Where $\Delta_2 X$ represents the yearly rate of change in GVA or in water use. This is to help understanding the acceleration or deceleration of decoupling trends. The assessment of the year-to-year variation is then used to understand the longer-term decoupling, and therefore the sustainability of economic growth vis-à-vis water usage.

The results of the calculations are interpreted by the traffic-light colours as follows.

Box 2. Assessing the extent of decoupling between economic growth and water use

The green light represents a positive scenario where economic growth is accompanied by a decrease in water usage. As a result, the country is able to sustain its economic expansion without putting additional strain on its water resources. The green light signifies that the nation is fully decoupling economic growth from water use. Water-use efficiency [USD/m^3] (WUE) increases.

$$\Delta_2 GVA >= 0 \text{ and } \Delta_2 V<0$$

The yellow light signals caution and represents those cases where the two variables move one in the desired direction and the other in the undesired direction, as follows:

both gross value added for all main sectors (agriculture, MIMEC, services) (GVA) and water use volume grow; and GVA growth is faster than the growth of water volume. In this case, in the long-term, economic expansion might be hampered by the constant need of more water to sustain it.

- both GVA and water volume decrease. In this case it is uncertain whether economy is decoupled from water use, and however it represents a situation not economically sustainable.

In these circumstances WUE may decrease or even increase, however the situation should be assessed through a more detailed analysis.

$$\Delta_2 GVA >= \Delta_2 V \text{ and } \Delta_2 V>0$$

$$\Delta_2 GVA < 0 \text{ and } \Delta_2 V<0$$

The red light is a warning of a critical situation where growth in water usage is surpassing the rate of economic expansion. This imbalance poses a significant threat to both economic prosperity and environmental sustainability, as economy relies heavily on ever increasing input of water resources. WUE decreases in this case.

$$\Delta_2 GVA < \Delta_2 V \text{ and } \Delta_2 V>0$$

Where: $\Delta_2 GVA$ = Increment of the GVA; and $\Delta_2 V$= Increment of water volume used.

National, regional authorities, as well as international donors can use this model to assess the extent of decoupling following the implementation of policies and strategies that affect overall and sector-specific economic growth and water use.

Annex 7. SDG Target 6.4 Indicators-related basic documents and information resources

- **SDG 6.4.1 and 6.4.2 support page (FAO/IMI-SDG6):**
  EN: https://www.fao.org/in-action/integrated-monitoring-initiative-sdg6/en
- **SDG 6.4.1 e-learning course** (available in AR | EN | FR | PT | RU | SP)
- **SDG 6.4.2 e-learning course** (available in AR | EN | FR | PT | RU | SP)
- **Environmental flows within SDG 6.4.2 – e-learning course** (available in EN | FR | SP)
- **SDG 6.4.1 statistics page** (available in AR, CN, EN, FR, RU, SP):
  EN: https://www.fao.org/sustainable-development-goals-data-portal/data/indicators/641-change-in-water-use-efficiency-over-time/en
- **SDG 6.4.2 statistics page** (available in AR, CN, EN, FR, RU, SP):
  EN: https://www.fao.org/sustainable-development-goals-data-portal/data/indicators/642-water-stress/en
- **SDG 6.4.1 metadata** (available in EN):
  EN: https://unstats.un.org/sdgs/metadata/files/Metadata-06-04-01.pdf
- **SDG 6.4.2 metadata** (available in AR, EN):
  EN: https://unstats.un.org/sdgs/metadata/files/Metadata-06-04-02.pdf
- **Step-by-step monitoring methodology for SDG 6.4.1** (available in AR | EN | FR | PT | RU | SP:
  EN: http://www.fao.org/3/ca8484en/ca8484en.pdf
- **Step-by-step monitoring methodology for SDG 6.4.2** (available in AR | EN | FR | PT | RU | SP):
  EN: http://www.fao.org/3/ca8483en/ca8483en.pdf
- **SDG 6.4 monitoring sustainable use of water resources papers. Guidelines for calculation of the agriculture water use efficiency for global reporting. The agronomic parameters in the SDG Indicator 6.4.1: yield ratio and proportion of rainfed production** (available in AR | EN | FR | RU | SP):
  EN: https://doi.org/10.4060/cb8768en
- **SDG 6.4 monitoring sustainable use of water resources papers. Change in water-use efficiency over time (SDG Indicator 6.4.1). Analysis and interpretation of preliminary results in key regions and countries** (available in EN):
  EN: https://www.fao.org/documents/card/en/c/ca5400en
- **SDG 6.4 monitoring sustainable use of water resources papers. Incorporating environmental flows into "water stress" Indicator 6.4.2 - Guidelines for a minimum standard method for global reporting**
  (available in AR | EN | FR | PT | SP | RU):
  EN: https://www.fao.org/publications/card/en/c/CA3097EN/
- **SDG 6.4 monitoring sustainable use of water resources papers. Disaggregation of SDG 6.4.2 - country pilot of Italy** (available in EN):
  EN: https://www.fao.org/documents/card/en/c/CC5037EN
- **SDG 6.4 monitoring sustainable use of water resources papers. Disaggregation of water stress levels by river basin: Cap Matifou sub-basin, Algeria** (available in FR):
  FR: https://doi.org/10.4060/cc9424fr
- **SDG 6.4 monitoring sustainable use of water resources papers. Water stress plugin for Water Evaluation and Planning system (WEAP). Using the water evaluation and planning tool for the calculation of Sustainable Development Goal Indicator 6.4.2** (available in EN | FR | SP):
  EN: https://doi.org/10.4060/cc7435en

