



# FAO AQUASTAT and the SDG indicators 6.4.1. and 6.4.2.

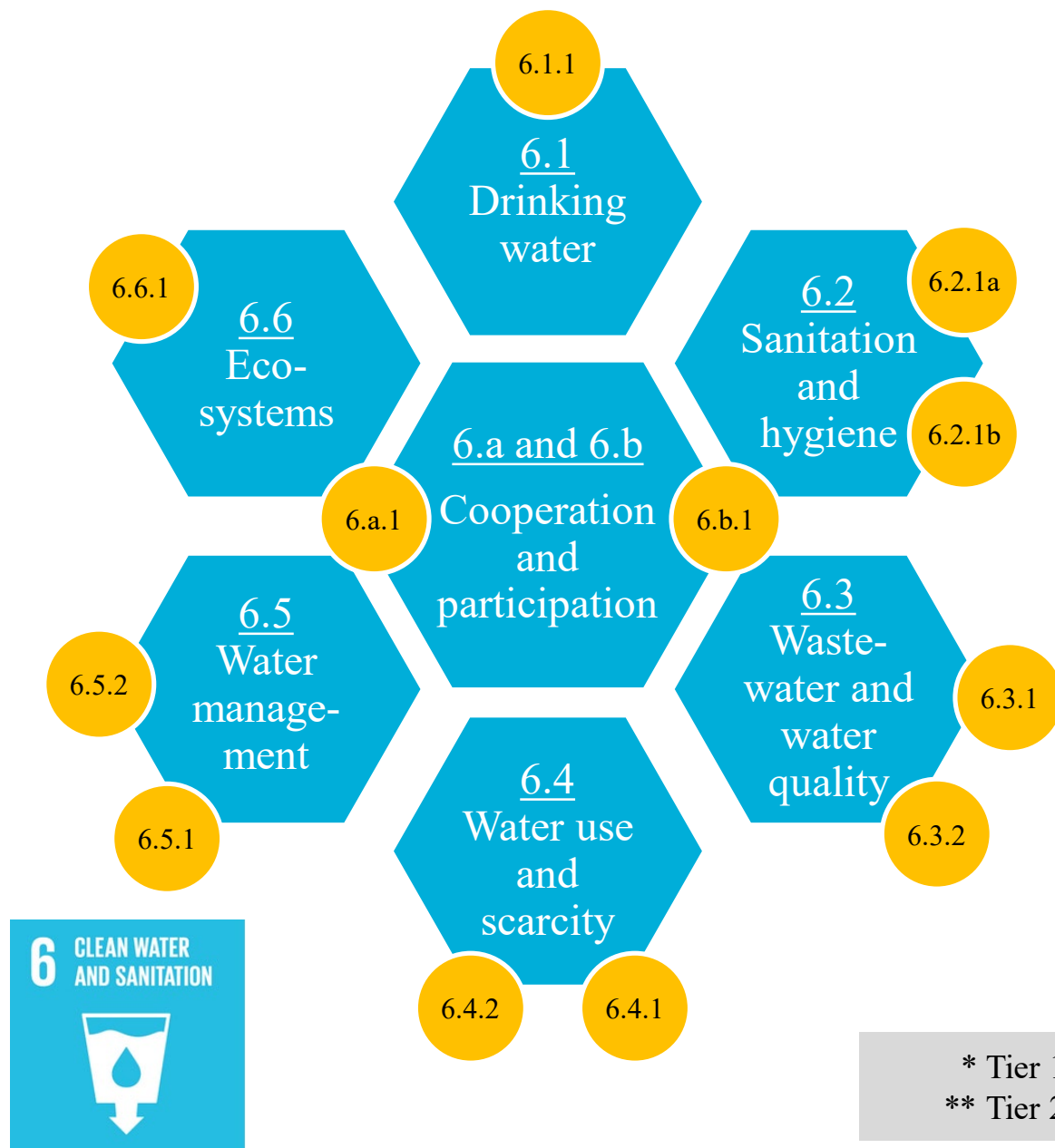
Seventh Meeting of the Expert Group on Environment Statistics  
(Virtual)  
New York, 10-19 November 2020

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- Introduction of SDG 6.4.1 and 6.4.2
- AQUASTAT data collection process
- Progress and results

