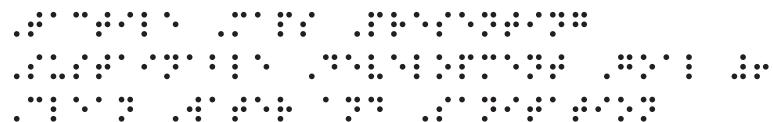
# Tactile Maps Presenting Sustainable Development Goal 6 Clean Water and Sanitation

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Appendix 1 to the thesis
Title of diploma thesis: Tactile Maps Presenting Sustainable
Development Goal 6: Clean Water and Sanitation
Author of the diploma thesis: Bc. Madeline MULDER
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This thesis was developed as part of the Copernicus Master in Digital Earth Erasmus Mundus Joint Master Program

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Palacký University Olomouc



With the support of the Erasmus+ Programme of the European Union



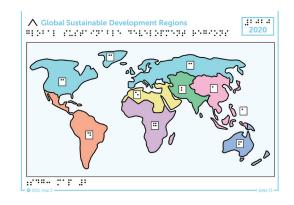
### HOW TO USE THIS ATLAS

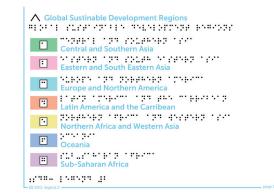
This tactile atlas, dedicated to the sixth Sustainable Development Goal (SDG), fills a void in environmental educational resources for individuals with visual impairments and their aides. It merges visual and tactile elements across its pages, featuring maps, charts, and diagrams that delve into all 11 indicators and additional aspects of SDG 6.

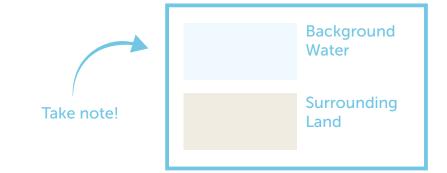
Organized into eight sections, the atlas begins with an introduction to the Sustainable Development regions, followed by seven sections corresponding to these regions. Each section begins with an overview of the indicators that will be showcased. This overview is followed by a map of the average annual precipitation for the region of interest so users can familiarize themselves with the region. Subsequently, additional maps in each section highlight specific indicators relevant to the region.

Each map is preceded by explanatory text and followed by a legend, with all content available as audio files. Given potential page orientation variations, an arrow marks the top-left corner of each page for clarity. Each map page features the year of data collection and a title, with the map displayed within a frame. A scale sits above the top-left corner of the map frame to aid in map comprehension. The associated legend page, also marked for orientation, elaborates on map textures and data focus. All elements on all pages are provided in both visual and tactile formats for inclusivity.

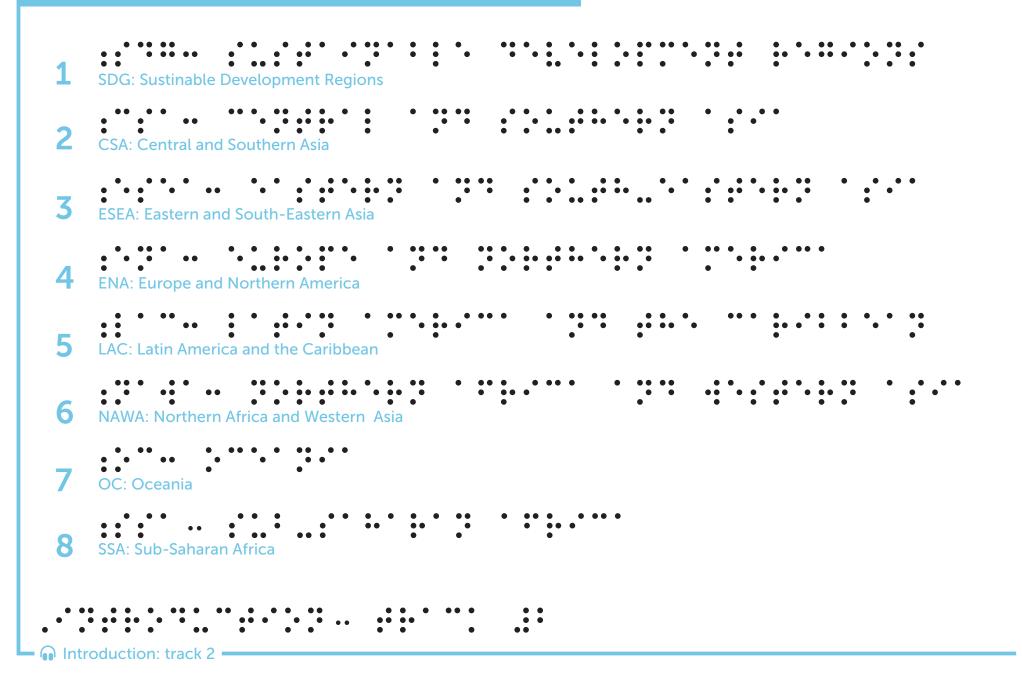
Each page of the atlas is labeled in both braille and text at the bottom-left corner. This indicates the section to which the page belongs and the type of page: map, legend, or text. For text pages, it specifies the associated audio track. The following table of contents can be used to locate the desired materials.







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## THE SUSTAINABLE DEVELOPMENT GOALS

In 2015 the United Nations (UN) introduced **17 Sustainable Development Goals (SDGs)** meant to provide "a shared blueprint for peace and prosperity for people and the planet." In order to monitor progress toward achieving all of the goals, the UN developed a total of 169 sub-targets and 225 indicators. The SDGs focus on fostering peace, prosperity, and environmental sustainability. However, despite these aspirations, recent reports indicate a bleak outlook, with many of the goals likely to remain unmet by the 2030 deadline set for fulfilling them as challenges in addressing the goals have only been exacerbated by recent challenges such as the COVID-19 pandemic and climate change.

Education emerges as a crucial avenue for advancing these goals. When students are equipped with an understanding of the SDGs and the global issues at stake, they are more inclined to actively engage in efforts to achieve them. This awareness can be cultivated through direct instruction on the goals or by integrating SDG-related content into existing curricula. However, there remains a lack of educational resources specifically tailored to the SDGs, especially accessible materials for students with disabilities.

Recognizing the geographical dimensions of the SDGs, incorporating maps into educational materials focused on the SDGs can enhance understanding and relevance. Nevertheless, studies reveal disparities in the prominence of different goals within curricula worldwide, reflecting broader discrepancies in political prioritization. Often, socio-economic objectives overshadow environmental concerns in both national and global agendas, underscoring the need for a more balanced approach to sustainable development. To remedy this situation, this tactile guide for users with visual impairments spotlights one of the most important, but least studied SDGs: SDG 6, Clean Water and Sanitation. • A shared blueprint for peace and prosperity for people and the planet.



## **SDG 6: CLEAN WATER AND SANITATION**



The sixth Sustainable Development Goal (SDG) emphasizes clean water and sanitation, aiming to ensure access to safe water and hygienic sanitation facilities for all while addressing the quality and sustainability of water resources. Despite its importance for human health, poverty reduction, food security, and education, billions of people still lack access to these resources, perpetuating cycles of poverty and disease. Recent global challenges such as the COVID-19 Pandemic, regional conflicts, and climate change have further exacerbated water scarcity issues, especially in vulnerable communities. Current reports indicate improvements WASH-related activities in rural areas but stagnation or decline in urban areas regarding access to safe drinking water and sanitation.

Water stress, scarcity, and pollution pose significant threats to people around the globe. Despite water covering much of the Earth's surface, only a tiny fraction is freshwater, with surface freshwater sources increasingly under pressure due to various factors. Freshwater withdrawals have doubled since 1960, driven by population growth and economic demands, further straining the finite renewable freshwater supply. Ensuring access to clean water and sanitation is not only essential for sustainability but also a fundamental human right crucial for inclusive growth and the well-being of current and future generations.

#### WASH: Water, Sanitation, and Hygiene

SDG 6 has 8 targets and 12 indicators to track progress

- 6.1 Universal and equitable access to drinking water
- 6.2 Adequate and equitable sanitation and hygiene for all
- 6.3 Improve water quality
- 6.4 Increase water-use efficiency and reduce water scarcity
- 6.5 Implement integrated water resources management
- 6.6 Protect and restore water-related ecosystems
- 6.A Expand international support for WASH-related activities
- 6.B Strengthen local participation in WASH management

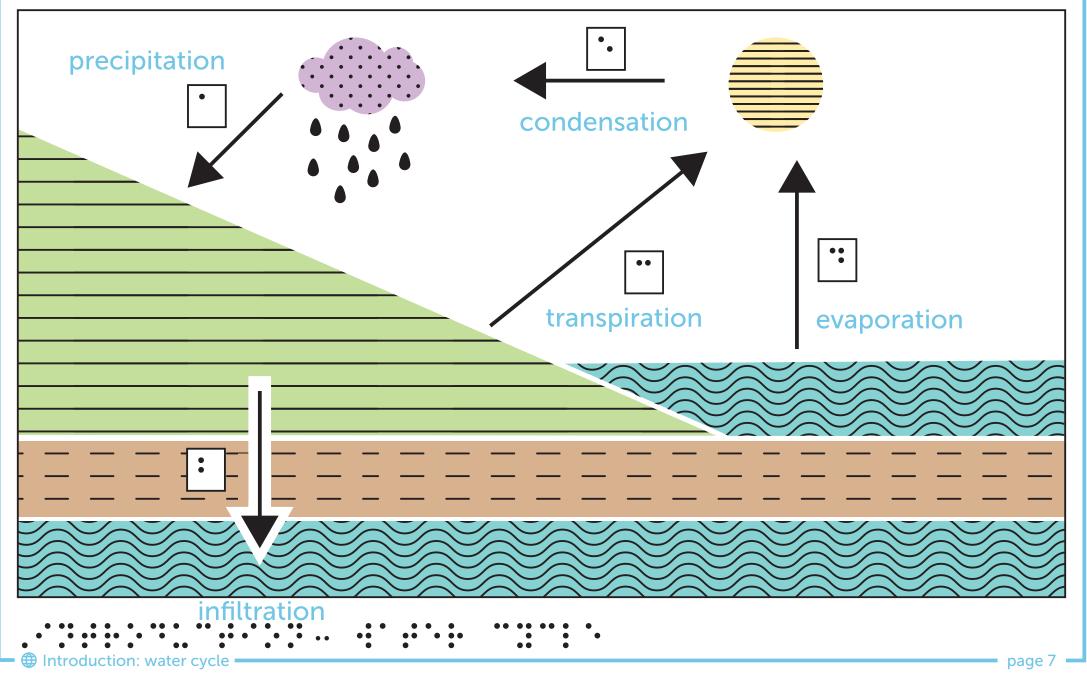
Only 0.3% of all of the water on Earth is accessible freshwater!

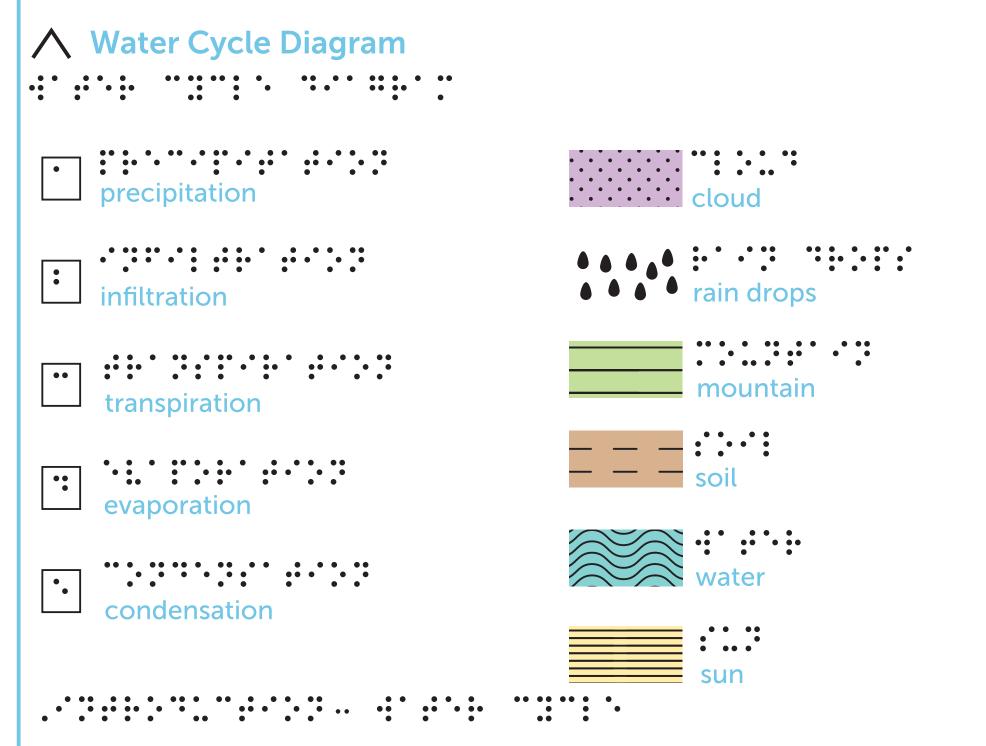
Introduction: track 4

More information in the audio track The following diagram illustrates the water cycle which shows the continuous movement of water on, above, and below the Earth's surface. Each step in the water cycle is represented by a black arrow and is accompanied by a braille square with a letter identifying it. The cycle begins with the cloud at the top left of the page and proceeds in a counter-clockwise direction. The cloud shows raised drops of rain coming down from it which fall onto the mountain below. This is the step of the water cycle called precipitation. The next step in the water cycle is called infiltration. In this step precipitation seeps into soil. The precipitation then seeps into groundwater stores or enters large bodies of water, such as lakes, seas, and oceans through runoff and rivers. Once the precipitation has been collected in bodies of water or taken up by trees and other plants, heat from the sun causes the water to evaporate or transpire into the atmosphere and transforms the water vapor in the atmosphere cools, it condenses together to form clouds and liquid water, where the process begins again as the cloud releases precipitation.