- **SDG 6.4 monitoring sustainable use of water resources papers. Considerations on how SDG Target 6.4 is reflected in Voluntary National Reviews** (available in EN):
  EN: https://doi.org/10.4060/cd1269en
- **Progress on Water-Use Efficiency – Global baseline for SDG Indicator 6.4.1 – 2018**
  (available in AR | CN | EN | FR | RU | SP):
  EN: https://openknowledge.fao.org/handle/20.500.14283/ca1588en
- **Progress on Level of Water Stress – Global baseline for SDG Indicator 6.4.2 – 2018**
  (available in AR | CN | EN | FR | RU | SP):
  EN: https://openknowledge.fao.org/handle/20.500.14283/ca1592en
- **Progress on Water-Use Efficiency – Global status and acceleration needs for SDG Indicator 6.4.1 – 2021**
  (available in EN | AR | SP):
  EN: https://www.fao.org/documents/card/en/c/cb6413en
- **Progress on Level of Water Stress – Global status and acceleration needs for SDG Indicator 6.4.2 – 2021**
  (available in EN | FR | RU | SP):
  EN: https://www.fao.org/documents/card/en/c/cb6241en
- **Thinking the Unthinkable: Harnessing the Pandemic to Improve SDG 6 Capacity Development** https://sdg.iisd.org/commentary/guest-articles/thinking-the-unthinkable-harnessing-the-pandemic-to-improve-sdg-6-capacity-development/
- **Assessing SDG Indicator 6.4.2 'level of water stress' at major basins level**
  https://www.scienceopen.com/hosted-document?doi=10.14324/111.444/ucloe.000026

Learn more about progress towards SDG 6

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

Monitoring progress towards SDG 6 is key to achieving this SDG. High-quality data help policymakers and decision makers at all levels of government to identify challenges and opportunities, to set priorities for more effective and efficient implementation, to communicate progress and ensure accountability, and to generate political, public and private sector support for further investment.

The 2030 Agenda for Sustainable Development specifies that global follow-up and review shall primarily be based on national official data sources. The data are compiled and validated by the United Nations custodian agencies, who contact country focal points every two to three years with requests for new data, while also providing capacity-building support. The last global "data drive" took place in 2023, resulting in status updates on seven of the global indicators for SDG 6 (please see below). These reports provide a detailed analysis of current status, historical progress and acceleration needs regarding the SDG 6 targets.