# SDG 6 global indicators



6.1.1	Safely managed drinking water services (WHO, UNICEF)**
6.2.1	Safely managed sanitation services and hygiene (WHO, UNICEF)**
6.3.1	Wastewater safely treated (WHO, UN-Habitat, UNSD)**
6.3.2	Good ambient water quality (UNEP)**
6.4.1	<b>Change in water use efficiency (FAO)*</b>
6.4.2	<b>Level of water stress (FAO)*</b>
6.5.1	Integrated water resources management (UNEP)*
6.5.2	Transboundary basin area with water cooperation (UNECE, UNESCO)*
6.6.1	Water-related ecosystems (UNEP, Ramsar)*
6.a.1	Water- and sanitation-related official development assistance (WHO, OECD)*
6.b.1	Participation of local communities in water and sanitation management (WHO, OECD)*

\* Tier 1

\*\* Tier 2



# Water use efficiency - SDG 6.4.1.

- The **change** in the ratio of the value added to the volume of water use, over time.
- Water Use Efficiency (WUE) is defined as the Gross Value Added of a sector divided by the volume of water used by that sector.

$$WUE_{sec} = \frac{GVA_{sec}}{V_{sec}}$$



- Following ISIC 4 coding, sectors are defined as:
  - agriculture; forestry; fishing (ISIC A), hereinafter “**agriculture**”;
  - mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; constructions (ISIC B, C, D and F), hereinafter “**MIMEC**”;
  - all the service sectors (ISIC E and ISIC G-T), hereinafter “**Services**”.

# SDG 6.4.1 Rationale and interpretation



- Increasing values in time series indicate decoupling of the economic growth from water use. It does not necessarily indicate decline in total water use or a reduction of the impact of water use.
- The change in water use efficiency is influenced by both ‘real’ improvements and deteriorations, as well as by changes in economic and social structure.



## SDG 6.4.2. Level of water stress.

### Definition and method of computation

The ratio between total freshwater withdrawn by all major sectors and total renewable freshwater resources, after having taken into account environmental water requirements.



$$\text{Water Stress (\%)} = \frac{TFWW}{TRWR - EFR} * 100$$

# SDG 6.4.2. Rationale and interpretation



- The purpose of this indicator is to show the degree to which water resources are being exploited to meet the country's water demand.
- It measures a country's pressure on its water resources and therefore the challenge on the sustainability of its water use
- Increased water stress, shown by an increase in the value of the indicator, has potentially negative effects on the sustainability of the natural resources and on economic development.
- Low values of the indicator indicate that water does not represent a particular challenge for economic development and sustainability.



# DATA COLLECTION FOR SDG 6.4.1 and 6.4.2

- **AQUASTAT** - FAO Global information system on water and agriculture
  - Since 1994
  - Target 6.4 relies on data, guidelines and methodologies developed and provided by AQUASTAT
- **Integrated Monitoring Initiative (IMI) for SDG6 of UN- Water** An inter-agency initiative under UN-Water to integrate and support existing monitoring efforts on SDG6.
- **Regional workshops AQUASTAT + IMI project**
  - Southern Africa (April 2019)
  - Central Asia (October 2019)
  - Eastern Africa (October 2019)
  - Latin America & Southern Asia (online June and July 2020)
  - Africa (online 2020)



# AQUASTAT - global water statistics



AQUASTAT

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English

**SELECT VARIABLES (4)**

- All Variables
  - Geography and population
    - Land use
    - Population
    - Economy, development and food security
  - Water resources
    - Precipitation
    - Internal renewable water resources
    - External renewable water resources
    - Total renewable water resources
    - Exploitable water resources and dam capacity
  - Water use
    - Water withdrawal by sector
      - Agricultural water withdrawal ⓘ
      - Industrial water withdrawal ⓘ
      - Municipal water withdrawal ⓘ
      - Total water withdrawal ⓘ
      - Irrigation water withdrawal ⓘ

**SELECT COUNTRIES (1)**

- All Countries
  - Afghanistan
  - Albania
  - Algeria
  - Andorra
  - Angola
  - Antigua and Barbuda
  - Argentina
  - Armenia
  - Australia
  - Austria
  - Azerbaijan
  - Bahamas
  - Bahrain
  - Bangladesh
  - Barbados
  - Belarus
  - Belgium