NTRODUCTION: THE WATER CICK

## **A** Water Cycle Diagram





Introduction: water cycle

## SUSTAINABLE DEVELOPMENT REGIONS

### **Indicators Covered**

# **3.6.1** WATER-RELATED ECOSYSTEMS

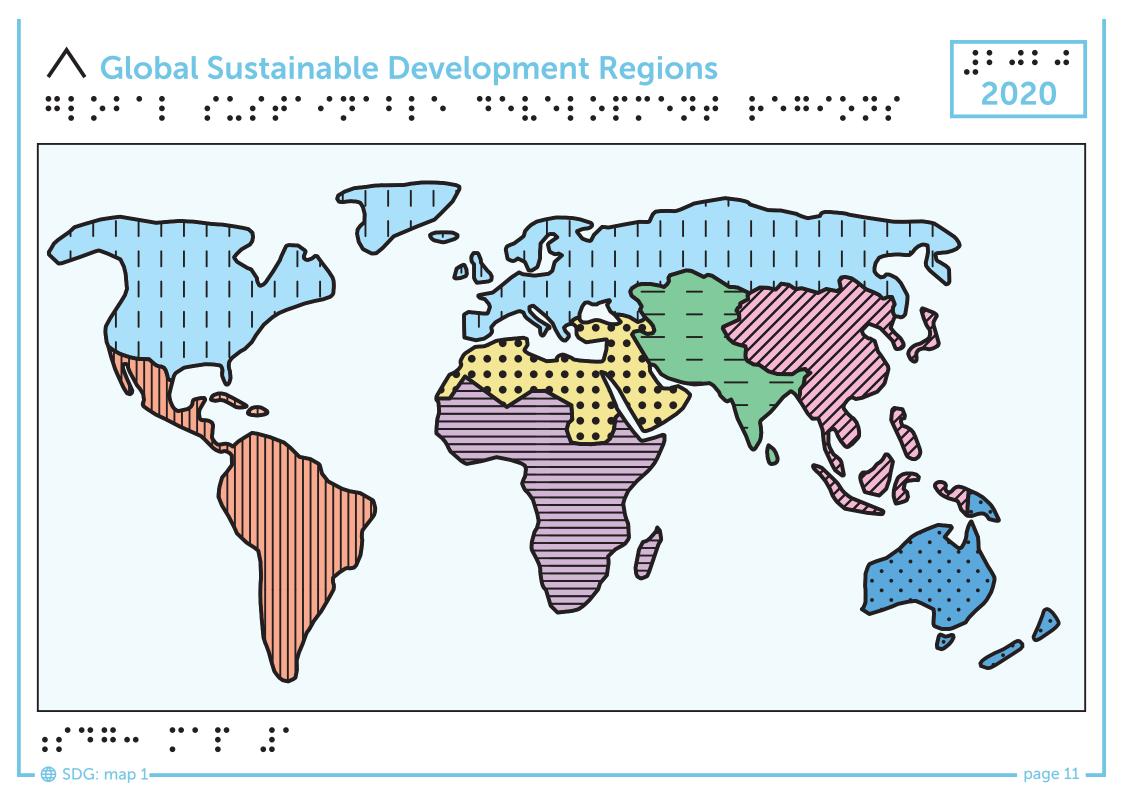
Target 6.6 of the Sustainable Development Goals aims to protect and restore water-related ecosystems by 2020. This target is unique as it had an earlier deadline compared to most SDG targets which aim for achievement by 2030. The sole indicator developed to track progress towards this goal is Indicator 6.6.1, which monitors changes over time in the extent of water-related ecosystems.

This indicator utilizes satellite images and earth observation data to assess changes in surface water bodies, including lakes, rivers, wetlands, and reservoirs. Changes in extent refer to the overall percentage of change, including both increases and decreases in the area covered by surface water. These changes often correlate with events such as flooding or droughts, which are frequently associated with climate change. Indicator 6.6.1 incorporates data from various water bodies and measures parameters such as surface area of lakes, rivers, and reservoirs (both permanent and seasonal), as well as water quality, river flow, and groundwater levels.

Understanding the reasons behind changes in the extent of water-related ecosystems is crucial for ensuring the continued provision of ecosystem services. Protecting and restoring these ecosystems not only mitigates environmental degradation but also strengthens resilience to climate change.

More information in the audio track

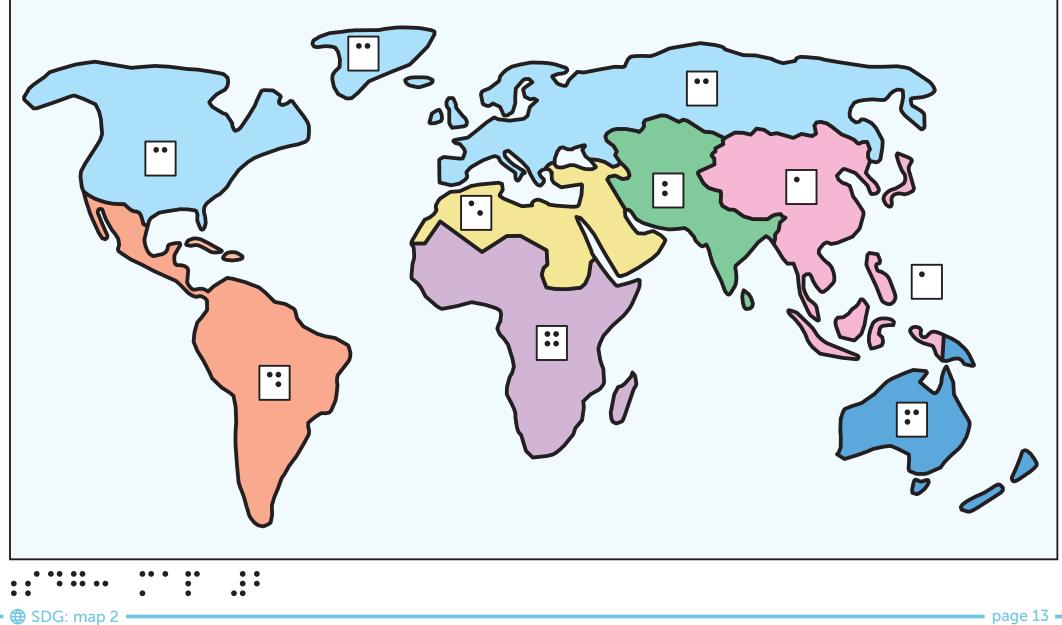
CLOBAL The cu The following maps show the global Sustainable Development regions. These regions are used as a framework for data analysis and reporting on sustainable development initiatives worldwide. The United Nations Statistics Division categorized the world into eight geographic regions for the purpose of tracking progress on the Sustainable Development Goals. These regions may differ from other pre-existing geographic or other groupings. The regions, in alphabetic order, include Central and Southern Asia, Eastern and South-Eastern Asia, Europe and North America, Latin America and the Caribbean, Northern Africa and Western Asia, Oceania, and Sub-Saharan Africa. Initially, Oceania was considered a separate region from Australia and New Zealand, but for the purposes of this atlas, they are combined into one region called Oceania. Additionally, though the country of Russia stretches across both the European and Asia continents, it is fully considered a part of the Europe region in this context. Finally, the maps exclude small islands due to difficulty in being able to perceive them by touch as a result of their size.

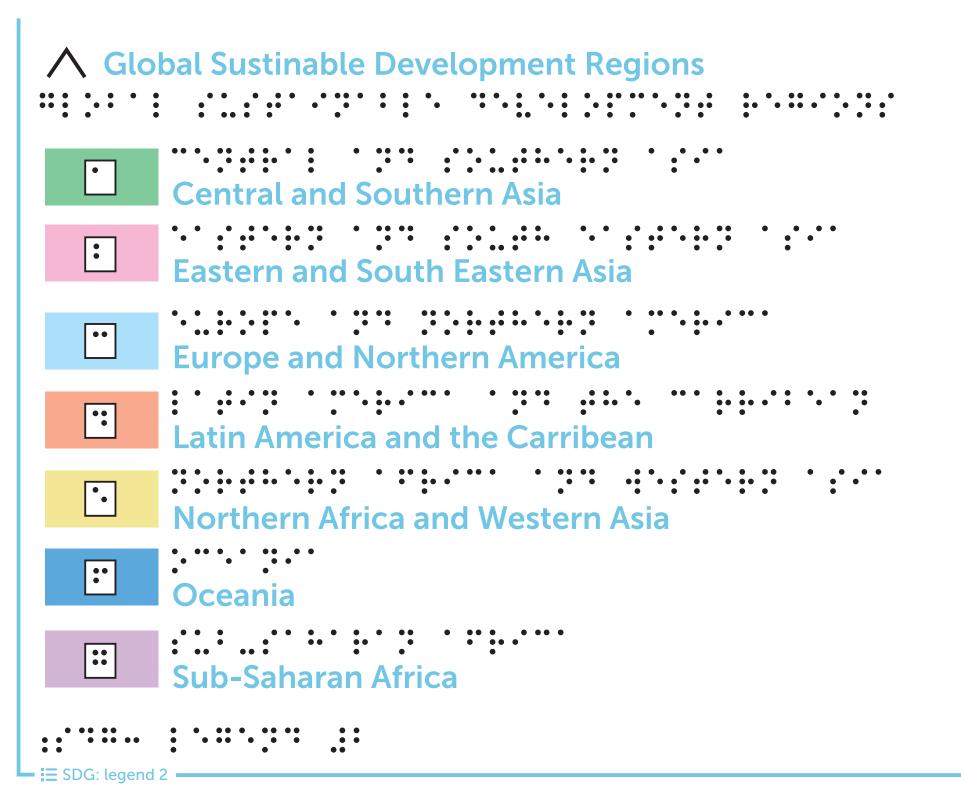


# ∧ Global Sustinable Development Regions









page 14

- Europe and North America: 15%
- Latin America and the Caribbean: 24%
- Northern Africa and Western Asia: 18%
- Oceania: 63%

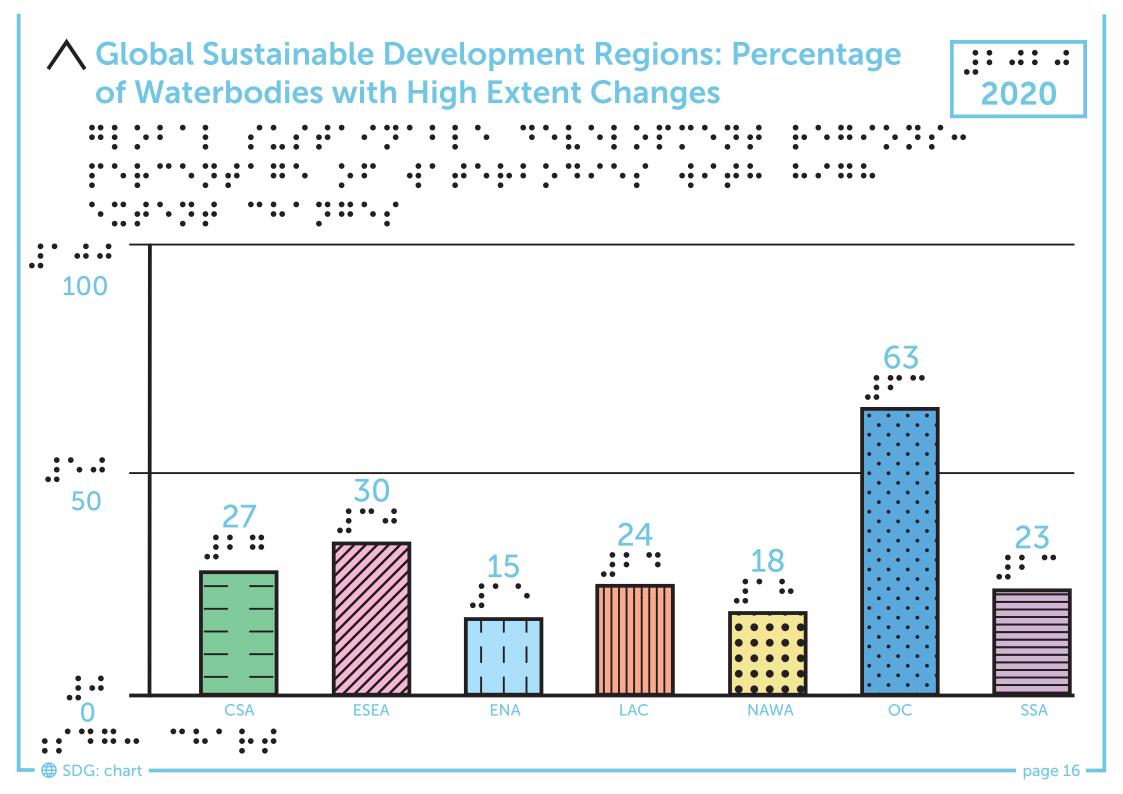
More

information

in the audio track

SDG: track 3

• Sub-Saharan Africa: 23%



# **A** Waterbodies with High Extent Changes CSA: Central and Southern Asia **ESEA: Eastern and South Eastern Asia** • ENA: Europe and Northern America LAC: Latin America and the Carribean **NAWA: Northern Africa and Western Asia OC: Oceania** SSA: Sub-Saharan Africa •• • • • •