To enable a comprehensive assessment and analysis of overall progress towards SDG 6, it is essential to bring together data on all the SDG 6 global indicators and other key social, economic and environmental parameters. This is exactly what the SDG 6 Data Portal does, enabling global, regional and national actors in various sectors to see the bigger picture, thus helping them make decisions that contribute to all SDGs. UN-Water also publishes synthesized reporting on overall progress towards SDG 6 on a regular basis.

Summary Brief: Mid-term status of SDG 6 global indicators and acceleration needs

Based on latest available data on all SDG 6 global indicators. Published by UN-Water through the UN-Water Integrated Monitoring Initiative for SDG 6.

Progress on household drinking water, sanitation and hygiene 2000–2022: special focus on gender

Based on latest available data on SDG indicators 6.1.1 and 6.2.1. Published by World Health Organization (WHO) and United Nations Children's Fund (UNICEF).

https://www.unwater.org/publications/who/unicef-joint-monitoring-program-update-report-2023

Progress on the proportion of domestic and industrial wastewater flows safely treated – Mid-term status of SDG Indicator 6.3.1 and acceleration needs, with a special focus on climate change, wastewater reuse and health

Based on latest available data on SDG Indicator 6.3.1. Published by WHO and United Nations Human Settlements Programme (UN-Habitat) on behalf of UN-Water.

https://www.unwater.org/publications/progress-wastewater-treatment-2024-update

Progress on ambient water quality: Mid-term status of SDG Indicator 6.3.2 and acceleration needs, with a special focus on health

Based on latest available data on SDG Indicator 6.3.2. Published by United Nations Environment Programme (UNEP) on behalf of UN-Water.

Progress on change in water-use efficiency. Mid-term status of SDG Indicator 6.4.1 and acceleration needs, with special focus on food security and climate change

Based on latest available data on SDG Indicator 6.4.1. Published by Food and Agriculture Organization of the United Nations (FAO) on behalf of UN-Water.

Progress on the level of water stress. Mid-term status of the SDG Indicator 6.4.2 and acceleration needs, with special focus on food security and climate change

Based on latest available data on SDG Indicator 6.4.2. Published by FAO and UN-Water.

Progress on implementation of Integrated Water Resources Management. Mid-term status of SDG indicator 6.5.1 and acceleration needs, with a special focus on climate change

Based on latest available data on SDG Indicator 6.5.1. Published by UNEP and UN-Water.

Progress on transboundary water cooperation. Mid-term status of SDG Indicator 6.5.2, with a special focus on climate change – 2024

Based on latest available data on SDG Indicator 6.5.2. Published by United Nations Economic Commission for Europe (UNECE) and United Nations Educational, Scientific and Cultural Organization (UNESCO) on behalf of UN-Water.

Progress on water-related ecosystems. Mid-term status of SDG Indicator 6.6.1 and acceleration needs, with a special focus on biodiversity

Based on latest available data on SDG Indicator 6.6.1. Published by UNEP on behalf of UN-Water.

Strong systems and sound investments: evidence on and key insights into accelerating progress on sanitation, drinking-water and hygiene.

The UN-Water global analysis and assessment of sanitation and drinking-water (GLAAS) 2022 report

https://www.unwater.org/publications/un-water-glaas-2022-strong-systems-and-sound-investments-evidence-and-key-insights

Based on latest available data on SDG Indicators 6.a.1 and 6.b.1. Published by WHO through the UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS) on behalf of UN-Water.

UN-Water reports and other relevant publications

UN-Water coordinates the efforts of United Nations entities and international organizations working on water and sanitation issues. UN-Water publications draw on the experience and expertise of UN-Water's Members and Partners.

United Nations System-Wide Strategy for Water and Sanitation

The United Nations system-wide strategy for water provides a system-wide approach for the United Nations to work collaboratively on water and sanitation. In September 2023, Member States adopted General Assembly resolution 77/334, which requested the Secretary-General to present a United Nations system-wide water and sanitation strategy in consultation with Member States before the end of the seventy-eighth session. The strategy has been developed by UN-Water under the leadership of the UN-Water Chair, as requested by the Secretary-General, and will be launched in July 2024.