**SELECT PERIOD**

1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	2015
1958-1962	1963-1967	1968-1972	1973-1977	1978-1982	1983-1987	1988-1992	1993-1997	1998-2002	2003-2007	2008-2012	2013-2017

Latest values only  Value Years

**METADATA OPTIONS**

Category

- None --
- All --
- Reference Area
- Reference period

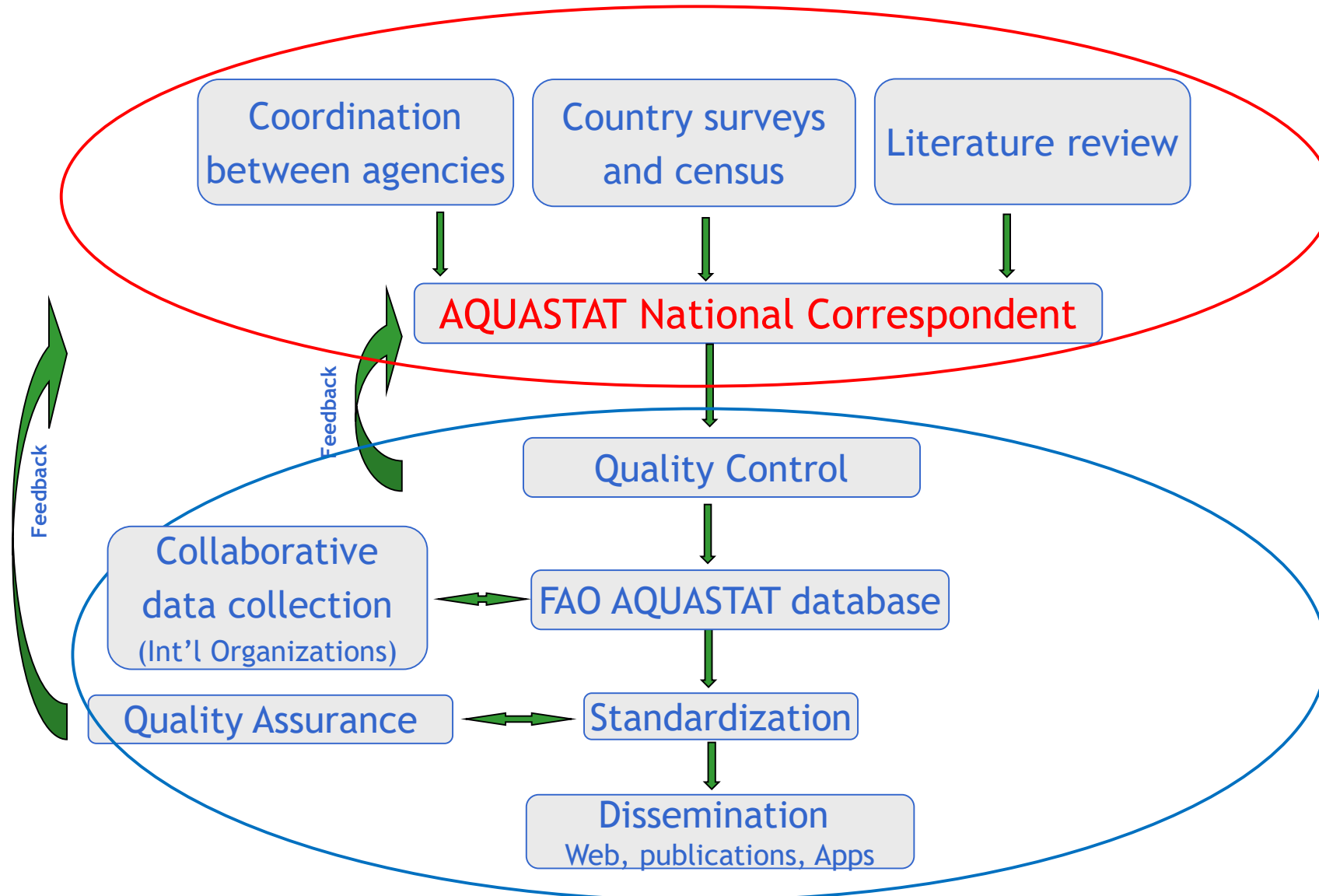
**OPTIONS**

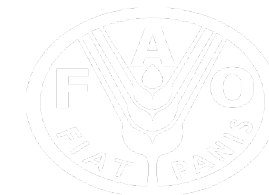
Axes X: Year Y: Variable Show  Data Symbols  Suppress empty rows/columns Show Codes »