# **CENTRAL AND SOUTHERN ASIA**

### **Indicators Covered**

# **3.4.2** WATER STRESS

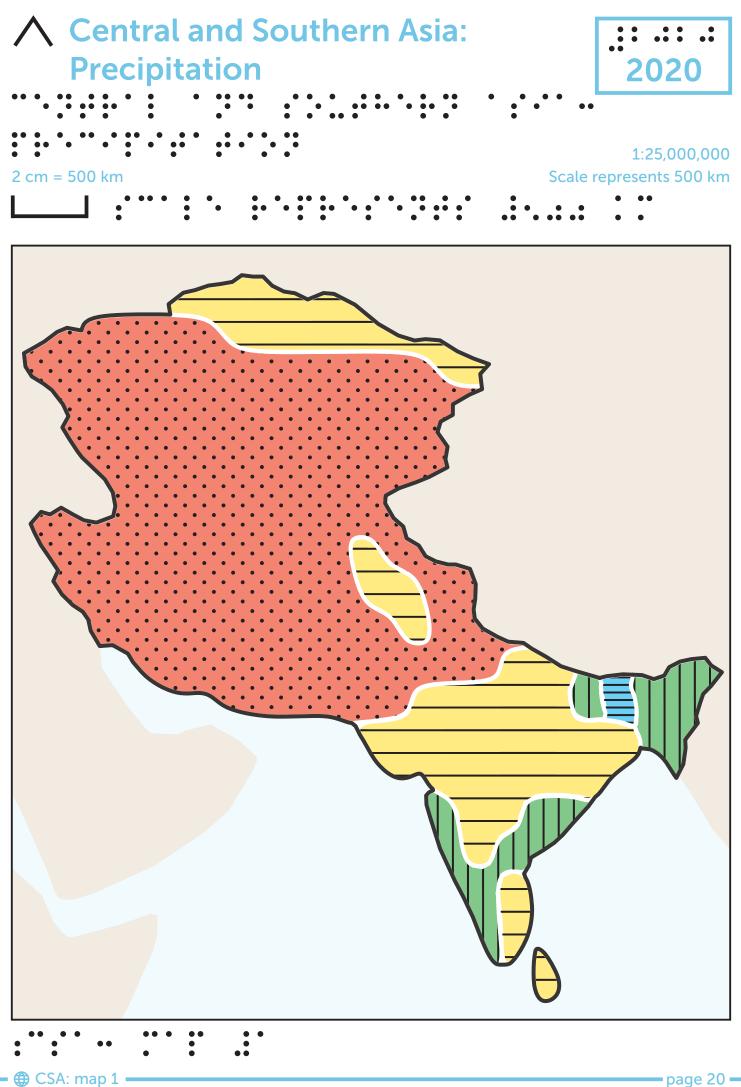
Target 6.4 of the Sustainable Development Goals aims to substantially increase water-use efficiency across all sectors by 2030 and ensure sustainable withdrawals and supply of freshwater to address water scarcity, thereby reducing the number of people suffering from it. This target is monitored through two indicators, with indicator 6.4.2 focusing on water stress levels. Water stress is assessed by comparing the total freshwater withdrawn by all major sectors of the economy to the total renewable freshwater resources available. Water stress is categorized into five levels categorized by the Food and Agriculture Organization (FAO) of the United Nation based on percentages, ranging from no stress to critical.

Given that only a small fraction of the world's water is freshwater, with an even smaller percentage accessible to humans, maintaining water withdrawals below rates of replenishment is vital for sustainable water resource management. The availability of renewable freshwater resources is influenced by factors such as geographical position, rainfall variability, and shared water bodies with neighboring countries.

Agriculture is the largest consumer of global freshwater resources, accounting for about 70% of withdrawals, although this percentage varies among countries based on income levels. Population growth, economic expansion, and climate change are significant drivers of increased water demand, posing challenges for water resource management. Despite improvements in water use efficiency, continued growth in population and economic activities is expected to strain water resources further. Monitoring water stress levels is crucial for early identification and mitigation of potential water scarcity issues.

CHNTRALLAND SOUTHERN ASIA: PRECIPITATION The follwing map shows the average annual rainfall level in the Central and Southern Asia region in 2020. Overall, the northern part of the Central and Southern Asia region generally experiences less rainfall compared to the southern part. The northernmost section receives low average annual rainfall, while the western portion encounters minimal precipitation. Much of the southern part region, including the island of Sri Lanka, situated off of the southeastern coast of the Indian peninsula, experiences low levels of annual precipitation. However, the southernmost and eastern parts of the region, comprising Nepal, Bhutan, Bangladesh, and parts of India, receive moderate to high annual rainfall, with certain areas within Nepal and Bhutan experiencing particularly high levels of precipitation.

More information in the audio track



# ∧ Precipitation

Annual Precipitation Level

Minimal Minimal Low Moderate





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**Helpers Note:** 

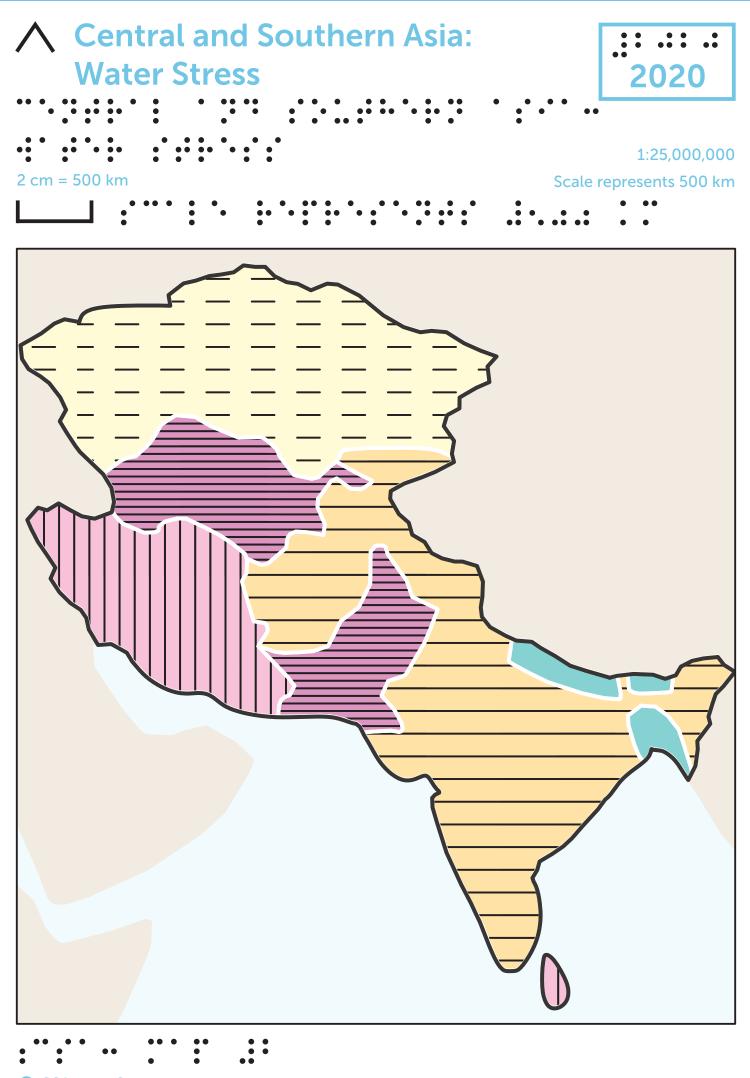
This legend can be used for all precipitation maps so not all of the symbols in the legend are present on all of the maps

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More information in the audio track

CHITRALAND SOUTHERN ASIA: WATER SPEC The following map shows the level of water stress in the Central and Southern Asia region. The levels of water stress (none, low, medium, high, and critical) are determined by the Food and Agriculture Organization of the United Nations.

Overall, the Central and Southern Asia region experiences a high level of water stress. The northernmost region of this map, which covers Kazakhstan, experiences a low water stress level. Across the central swath of the region, spanning from India to Afghanistan, and covering Kyrgyzstan and Tajikistan, water stress reaches a medium level. In the easternmost part of the region, which encompasses Nepal, Bhutan, and Bangladesh, there is no water stress. The western part of the region has the highest level of water stress, including areas with both high and critical levels of water stress. This critical zone encompasses countries such as Pakistan, Turkmenistan, and Uzbekistan, indicating an urgent need for water resource management and conservation efforts in these areas.



# **A** Central and Southern Asia Water Stress

Target 6.4	
Indicator 6.4.1	
Water Stress Level	
No Stress	
Medium	
High	
Critical	

 $\blacksquare$   $\blacksquare$  CSA: legend 2

# **EASTERN AND SOUTH-EASTERN ASIA**

## **Indicators Covered**

# **3.1.1** SAFE DRINKING WATER

Target 6.1 of the Sustainable Development Goals aims to achieve universal and equitable access to safe and affordable drinking water by 2030. This is tracked through indicator 6.1.1, which measures the proportion of the population using safely managed drinking water services. Safely managed drinking water refers to the presence of an improved water source on the premises which is available when needed and free from contamination. Improved sources include piped water, boreholes, protected wells, springs, rainwater, or packaged/delivered water. Water that does not meeting these criteria but is still accessible within a 30-minute round trip is considered basic service, while sources farther away are categorized as limited.

# **3.5.1** INTEGRATED WATER RESOURCES MANAGEMENT

Target 6.5 of the Sustainable Development Goals aims to implement integrated water resources management (IWRM) at all levels by 2030, including through transboundary cooperation where appropriate. Indicator 6.5.1 tracks the degree of IWRM implementation worldwide. IWRM is a process that seeks to balance the development and management of water and related resources to maximize social and economic welfare while ensuring the sustainability of ecosystems.

IWRM comprises four key components: an enabling environment, institutions and participation, management instruments, and financing. It aims to generate positive social, economic, and environmental impacts from water use and fosters a participatory approach to water management, bringing together various stakeholders throughout the process. Integrated water resources management is crucial for achieving the long-term well-being outlined in the SDGs by balancing competing water demands and ensuring sustainability across sectors and society.

EASTERN AND SOUTH-EASTERN ASIA: PRECINITION The followie Southrelatively low, while the southern areas and many of the islands experience moderate to high levels of annual rainfall. The map includes, from north to south, the islands of Japan, the Philippines, Malaysia, and Indonesia. Due to their small size, some smaller islands have been omitted, with a focus on generalizing the larger islands for clarity and usability.

More information in the audio track

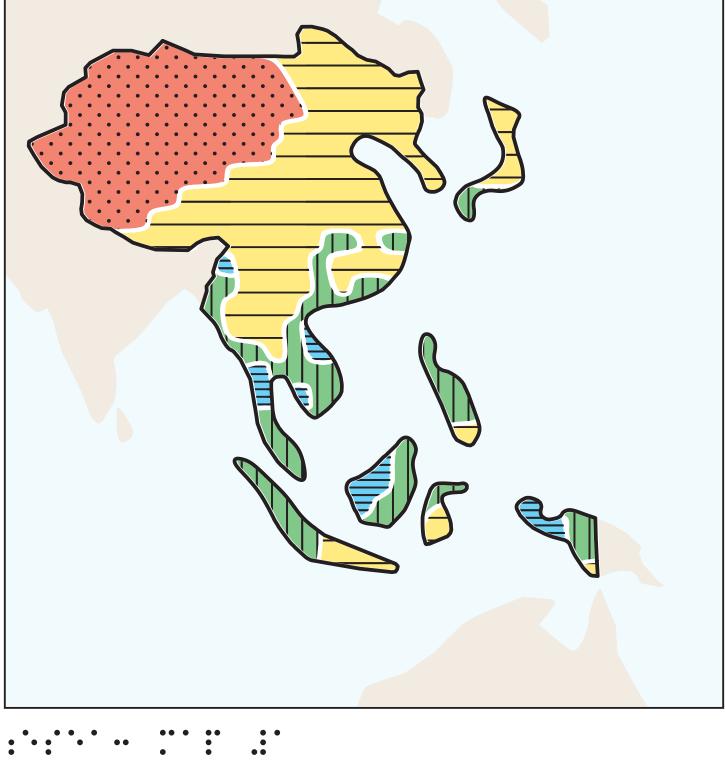
# Eastern and South-Eastern Asia: Precipiation