Blueprint for Acceleration: Sustainable Development Goal 6 Synthesis Report on Water and Sanitation 2023

The report, written by the UN-Water family of Members and Partners, is a concise guide to delivering concrete results – offering actionable policy recommendations directed towards senior decision-makers in Member States, other stakeholders, and the United Nations System to get the world on track to achieve SDG 6 by 2030. It was released ahead of the discussions of Member States and relevant stakeholders at the 2023 High-level Political Forum on Sustainable Development (HLPF), which includes a Special Event focused on SDG 6 and the Water Action Agenda.

United Nations World Water Development Report

The United Nations World Water Development Report is UN-Water's flagship report on water and sanitation issues, focusing on a different theme each year. The report is published by UNESCO on behalf of UN-Water, and its production is coordinated by the UNESCO World Water Assessment Programme.

SDG 6 Progress Update – 9 reports, by SDG 6 global indicator

This series of reports provides an in-depth update and analysis of progress towards the different SDG 6 targets and identifies priority areas for acceleration. *Progress on household drinking water, sanitation and hygiene, Progress on wastewater treatment, Progress on ambient water quality, Progress on water-use efficiency, Progress on level of water stress, Progress on integrated water resources management, Progress on transboundary water cooperation, Progress on water-related ecosystems and Progress on international cooperation and local participation*. The reports, produced by the responsible custodian agencies, present the latest available country, region and global data on the SDG 6 global indicators, and are published every two to three years.

Progress reports of the WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP)

The JMP is affiliated with UN-Water and is responsible for global monitoring of progress towards SDG 6 targets for universal access to safe and affordable drinking-water and adequate and equitable sanitation and hygiene services. Every 2 years, the JMP releases updated estimates and progress reports for WASH in households (as part of the progress reporting on SDG 6, see above), schools and health care facilities.

UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS)

The GLAAS report is produced by WHO on behalf of UN-Water. It provides a global update on the policy frameworks, institutional arrangements, human resource base, and international and national finance streams in support of water and sanitation. It is a substantive input into the activities of Sanitation and Water for All as well as the progress reporting on SDG 6. The next report will be published in 2025.

UN-Water Country Acceleration Case Studies

To accelerate the achievement of SDG 6 targets as part of the SDG 6 Global Acceleration Framework, UN-Water releases SDG 6 Country Acceleration Case Studies to explore countries' pathways to achieving accelerated progress on SDG 6 at the national level. Since 2022, six case studies have been released from Costa Rica, Pakistan. Senegal, Brazil, Ghana and Singapore. Three new are planned to be released in July 2024 from Cambodia, Czechia and Jordan.

Policy and Analytical Briefs

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

UN-Water Planned Publications

- UN-Water Policy Brief on Transboundary Waters Cooperation – update

More information: https://www.unwater.org/unwater-publications/

How is the world doing on Sustainable Development Goal 6?
View, analyse and download global, regional and national water and sanitation data

http://www.sdg6data.org/

The global indicator on water-use efficiency tracks to what extent a country's economic growth is dependent on the use of water resources, and enables policy and decision makers to target interventions at sectors with high water use and low levels of improved efficiency over time.

This indicator addresses the economic component of Target 6.4. In this report, you can learn more about the global and country progress on water-use efficiency. More information and methodological guidance can be found at:
https://www.fao.org/in-action/integrated-monitoring-initiative-sdg6/resources-support/en

and https://www.fao.org/aquastat/en/

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

Austrian Development Agency

BMZ Federal Ministry for Economic Cooperation and Development

European Commission

Ministry of Foreign Affairs of the Netherlands

Ministry of Infrastructure and Water Management

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Swiss Agency for Development and Cooperation SDC

ISBN 978-92-5-139041-2

CD2023EN/1/11.24