Submit

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# AQUASTAT data collection process





# 2020 questionnaire

## Water and Agriculture Questionnaire 2020 AQUASTAT Data collection on water use for agriculture and rural development

Country:

Reference: calendar years from 2016 to 2018

### Purpose of the questionnaire

Data collected through this questionnaire aim to provide a comprehensive picture of water resources and uses at the national level, and to describe its major characteristics, trends, constraints and perspectives, with particular attention to the agricultural sector. In particular, data collected are expected to:

- Allow the update the AQUASTAT database, which is the global public reference information system on water maintained by the FAO. Since 1994, AQUASTAT provides quality information on water resources and water use in each country and makes it available to the users in a standard format. It focuses on developing countries in Africa, Asia, Latin America and the Caribbean. AQUASTAT data and reports are available on at <http://www.fao.org/aquastat>.

- Monitor the water-related Sustainable Development Goals' (SDG) indicators 6.4.1 (water efficiency) and 6.4.2 (water stress), of which FAO is the custodian agency.

- Support the analyses on water in agriculture and serve as a major tool for large-scale planning and predictive studies.

- Provide policy makers with comprehensive information on the state of country water management in

*Please complete or update the contact details of the national focal point responsible for this questionnaire in your country.*

### AQUASTAT National Correspondent

Name	
Title	
Organization	
Address	
City	
Email	
Tel	
Fax	
Web site address	

- 3 languages
- Annual questionnaire
- 5 yr longer data collection - 2020

0 Water Resources						
0.1.		Unit	2015	2016	2017	Metadata
6.4.2	Total Renewable Water Resources (Long-term average)	10 <sup>9</sup> m <sup>3</sup> /yr				<a href="#">Click to add metadata on 011</a>
I Water withdrawals						
1.1.	Water withdrawals by sector	Unit	2015	2016	2017	Metadata
6.4.2	Total water withdrawal (1111 + 1112 + 1113)					<a href="#">Click to add metadata on 111</a>
6.4.1	Agricultural water withdrawal: total (1111 + 1112 + 1113)					<a href="#">Click to add metadata on 1111</a>
1111	Water withdrawal for irrigation					<a href="#">Click to add metadata on 11111</a>
11112	Water withdrawal for livestock (watering and cleaning)					<a href="#">Click to add metadata on 11112</a>
11113	Water withdrawal for aquaculture	10 <sup>9</sup> m <sup>3</sup> /year				<a href="#">Click to add metadata on 11113</a>
6.4.1	Municipal water withdrawal					<a href="#">Click to add metadata on 1112</a>
6.4.1	Industrial water withdrawal (incl. water for cooling of thermoelectric plants)					<a href="#">Click to add metadata on 1113</a>
11131	Water withdrawal for cooling of thermoelectric plants					<a href="#">Click to add metadata on 11131</a>
6.4.2	Environmental flow requirements (stable over time)					<a href="#">Click to add metadata on 112</a>
1.2.	Water withdrawals by source	Unit	2015	2016	2017	Metadata
121	Total surface water and groundwater withdrawal (freshwater) (1211 + 1212)					<a href="#">Click to add metadata on 121</a>
1211	Surface water withdrawal					<a href="#">Click to add metadata on 1211</a>
1212	Groundwater withdrawal	10 <sup>9</sup> m <sup>3</sup> /year				<a href="#">Click to add metadata on 1212</a>
6.4.2	Desalinated water produced					<a href="#">Click to add metadata on 122</a>
6.4.2	Direct use of treated municipal wastewater					<a href="#">Click to add metadata on 123</a>
6.4.2	Direct use of agricultural drainage water					<a href="#">Click to add metadata on 124</a>
II Municipal wastewater						
		Unit	2015	2016	2017	Metadata
21	Produced municipal wastewater					<a href="#">Click to add metadata on 21</a>
22	Collected municipal wastewater	10 <sup>9</sup> m <sup>3</sup> /year				<a href="#">Click to add metadata on 22</a>
23	Treated municipal wastewater					<a href="#">Click to add metadata on 23</a>
III Irrigation and drainage						
III.1.	Area under agricultural water management	Unit	2015	2016	2017	Metadata
311	Total agricultural water managed area (3111 + 3112 + 3113)					<a href="#">Click to add metadata on 311</a>
3111	Area equipped for irrigation: total (31112 + 31113 + 31114)					<a href="#">Click to add metadata on 3111</a>
6.4.1	Area equipped for irrigation: part actually irrigated					<a href="#">Click to add metadata on 31111</a>
31112	Area equipped for full control irrigation: total (311122 + 311123 + 311124)					<a href="#">Click to add metadata on 31112</a>
311121	Area equipped for full control irrigation: part actually irrigated					<a href="#">Click to add metadata on 311121</a>
311122	Area equipped for full control irrigation: surface irrigation					<a href="#">Click to add metadata on 311122</a>
311123	Area equipped for full control irrigation: sprinkler irrigation	1000 ha				<a href="#">Click to add metadata on 311123</a>
311124	Area equipped for full control irrigation: localized irrigation					<a href="#">Click to add metadata on 311124</a>
31113	Area equipped for irrigation: equipped lowland area					<a href="#">Click to add metadata on 31113</a>
31114	Area equipped for irrigation: spate irrigation					<a href="#">Click to add metadata on 31114</a>
3112	Cultivated wetlands and inland valley bottoms non-equipped					<a href="#">Click to add metadata on 3112</a>
3113	Flood recession cropping area non-equipped					<a href="#">Click to add metadata on 3113</a>
III.2.	Irrigated production					
6.4.1	Total harvested irrigated crop area (full control irrigation only)	1000 ha				<a href="#">Click to add metadata on 312</a>
III.3.	Drainage					
331	Area equipped for irrigation drained	1000 ha				<a href="#">Click to add metadata on 331</a>
IV Environment						
		Unit	2015	2016	2017	Metadata
41	Area salinized by irrigation	1000 ha				<a href="#">Click to add metadata on 41</a>