2 cm = 1,000 km

1:50,000,000 Scale represents 1,000 km

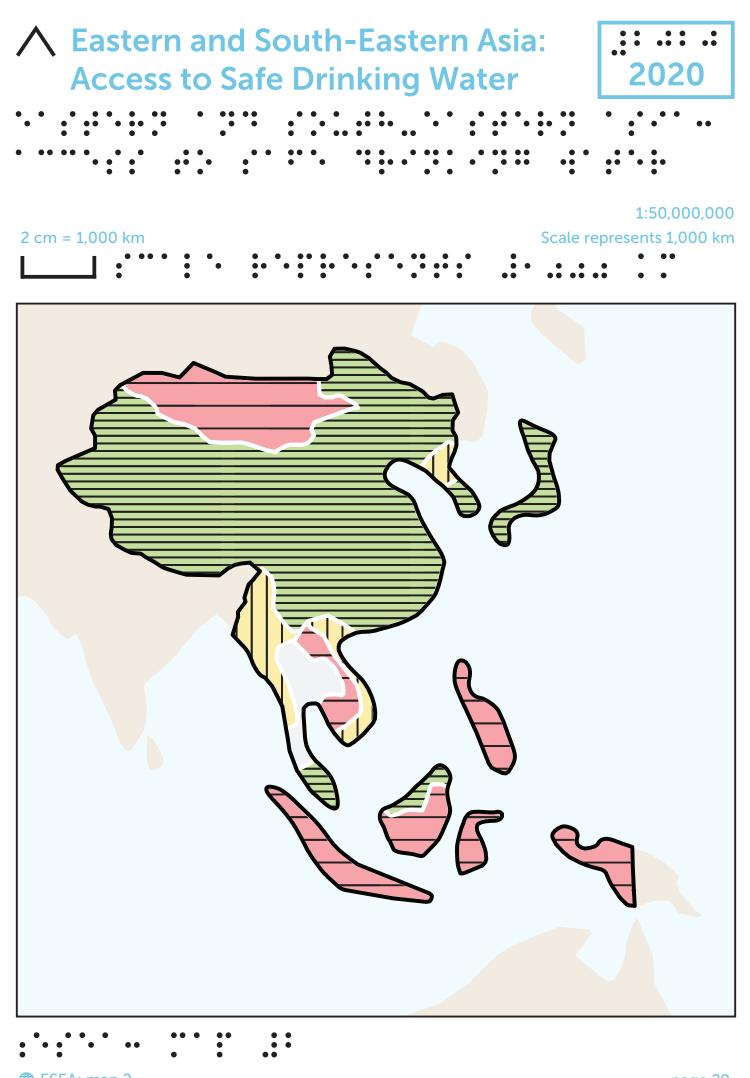


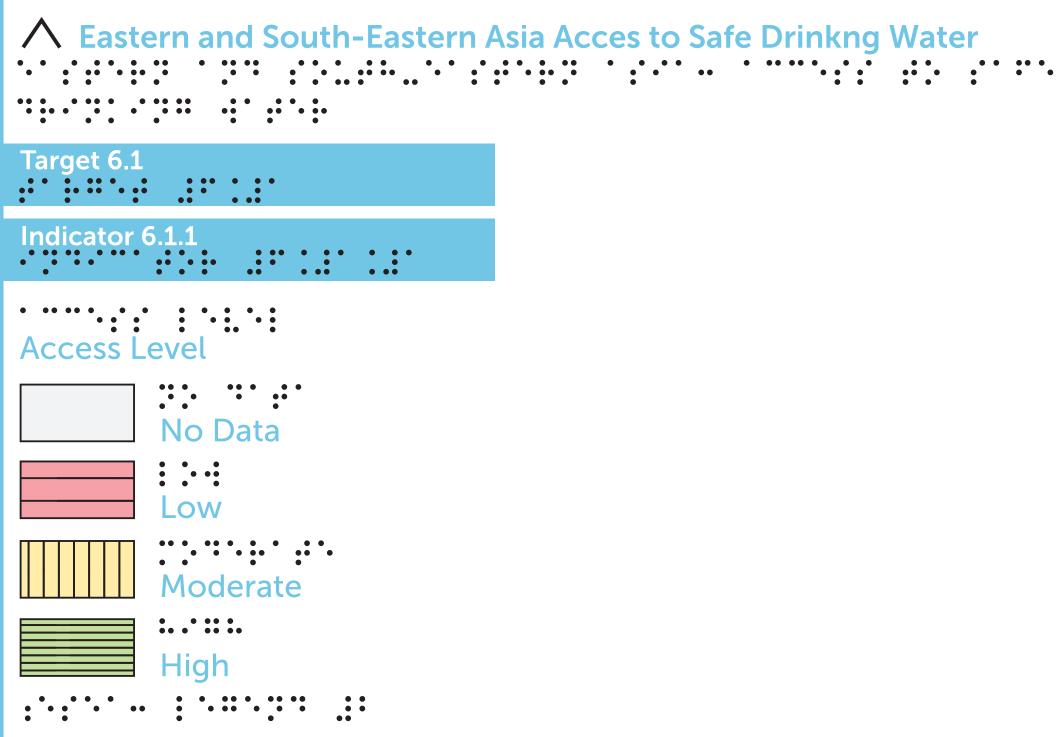


More information in the audio track

EASTERNAND SOUTH-EASTERN ASIA: SAFE DRIVING WATER

The Eastern and South-Eastern region can be characterized by a stark disparity in access to safe drinking water services, with large sections of the region reflecting both high and low levels of access. In the northern part of the mainland of this region covering China, and in the island of Japan to the east, there is generally high access to safe drinking water services. However, the northernmost part of this region, covering Mongolia, and many southern islands, except for Malaysia, exhibit low access. Additionally, parts of the southern mainland, including Laos and Cambodia, and a section of the eastern mainland covering North Korea, show moderate levels of access to safe drinking water.



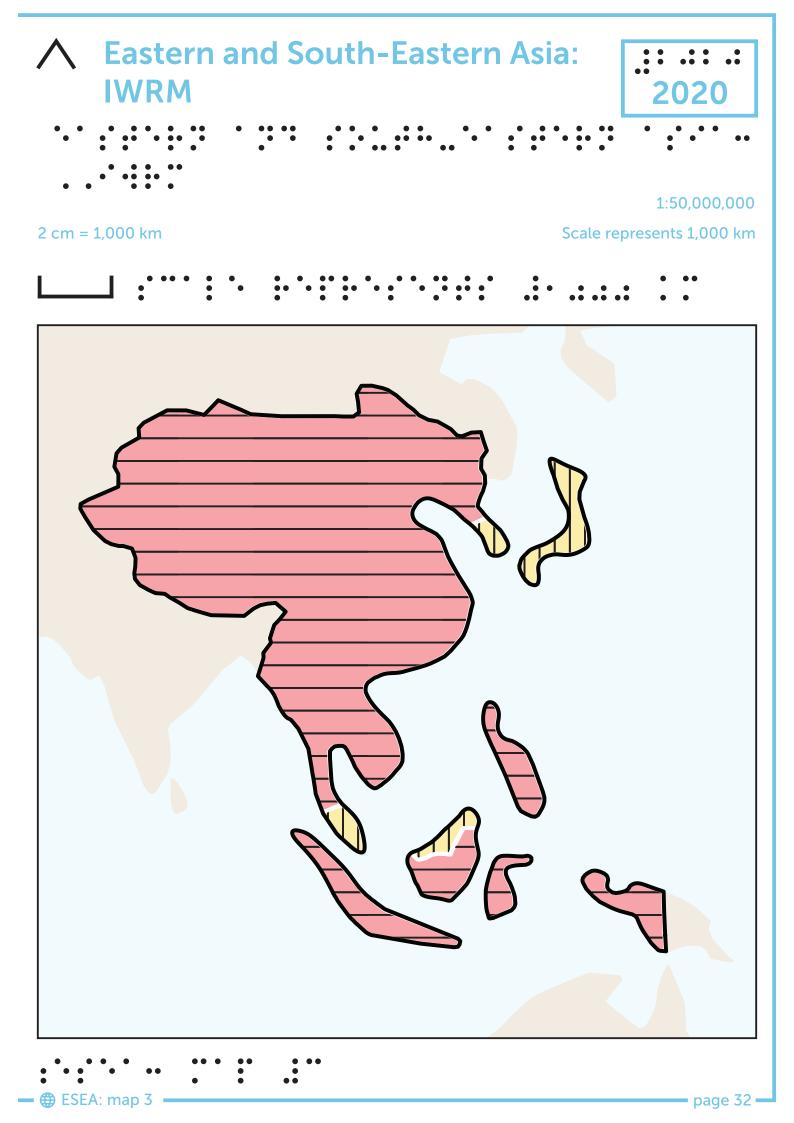


ESEA: legend 2

More information in the audio track

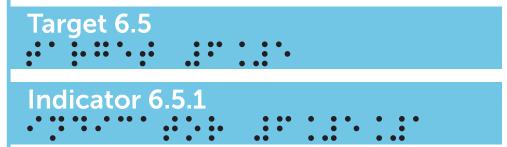
EASTERN AND SOUTH-EASTERN ASIA. MAN The following map illustrates the extent of Integrated Water Resources Management (IWRM) implementation in the Eastern and South-Eastern Asia region. A high level indicates comprehensive implementation across the four key dimensions of IWRM: enabling environment, institutions and participation, management instruments, and financing. Conversely, a low level suggests minimal implementation across these

> Across much of Eastern and South-Eastern Asia, IWRM implementation remains generally low. However, moderate levels are observed in specific areas. Notably, the northeastern part of the mainland, including South Korea, the island of Japan to the east of the mainland, and Malaysia, which spans the southern tip of the mainland and the northern part of the adjacent island, exhibit moderate levels of IWRM implementation. No parts of the region demonstrate high levels of IWRM implementation.

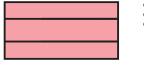


# **A** Eastern and South-Eastern Asia: IWRM

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	٠	•	•	•		•		•	•	••	•	••		•	•	•	•	•			• •	• •	•



# IWRM Implementation Level





Moderate

Helpers Note:

IWRM stands for Integrated Water Resources Management

ESEA: legend 3

# **EUROPE AND NORTHERN AMERICA**

### **Indicators Covered**

# **3.3.2** WATER QUALITY

Indicator 6.3.2 tracks progress towards achieving Goal 6.3, which aims to improve water quality globally by 2030. It focuses on the proportion of bodies of water with good ambient water quality, defined as water quality that does not harm ecosystem function or human health. Good ambient water quality is determined by at least 80% compliance with country-specific targets for core physical and chemical parameters. These parameters reflect natural water quality factors such as climate and geology, as well as potential impacts on water quality. An index incorporating data from parameters like oxygen, salinity, nitrogen, phosphorus, and acidification is used to assess overall water quality. Monitoring ambient water quality helps the identification of pollution hotspots and the enforcement of pollution laws and discharge permits.

# **3.5.2** TRANSBOUNDARY WATER BASIN AGREEMENTS

Indicator 6.5.2, part of Target 6.5 of the SDGs, measures the proportion of transboundary basin areas with operational arrangements for water cooperation. Transboundary basins are river or lake basins or aquifer systems that cross or are on the boundaries of multiple countries. Operational water cooperation agreements between countries are essential for effective water management. An operational arrangement for water cooperation involves bilateral or multilateral treaties, conventions, agreements, or other formal arrangements that establish a framework for cooperation. For an arrangement to be considered operational, it must include elements such as a joint body, regular formal communication between the countries involved, coordinated management plans, and regular exchange of data and information, at least annually. Monitoring the proportion of transboundary basin areas covered by operational cooperation agreements helps facilitate sustainable water management and address challenges related to shared water resources.

The following map illustrates the average annual rainfall levels across the Europe region in 2020. In general, the Europe region experiences low average annual rainfall across most of the area. This also applies to the islands of Iceland, Ireland, and the United Kingdom, situated to the west of the mainland. However, certain areas in the southwest and northeast part of Russia, which is in the eastern part of the region, record minimal rainfall. The northwestern part of the mainland, specifically the westernmost part of Norway, stands out as receiving moderate rainfall levels. No part of the region experiences high levels of average annual rainfall.

EUROPE: PRECIPITATION

More information in the audio track



🕀 ENA: map 1





2 cm = 1,000 km	1:50,000,000
	Scale represents 1,000 km

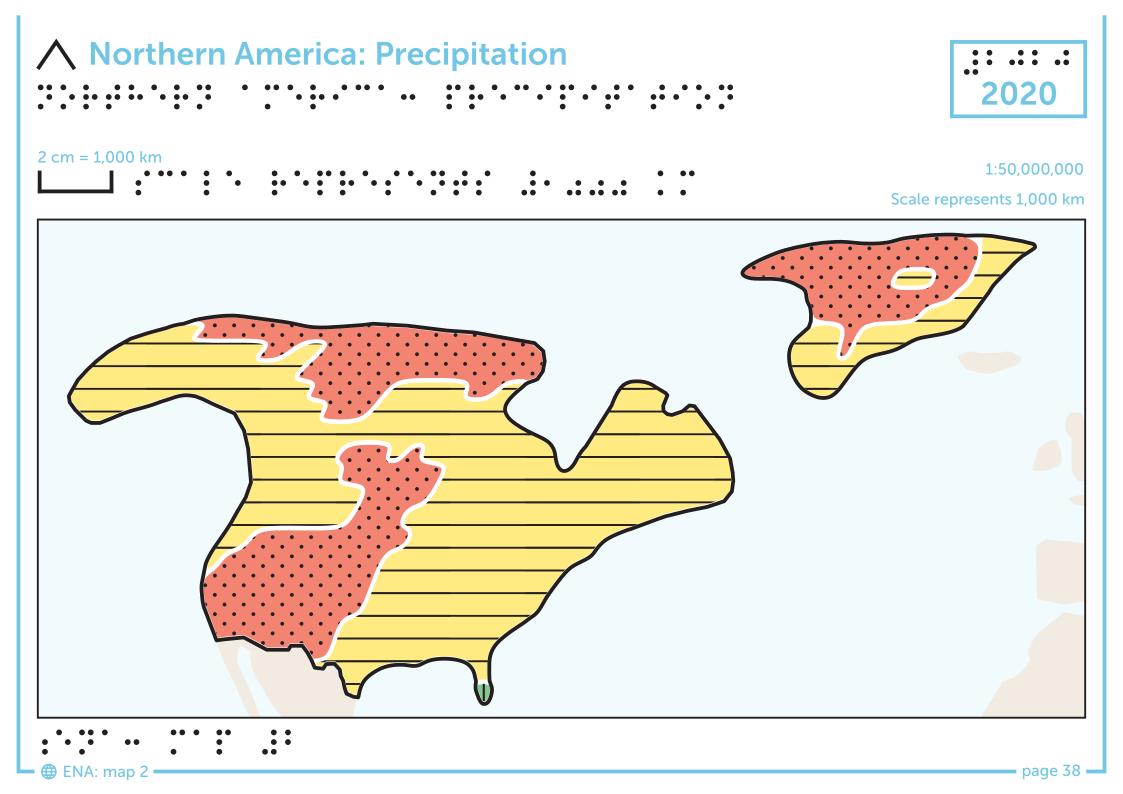


The following map shows the average annual precipiation levels in the Northern America region in 2020. In general, the Northern American region experiences low average annual rainfall across most of the area. On the mainland, which includes Canada to the North and the United States of America to the south, the northernmost part of the region and a large part of the southwest experience minimal rainfall, while the rest of the region gets slightly more rainfall with an average annual rainfall level of low. The island of Greenland to the east of the mainland reflects this precipitation pattern as well. The northernmost part of the island experiences minimal rainfall while the southern part experiences slightly more average annual rain with low levels.