# National data



- 34 variables
- SDG indicators 6.4.1 (green) & 6.4.2 (yellow)
- Gross Value Added (GVA) from UNSD
- Cultivated area & GDP Deflators from FAOSTAT



# SDG 6.4.1 Calculation tool

- New in 2019: SDG computation sheets
- Automatically filled in from data compiled in “National data” worksheet

IRRIGATED AGRICULTURE WATER USE EFFICIENCY (Awe)		UNIT	CALCULATION RULES
Ratio between rainfed and irrigated yields	[1] <input type="text" value="0.461"/>	decimals	AQUASTAT data (below) used if no data is entered
<i>Proportion of irrigated land on the total arable land (Ai)</i>	[2] <input type="text" value="0.125"/>	decimals	= [3]/[4]
Irrigated land	[3] <input type="text" value="5800"/>	1000 ha	
Cultivated land	[4] <input type="text" value="46378"/>	1000 ha	
<i>Proportion of agricultural GVA produced by rainfed agriculture (Cr)</i>	[5] <input type="text" value="0.763"/>	decimals	= (1/(1+([2]*(1-[2])*[1])))
Gross value added by agriculture (excluding river and marine fisheries and forestry)	[7] <input type="text" value="30304481325"/>	USD (2015 price)	
Volume of water used by the agricultural sector (including irrigation, livestock and aquaculture)	[6] <input type="text" value="3.500"/>	km <sup>3</sup>	
<b>Irrigated Agriculture Water Use Efficiency</b>	[8] <input type="text" value="2.049"/>	USD/m <sup>3</sup>	= ([7]*(1-[5]))/([6]*1000000000)
MIMEC WATER USE EFFICIENCY (Mwe)			
Gross value added by MIMEC sector (including energy)	[9] <input type="text" value="278000000000"/>	USD (2015 price)	
Volume of water used by the MIMEC sector (including energy)	[10] <input type="text" value="0.500"/>	km <sup>3</sup>	
<b>MIMEC sector Water Use Efficiency</b>	[11] <input type="text" value="556.000"/>	USD/m <sup>3</sup>	= [9]/([10]*1000000000)
SERVICES WATER USE EFFICIENCY (Swe)			
Gross value added by services	[12] <input type="text" value="851000000000"/>	USD (2015 price)	
Volume of water used by the services	[13] <input type="text" value="1.000"/>	km <sup>3</sup>	
<b>Services Water Use Efficiency</b>	[14] <input type="text" value="851.000"/>	USD/m <sup>3</sup>	= [12]/([13]*1000000000)
WATER USE EFFICIENCY (WUE)			
<i>Proportion of water used by the agricultural sector over the total water use</i>	[15] <input type="text" value="0.70"/>	decimals	= [6]/([6]+[10]+[13])
<i>Proportion of water used by the MIMEC sector over the total water use</i>	[16] <input type="text" value="0.10"/>	decimals	= [10]/([6]+[10]+[13])
<i>Proportion of water used by the service sector over the total water use</i>	[17] <input type="text" value="0.20"/>	decimals	= [13]/([6]+[10]+[13])
<b>Water Use Efficiency</b>	[18] <input type="text" value="227.23"/>	USD/m <sup>3</sup>	= ([15]*[8]) + ([16]*[11]) + ([17]*[14])

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# SDG 6.4.2 Calculation tool

Year: 2015

WATER STRESS		UNIT	CALCULATION RULES
Total freshwater withdrawal (surface + groundwater)	[1]	4.500 in km <sup>3</sup>	= [2]-[3]-[4]-[5] if missing from "National data"
Total water withdrawal	[2]	5.000 in km <sup>3</sup>	OK
Desalinated water produced	[3]	#N/A in km <sup>3</sup>	
Direct use of treated municipal wastewater	[4]	0.500 in km <sup>3</sup>	
Direct use of agricultural drainage water	[5]	#N/A in km <sup>3</sup>	
Total renewable freshwater resources	[6]	492.000 in km <sup>3</sup>	AQUASTAT data (below) used if no data is entered
Environmental flow requirements (volume)	[7]	243.300 in km <sup>3</sup>	FAO-IMWI data (below) used if no data is entered
<b>Water Stress</b>	[8]	<b>1.809 %</b>	= [1]/([6]-([7]/100))

**Notes:** The definitions of the variables listed in the form are available in AQUASTAT:

<http://www.fao.org/aquastat/en/databases/glossary/>

**Additional data used in the computation of the SDG 6.4.2:**

Source	Variable	Unit	2015	2016	2017
AQUASTAT	Total renewable freshwater resource	km <sup>3</sup> /yr			492
FAO & WMI	Environmental flow requirements (volu	km <sup>3</sup> /yr			243.3



## AQUASTAT - FAO's Global Information System on Water and Agriculture

[Home](#) | [Overview](#) | [Databases](#) | [Geospatial Information](#) | [Profiles](#) | [Data Analysis](#) | [Activities](#) | [Publications](#)

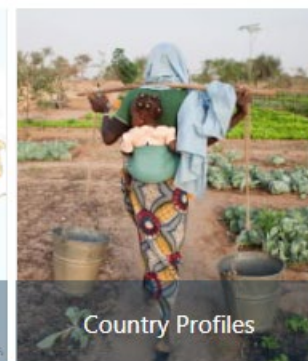
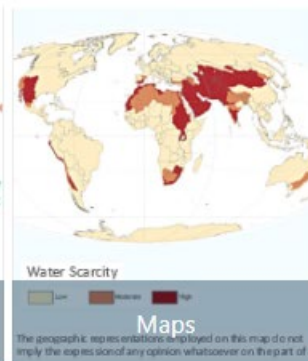


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### Did you know?

- **79 countries compiled the 2018 AQUASTAT questionnaire on water and agriculture.** The data collected through this questionnaire and validated are now available in the AQUASTAT core database. The 2019 questionnaire has also been sent out to over 180 countries.
- **WaPOR version 2 database and the WaPOR 1.0 quality assessment report were launched at the 2nd International seminar on Drought and Agriculture 2019.** The technical report describes the quality assessment of the FAO's data portal to monitor water productivity through open access of remotely sensed derived data. [\[Read the report\]](#).