OBTHERN AMERICA: PRECIPITATION

More information in the audio track

ENA: track 3

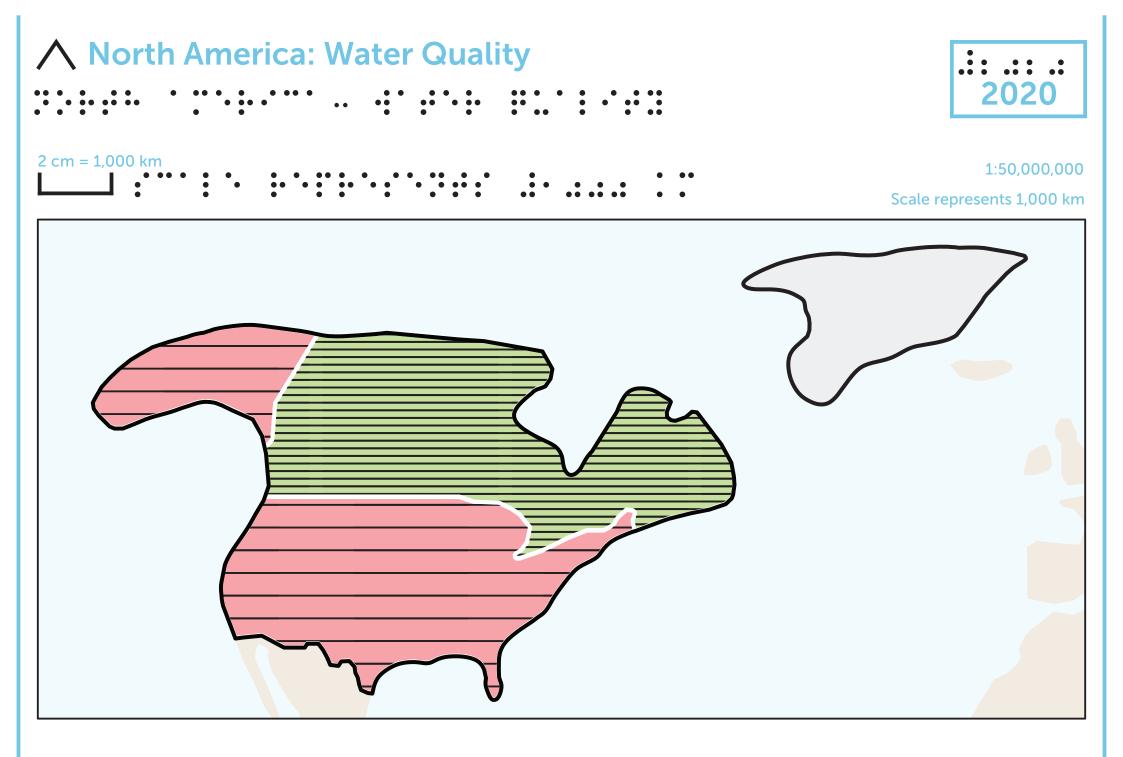


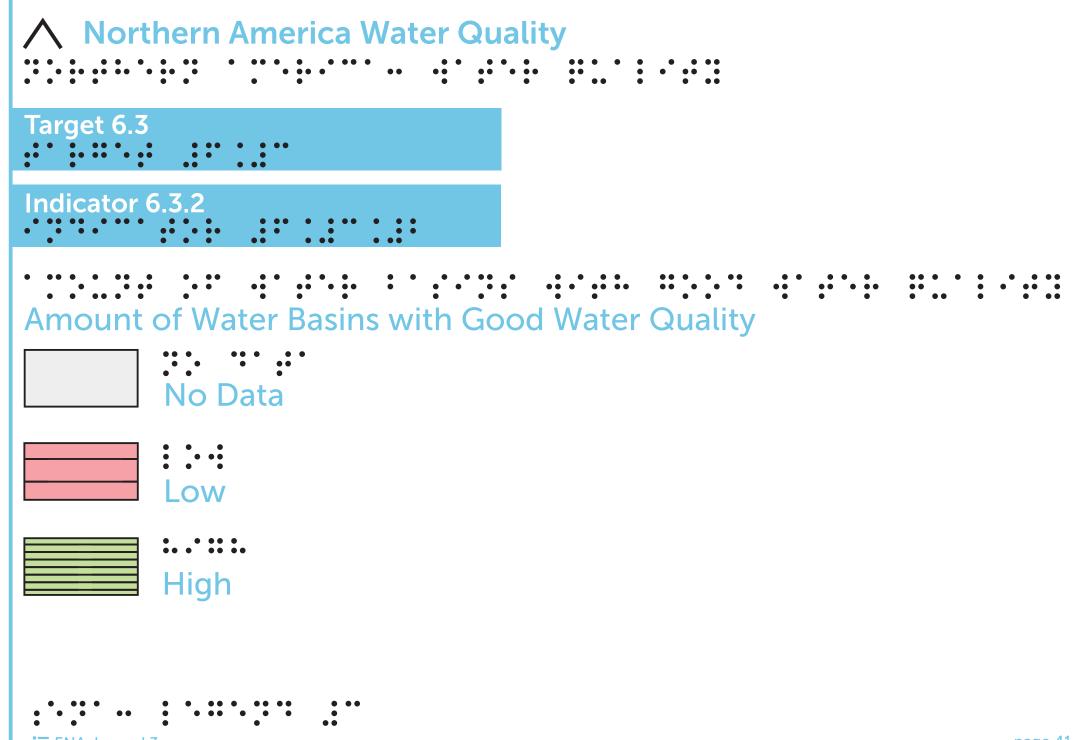
MORTHERN AMERICA. WATER QUALITY MORTHERN The following map depicts the amount of water basins in the Northern America region with a good ambient water quality. A high level indicates that over 75% of the water basins in an area exhibit good water quality, while a moderate level suggests between 50 to 75% of water basins meet this criterion. Conversely, a low level implies less than 50% of water basins have good ambient water quality.

In the northern part of the mainland, specifically where Canada is located, there is a high amount of water basins with good water quality. However, in the southern and northwestern parts of the region, encompassing the United States of America, the amount of water basins with good water quality is low. Notably, there are no areas in this region exhibiting a moderate level of water basins with good water quality. Data is unavailable for the island of Greenland to the east of the mainland.

More information in the audio track

ENA: track 4





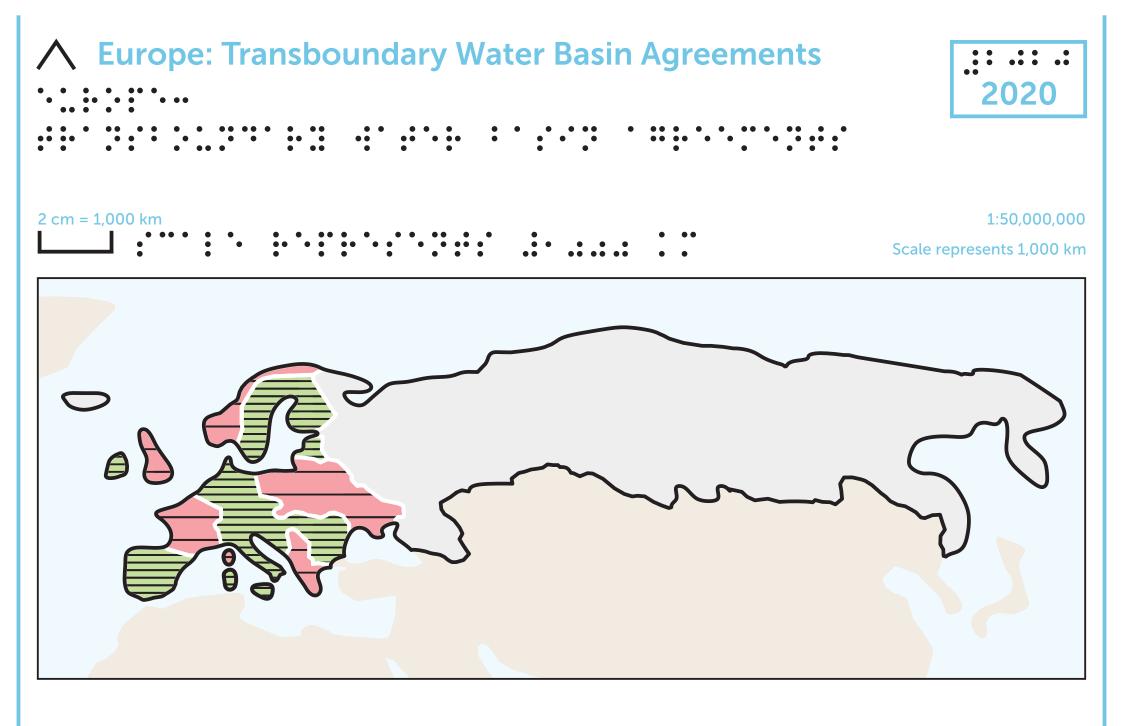
EUROPHI-TRANSBOUNDARY WATER BASIN ACTIVITY

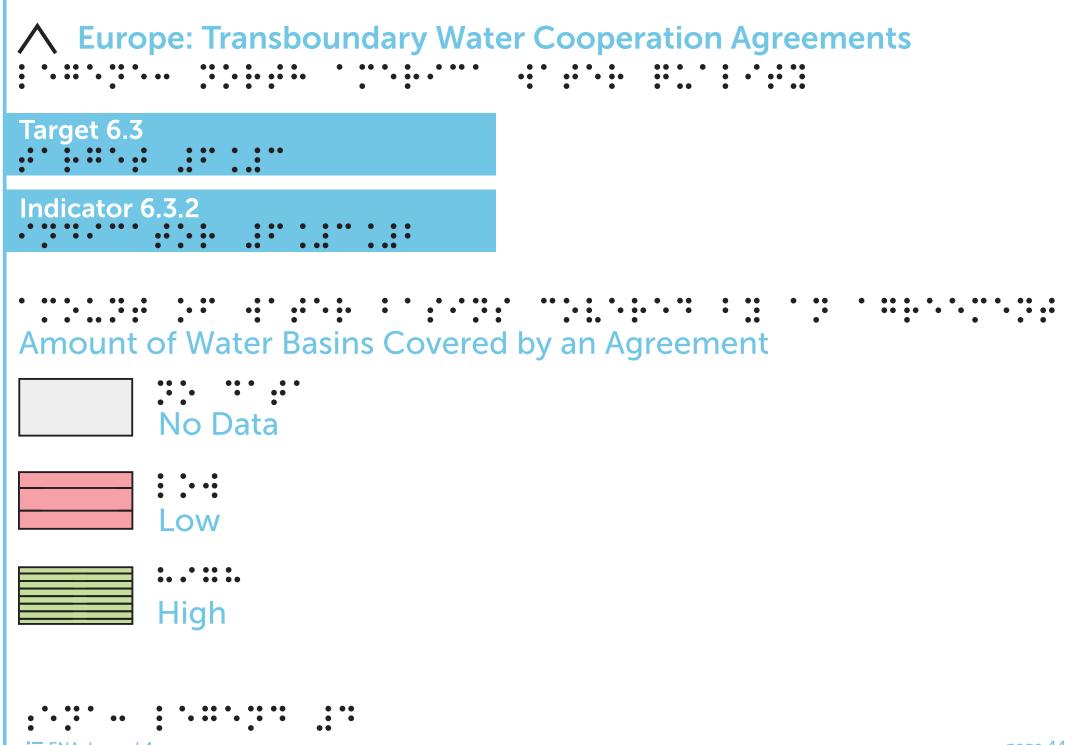
In Europe, there is a discernible pattern of alternating high and low levels of water basins covered by transboundary cooperation agreements. The western part of the region, including the island of Ireland and Spain, the central stretch of the region from Germany and Italy to Romania and Bulgaria, and the northwestern portion encompassing Estonia, Sweden, and Finland, all exhibit high levels of water basin coverage by cooperation agreements. Conversely, the remaining areas, such as sections of the northwest involving the United Kingdom, France, and Norway, as well as parts of the central region covering the western Balkans, Ukraine, and Belarus to the east, demonstrate low levels of water basin coverage by agreements. Data is unavailable for island of Iceland to the northwest of the region or in the eastern portion of the region comprising Russia.

More

information

in the audio track





ENA: legend 4

## LATIN AMERICA AND THE CARIBBEAN

### **Indicators Covered**

: tracl

## **3.A.1** OFFICIAL DEVELOPMENT ASSISTANCE

Target 6.A of the Sustainable Development Goals aims to expand international cooperation and capacity-building support to developing countries for water, sanitation and hygiene-related (WASH) activities. Monitoring the financial flows related to water and sanitation activities is crucial for increasing transparency and efficiency, and stimulating further investments in these sectors. These activities encompass various aspects of WASH activities such as water harvesting, desalination, water efficiency, wastewater treatment, and recycling technologies. The indicator designated to track progress towards this target is indicator 6.A.1, which measures the amount of water- and sanitation-related official development assistance (ODA) included in a government-coordinated spending plan.

ODA refers to official financing provided by donor government agencies to promote the economic development of developing countries. Indicator 6.A.1 focuses on the total amount of ODA allocated to water- and sanitation-related programs that is integrated into government budgets. This includes funding for various sectors such as water supply, sanitation, water resource management, waste management, education, agriculture, and hydroelectric power.