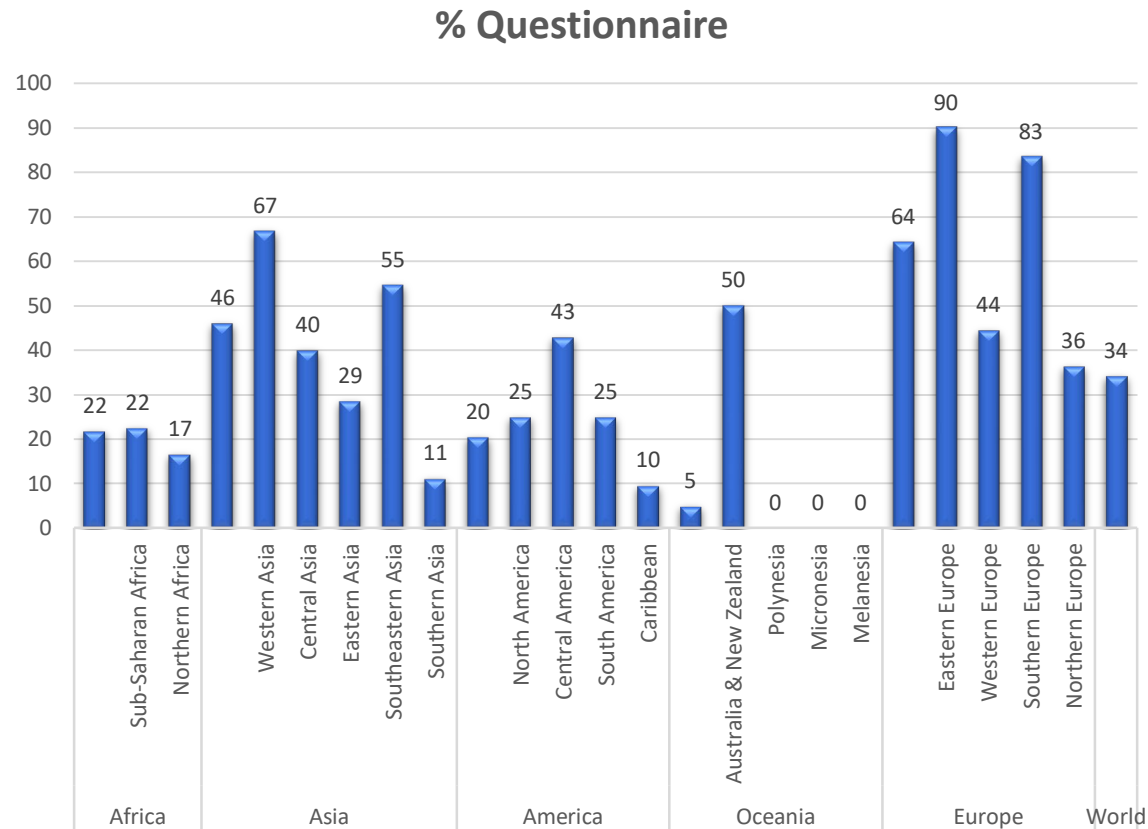
### Highlights



# 2018 Data collection



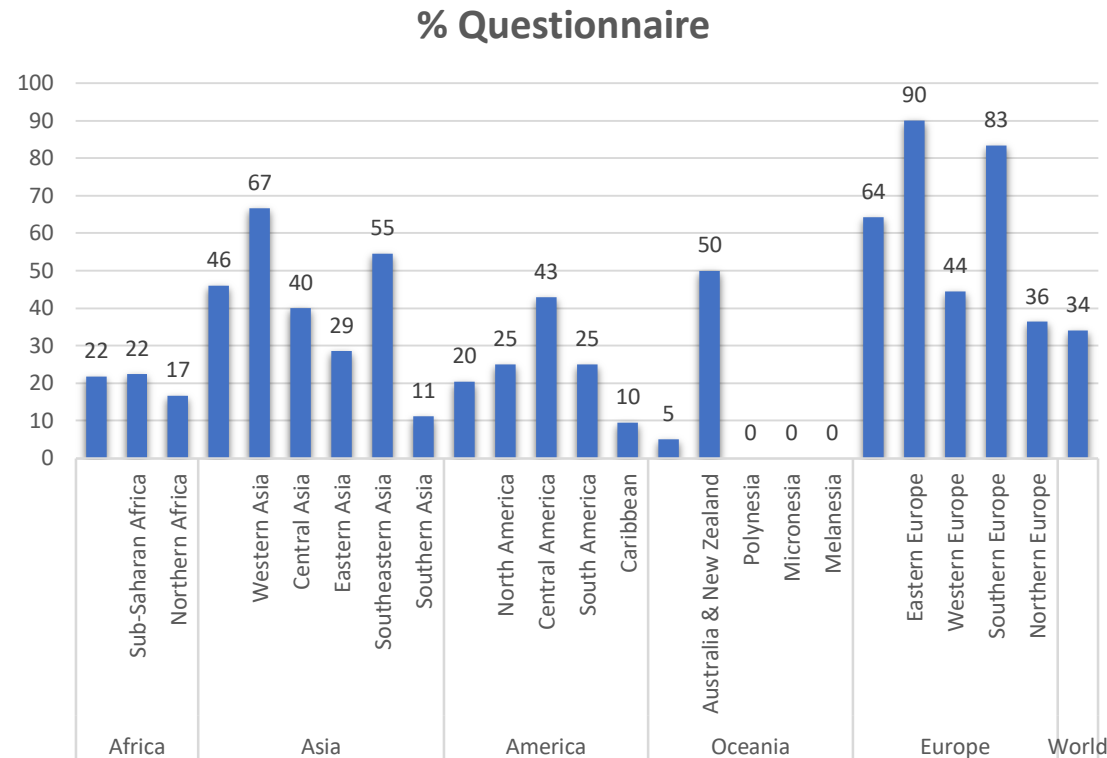
- Questionnaire sent to 187 countries
- 72 questionnaires received (38.5 %)