ATTIMANTERICA AND THE CARIBBEAN: PRECINITION The follows American rainfall, including the southern portion of North America around Mexico and Guatemala, as well as the northern part of South America covering Colombia, which receive medium levels of average annual rainfall. The area between these two continents, spanning Costa Rica and Panama, receives high levels of average annual

More information in the audio track

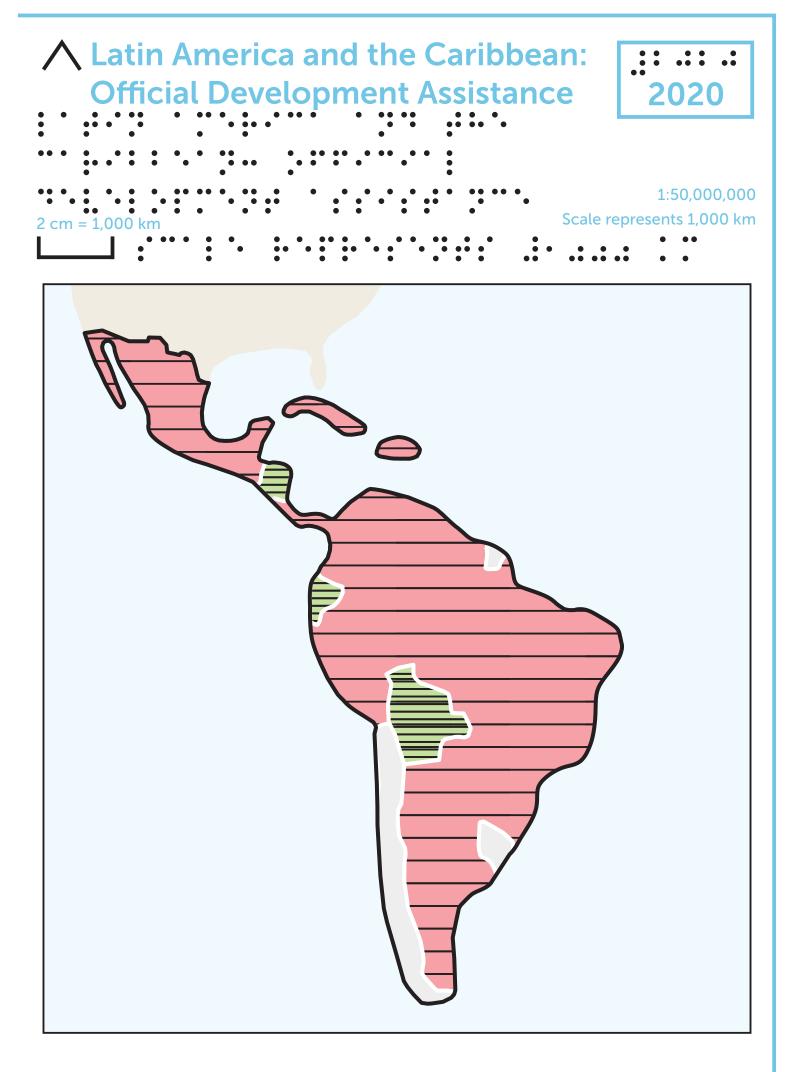
LAC: track 2

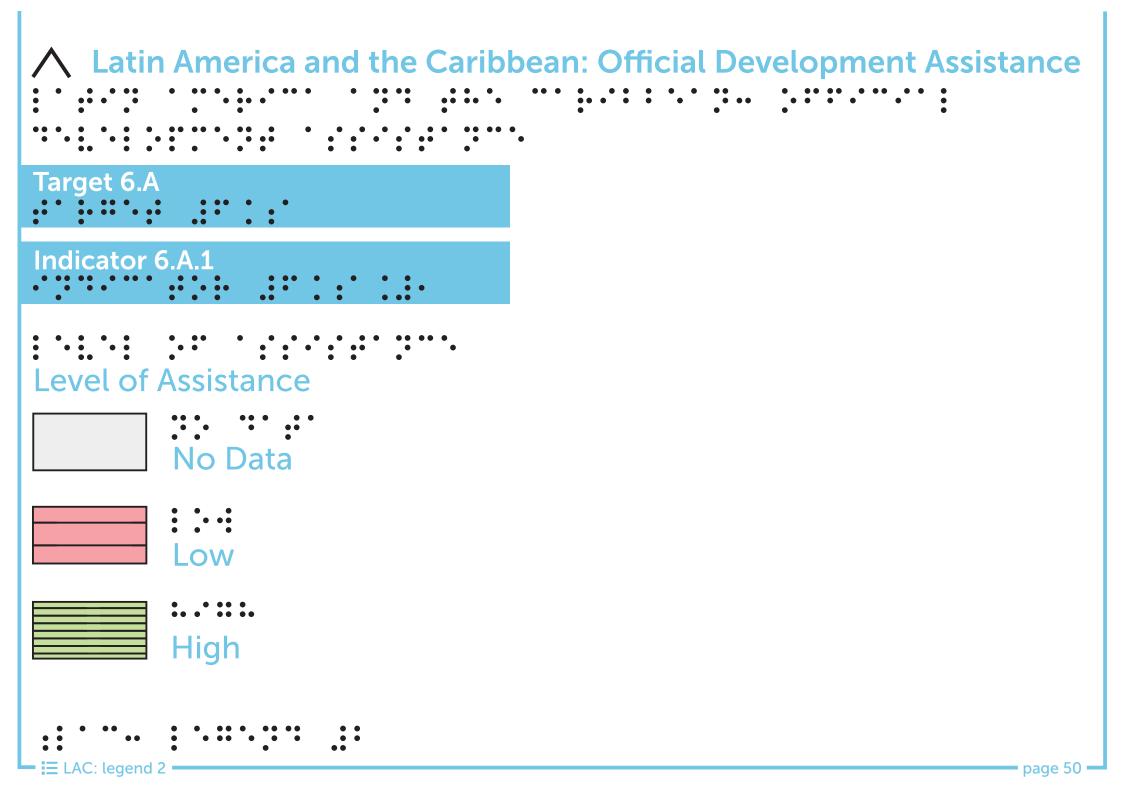


ATIN AMERICA AND THE CARIBBEAN The following map displays the extent of water- and sanitation-related official development assistance (ODA) incorporated into government-coordinated spending plans in the Latin America and Caribbean region. A high level of assistance indicates that over fifty million USD is allocated for water- and sanitation-related activities, whereas a low level suggests an allocation of less than fifty million USD. Across most of the region, official development assistance levels are low. However, a few small areas in the central-western area of the region demonstrate high levels of ODA. These areas encompass countries such as Honduras, El Salvador, Nicaragua, Ecuador, and Bolivia. Additionally, certain areas in the southern section of the region, particularly in the eastern and southernmost parts of the continent, lack available data regarding ODA. These areas include countries like French Guiana, Chile, and Uruguay.

More information in the audio track

LAC: track 3





## **NORTHERN AFRICA AND WESTERN ASIA**

## **Indicators Covered**

# **3.3.1** WASTEWATER TREATMENT

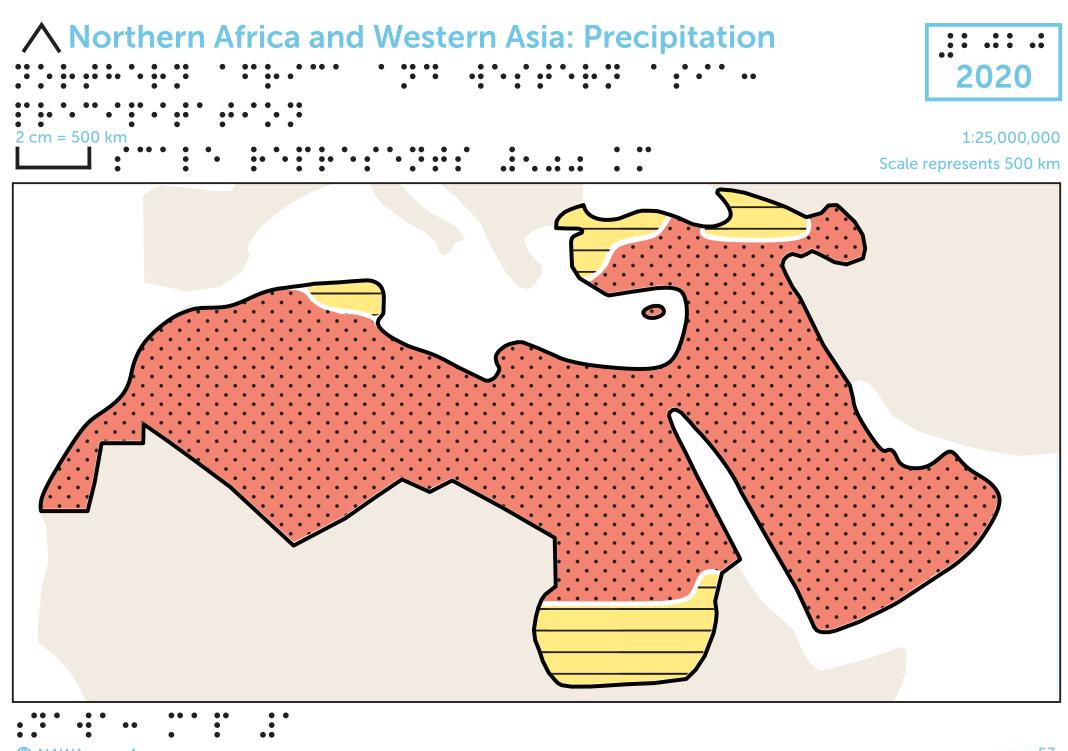
Target 6.3 of the Sustainable Development Goals aims to improve water quality by reducing pollution, eliminating dumping, minimizing the release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and substantially increasing recycling and safe reuse globally by 2030. To monitor progress towards this objective indicator 6.3.1 focuses on the proportion of domestic and industrial wastewater flows that are safely treated. Domestic wastewater originates from residential areas, while industrial wastewater is discharged after industrial processes. Wastewater treatment involves processes to remove solids, microorganisms, and pollutants, making the water suitable for environmental standards or reuse. Treating wastewater helps protect freshwater systems, oceans, and human health by preventing harmful pollutants from entering the environment.

# **3.B.1** LOCAL PARTICIPATION IN WASH ACTIVITIES

The participation of local communities in water, sanitation, and hygiene-related (WASH) decision-making processes is crucial for ensuring the accountability and long-term sustainability of water and sanitation solutions. Target 6.B of the Sustainable Development Goals aims to support and strengthen the participation of local communities in improving water and sanitation management by 2030. To monitor progress towards this target, indicator 6.B.1 measures the proportion of local administrative units with established and operational policies and procedures for community participation in water and sanitation management. The indicator covers six sub-sectors within the scope of water and sanitation management: urban drinking water, rural drinking water, urban sanitation, rural sanitation, hygiene promotion, and water resources planning and management.

NORTHERMARKA AND WESTERN ASIA: PRECINITATION Wester southern part of Western Asia, covering Yemen and Oman, and a few areas to the south of the black sea covering the northwestern part of Turkey and the countries of Georgia, Armenia, and Azerbaijan.

More information in the audio track

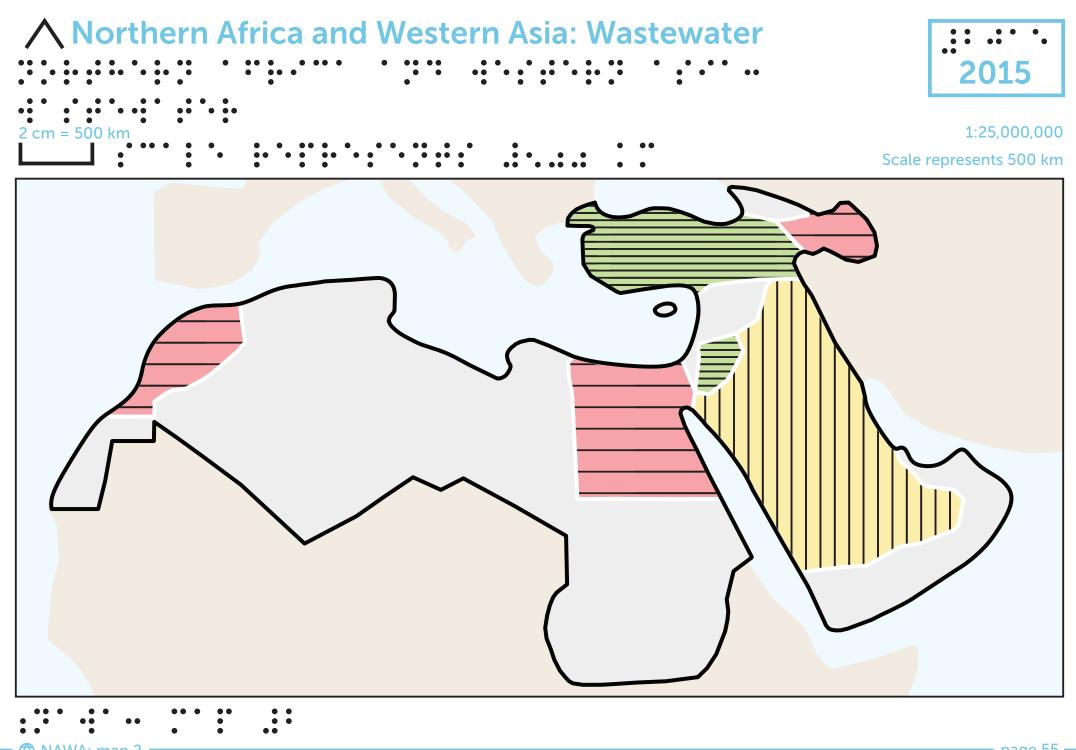


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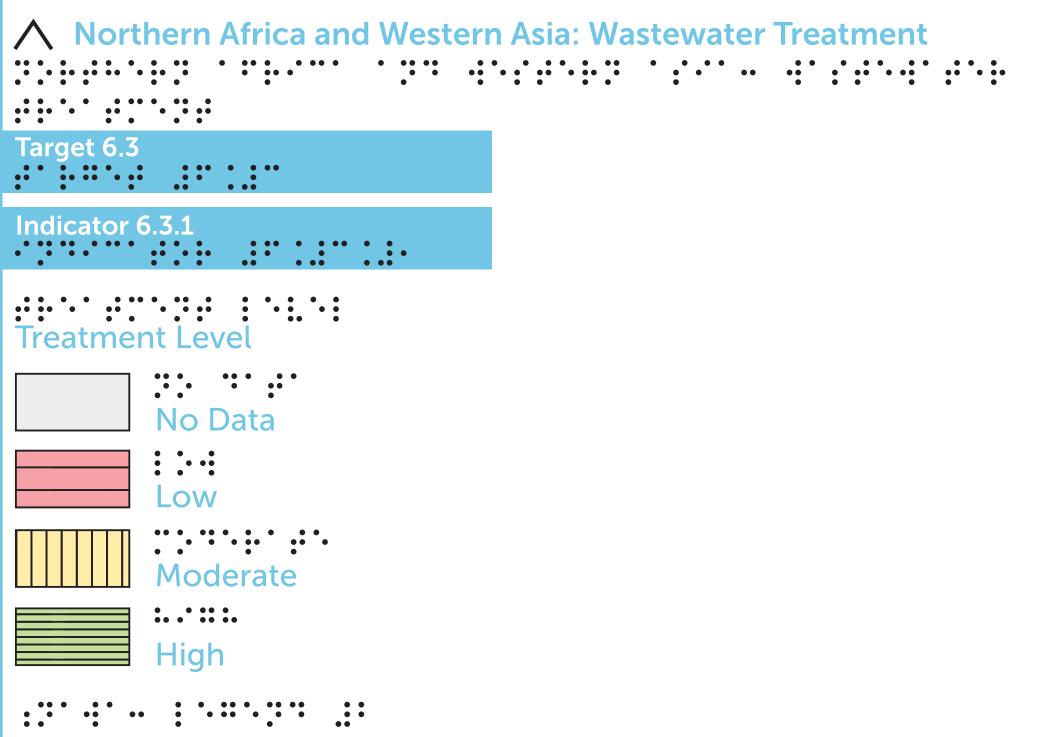
While data availability is limited across the region, notable differences can be observed in areas with available values. The areas in Northern Africa with data available, encompassing countries like Morocco and Egypt, exhibit low levels of safely treated wastewater. Similarly, a small region in the northeastern part of Western Asia, covering Azerbaijan, also shows low treatment levels. In contrast, the majority of the southern portion of Western Asia demonstrates moderate levels of wastewater treatment, including countries such as Saudi Arabia, Iraq, and Kuwait. Conversely, the northern part of Western Asia boasts the highest levels of treatment, with countries like Turkey, Armenia, and Jordan showing a high proportion of safely treated wastewater.

More information in the audio track

NAWA: track 3



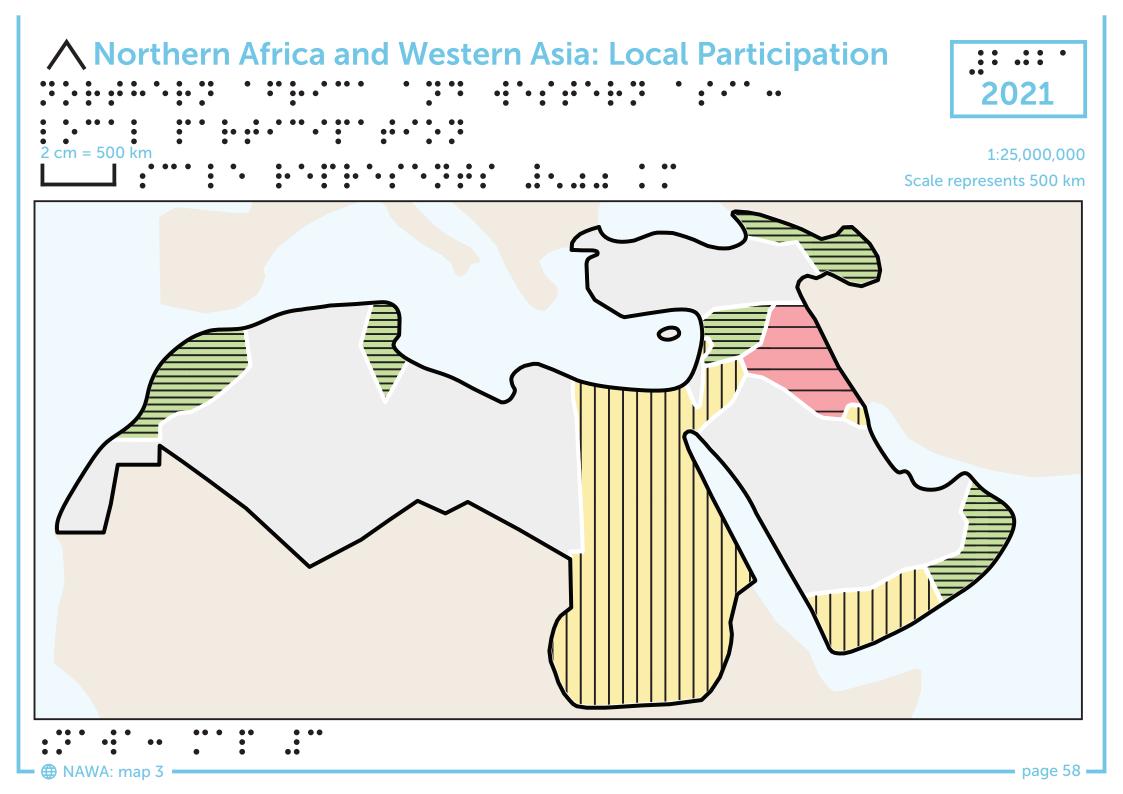
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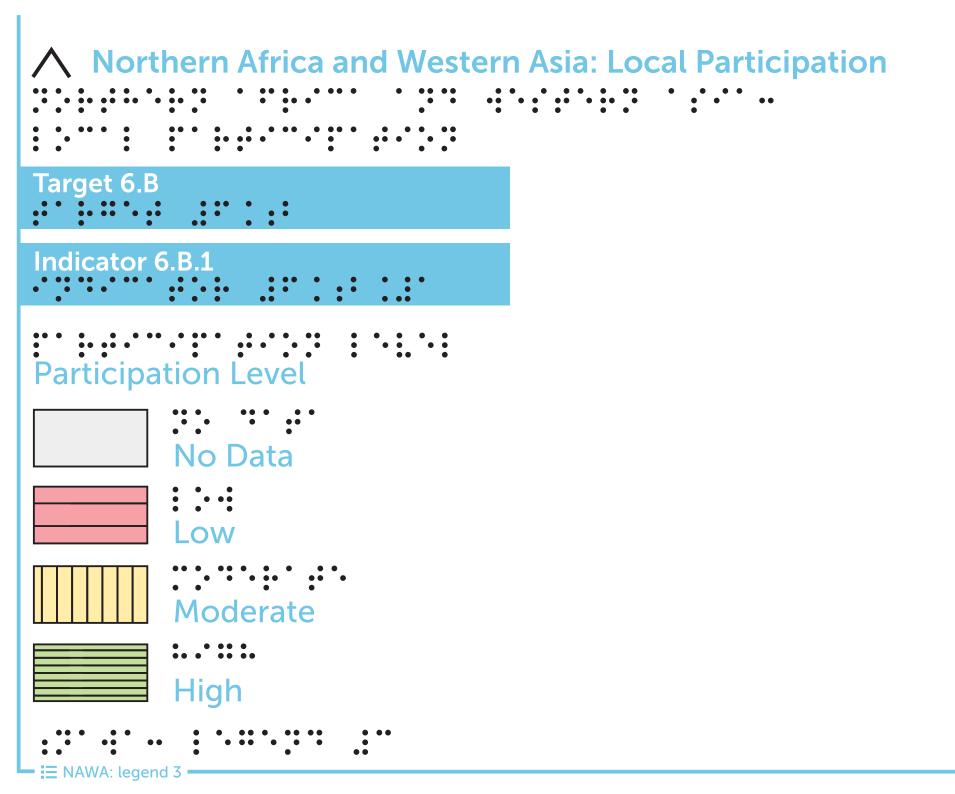


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More information in the audio track

Data availability varies across the region, but where data is accessible, significant differences are observed. areas along the western part of North Africa, including Morocco and Tunisia, as well as certain areas in the northern and southern Arabian Peninsula covering countries such as Georgia, Azerbaijan, Syria, and Oman, exhibit high levels of public participation in WASH-related management. Moderate levels of local participation are evident across much of the central part of the region, encompassing countries like Lebanon, Jordan, Egypt, Sudan, Yemen, and Kuwait. Conversely, only a small section in the northeast, comprising Iraq, demonstrates low levels of public participation.





### **OCEANIA**

### **Indicators Covered**

# **3.4.1** WATER-USE EFFICIENCY

Target 6.4 of the Sustainable Development Goals aims to substantially increase water-use efficiency across all sectors by 2030, address water scarcity and reduce the number of people suffering from it. Indicator 6.4.1 tracks progress toward this target by measuring the change in water-use efficiency over time. Water use efficiency is calculated as the ratio of the economic value added by a sector to the volume of water used. This indicator focuses on the agriculture, industry, and the service sectors. Monitoring changes in water use efficiency helps countries assess the impact of water resources on economic growth and identify sectors with high water use and low efficiency. Increasing water-use efficiency leads to more sustainable food and industrial production systems and often results in energy savings. Strategies to enhance efficiency include repairing water distribution systems, using less water-intensive crops, and adopting new technologies.

More information in the audio track

OC: track 2

The following map focuses on the three largest countries in the Oceania region, which is composed of a total of fourteen countries. Australia, positioned centrally on the map, receives relatively low average annual rainfall, with most areas experiencing minimal precipitation. Only the southeastern part of the country receives low levels of rainfall. Tasmania, located south of Australia and forming a detached state, also encounters low levels of annual rainfall. To the southwest of Australia lies New Zealand, depicted in two parts, both of which experience low levels of annual rainfall. Papua New Guinea, situated north of Australia, receives the highest level of annual rainfall among the depicted countries, characterized by a moderate level of precipitation.

OCEANIA: PRECIPITATION

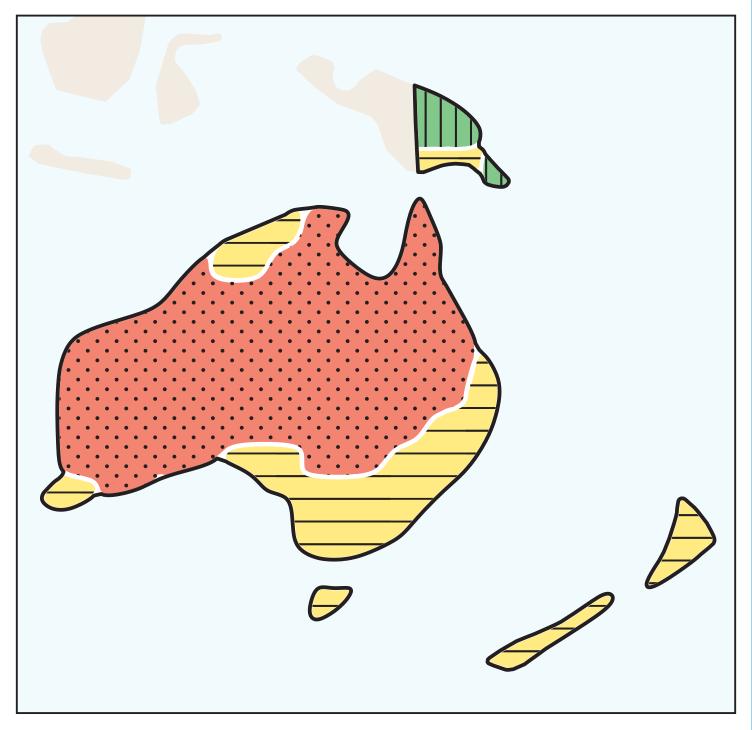




#### 2 cm = 600 km

### 1:30,000,000 Scale represents 600 km





The following map illustrates the water-use efficiency levels in the Oceania region. Water-use efficiency is calculated by comparing the economic value added by a sector to the volume of water utilized. Higher levels indicate a greater value added per volume of water, whereas lower levels signify less value added per volume of water.

CEANIA: WATER-USE EFFICIENCY

Although Oceania comprises fourteen countries, this map focuses solely on the three largest ones. Australia, the largest island, demonstrates a moderate level of water-use efficiency. Tasmania, an island state of Australia located below it, also exhibits a moderate level of water-use efficiency. Adjacent to Australia on the left is New Zealand, depicted in two parts, which experiences a low level of water-use efficiency. Papua New Guinea, situated above Australia, lacks available data regarding water-use efficiency for the year 2020. Notably, none of the regions within this depiction demonstrate a high level of water-use efficiency.

More information in the audio track

OC: track 3

# **Oceania: Water-use Efficiency**

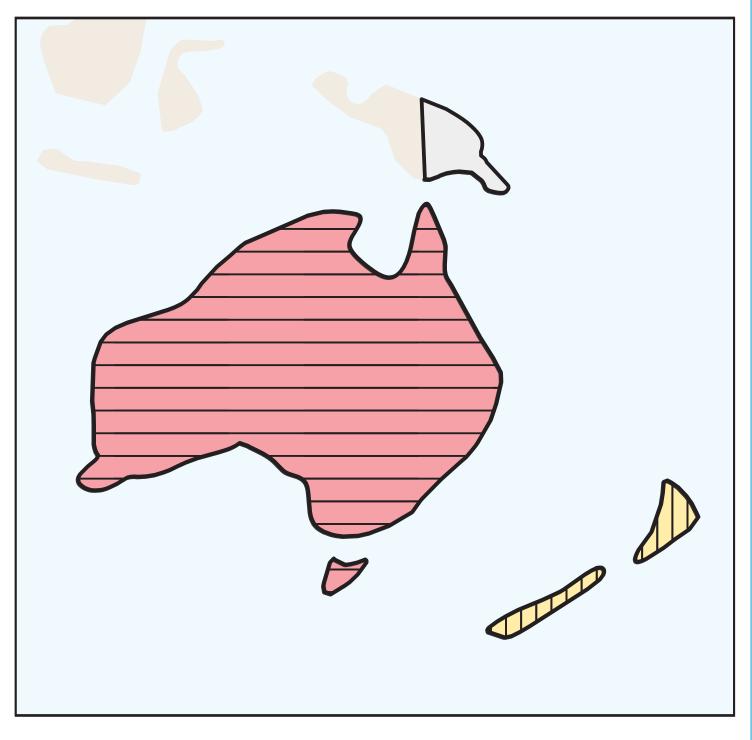
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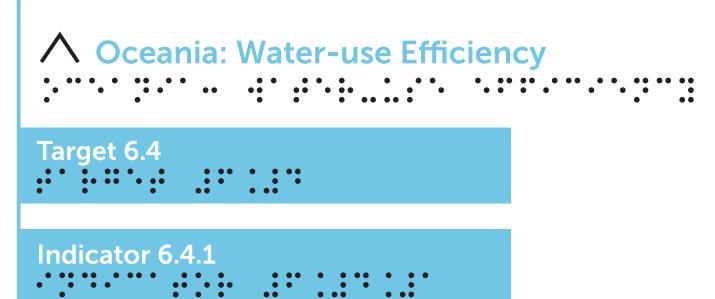


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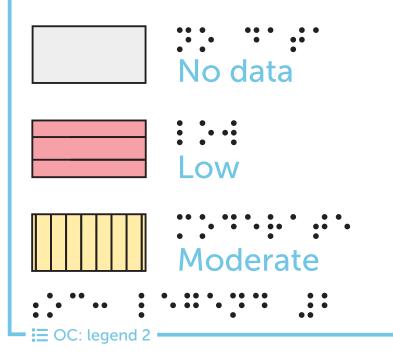
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Water-use Efficiency Level



## **SUB-SAHARAN AFRICA**

### **Indicators Covered**

A: track

# **3.2.1a** SAFE SANITATION SERVICES

Target 6.2 of the Sustainable Development Goals aims to achieve access to adequate and equitable sanitation and hygiene for all by 2030, including ending open defecation and addressing the needs of women, girls, and vulnerable populations. Indicator 6.2.1a tracks progress toward this goal by measuring the proportion of the population using safely managed sanitation services. This includes access to improved sanitation facilities that are not shared with other households and where excreta are safely disposed of in situ or treated off-site. Improved facilities encompass flush toilets connected to piped sewer systems, septic tanks, pit latrines, or composting toilets.

# **3.2.1b** ACCESS TO HAND-WASHING FACILITIES

Target 6.2 of the Sustainable Development Goals aims to ensure access to adequate and equitable sanitation and hygiene for all by 2030, including ending open defecation and addressing the needs of women, girls, and vulnerable populations. Indicator 6.2.1b tracks progress toward this goal by measuring the proportion of the population with access to basic handwashing facilities at home. A basic handwashing facility is defined as a facility that enables handwashing and includes soap and water on the premises. Monitoring sanitation and hygiene helps manage diseases and ensures women's equal participation in society.

SUB-Saharan Africa region in 2020. Generally, the region experiences limited rainfall. Sub-Saharan Africa region in 2020. Generally, the region experiences limited rainfall. Significant portions in the northern and southern regions receive minimal annual precipitation. Additionally, the central area, the southernmost tip, and the island of Madagascar off the southeast coast of the mainland receive relatively low average annual rainfall.

> There is a small area in the central part of the region and another small area to the northwest where moderate levels of annual average rainfall are observed. Notably, a small area near Sierra Leone and Liberia in the northwest receives the highest amount of rainfall, characterized by a high average annual rainfall level.

More information in the audio track

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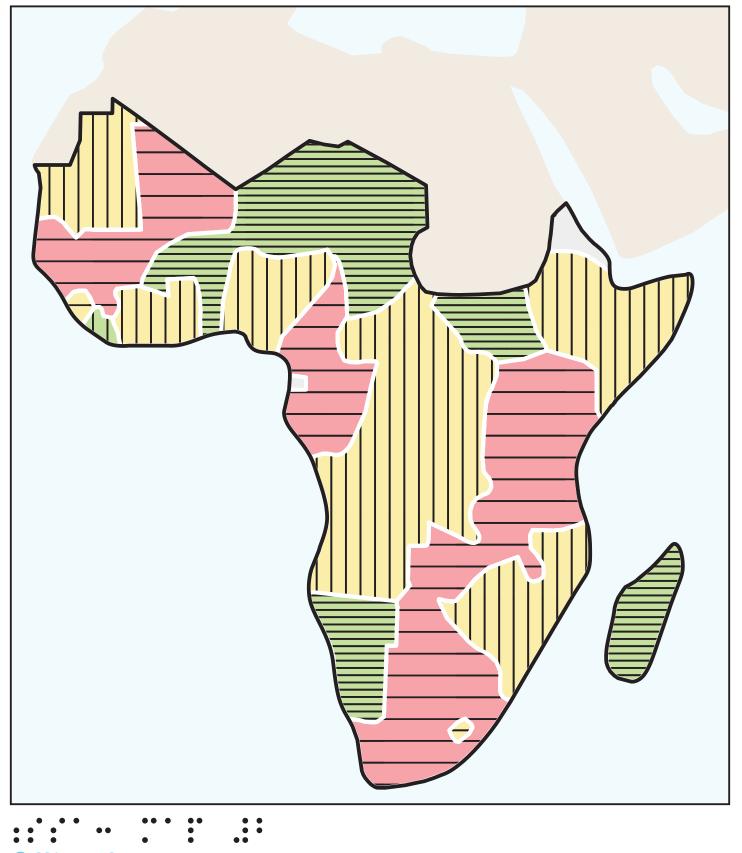
The following map illustrates the prevalence of open defecation across the sub-Saharan Africa region. High levels signify that over 75% of the population practices open defecation, moderate levels indicate a practice rate between 50 to 75%, and low levels suggest less than 50% of the population engages in this practice.

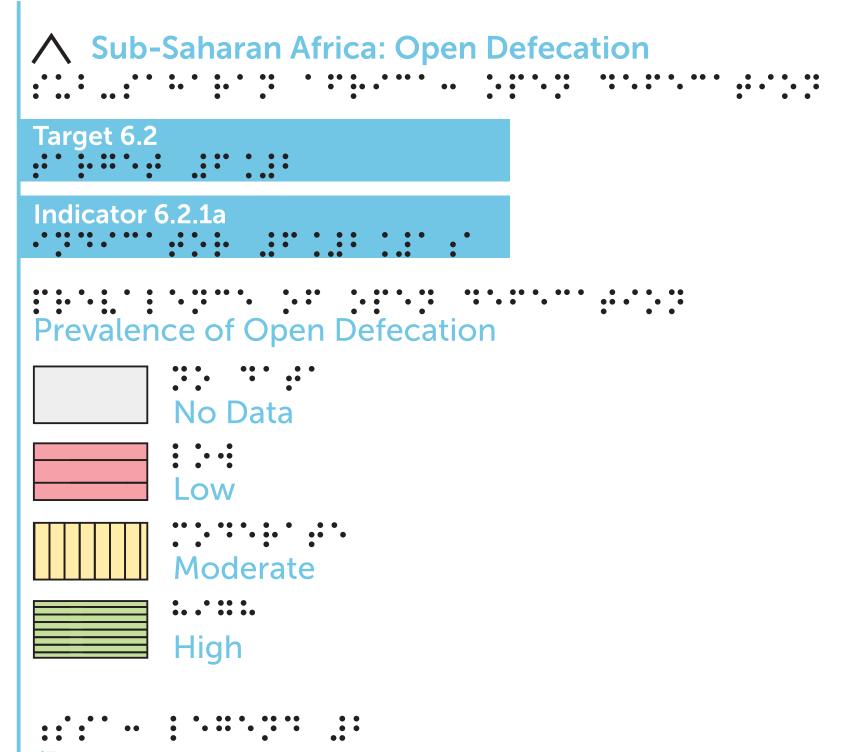
Across Sub-Saharan Africa, the prevalence of open defecation varies significantly. Large sections of the northwest, central, and southeast regions exhibit low levels of open defecation. Conversely, both northern and southern areas in the region, including Madagascar to the southeast of the mainland, experience high levels of open defecation. Moderate levels of open defecation characterize the remaining parts of the region.

More information in the audio track

SSA: track 3

Sub-Saharan Africa: Open Defecation	.::.:: 2020
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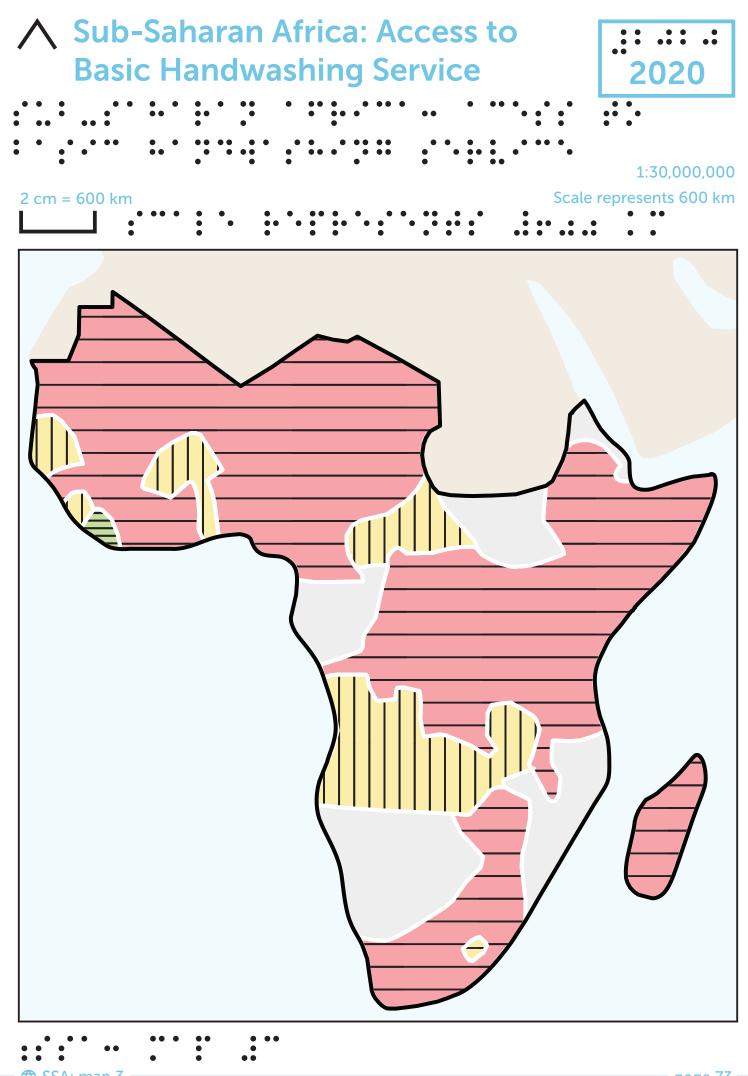
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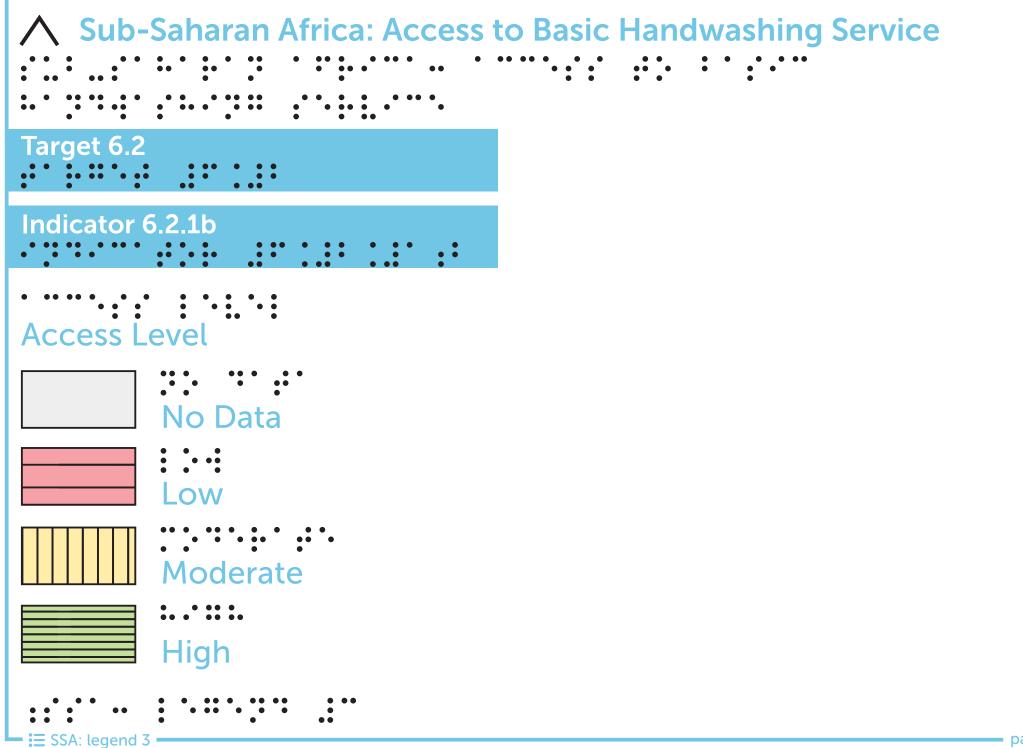
SUB-SAHARAMAR BUSIC HAMDING SERVICE

Basic handwashing services are largely limited across much of Sub-Saharan Africa, as both the mainland and the island of Madagascar situated off its southeastern coast have low levels of access to these services. However, moderate access to basic handwashing services can be found in select areas within the northwest and central regions. Among the countries falling into this category, from west to east, are Senegal, the Gambia, Burkina Faso, Togo, the Central African Republic, Angola, and Zambia. Notably, high access to basic handwashing services is primarily confined to a small area in the northwest region, specifically Liberia. There are a few areas where no data is available in the eastern part of this region.

More information in the audio track

SSA: track 4





## SOURCES



### Literature

Clean water & sanitation | SDG 6: Clean water & sanitation. (2023). Atlas of Sustainable Development Goals 2023. https://datatopics.worldbank.org/sdgatlas/goal-6-clean-water-and-sanitation/?lang=en

Ritchie, H., Spooner, F., & Roser, M. (2024, January 12). Clean water. Our World in Data. https://ourworldindata.org/clean-water Ritchie, H., Spooner, F., & Roser, M. (2024b, January 17). Sanitation. Our World in Data. https://ourworldindata.org/sanitation Ritchie, H., & Roser, M. (2024, February 27). Water use and stress. Our World in Data. https://ourworldindata.org/water-use-stress Roser, M. (2023, December 28). Ensure access to water and sanitation for all. Our World in Data.

https://ourworldindata.org/sdgs/clean-water-sanitationiterature

## Data

### Borders

Based on data from the United Nations Geospatial Contributor: UNGIS, UNGSC, Field Missions (2018) (https://geoportal.un.org/arcgis/home/item.html?id=de686b8d8436431190e5af3f79392cc1). [The data have been modified]

### Precipitation

Adler, R., Wang, J.J., Sapiano, M., Huffman, G., Chiu, L., Xie, P.P., Ferraro, R., Schneider, U., Becker, A., Bolvin, D., Nelkin, E., Gu, G., and NOAA CDR Program (2016). Global Precipitation Climatology Project (GPCP) Climate Data Record (CDR), Version 2.3 (Monthly). National Centers for Environmental Information. DOI: 10.7289/V56971M6 (Accessed on 23-02-2024)

### **Thematic Content**

Based on data provided by Food and Agriculture Organization (FAO), Organisation for Economic Co-operation and Development (OECD), The United Nations Economic Commission for Europe (UNECE), United Nation Environment Programme (UNEP), United Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations Human Settlements Programme (UN-Habitat), United Nations International Children's Emergency Fund (UNICEF), United Nations Statistics Division (UNSD), and World Health Organization (WHO). Downloaded from the UN-Water SDG 6 Data Portal (https://sdg6data.org/) on February 13, 2024. [The data have been modified].