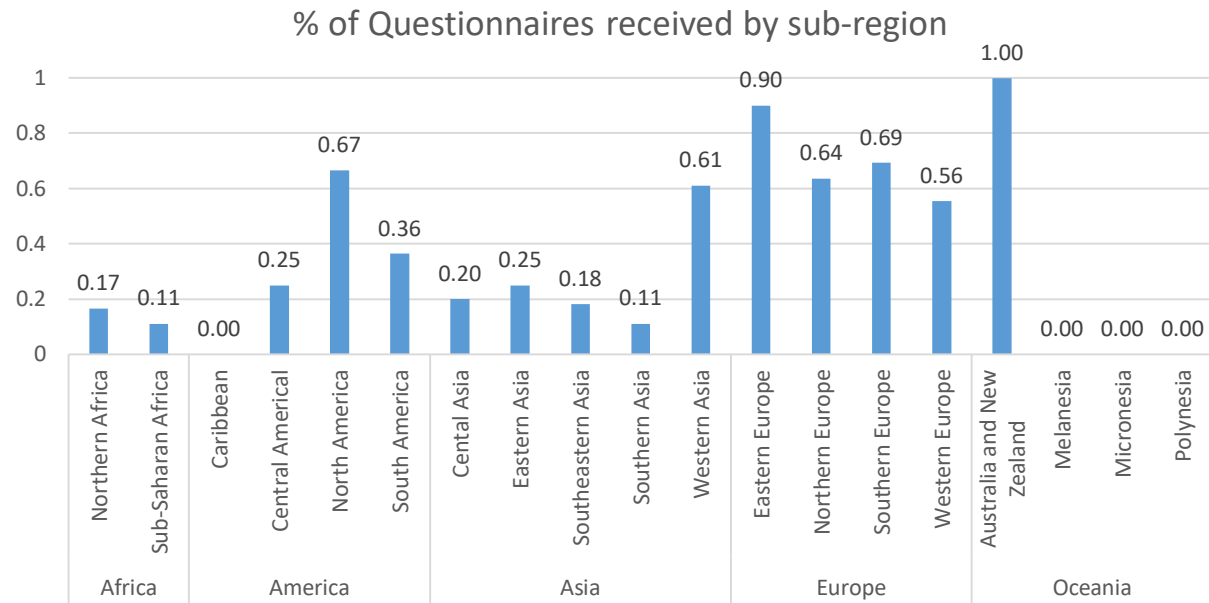
# 2019 AQUASTAT data collection

- Annual questionnaire sent to 194 countries
- 88 questionnaires received in 2019 - 45% (+ 5 additional countries indicated that they don't have new data)

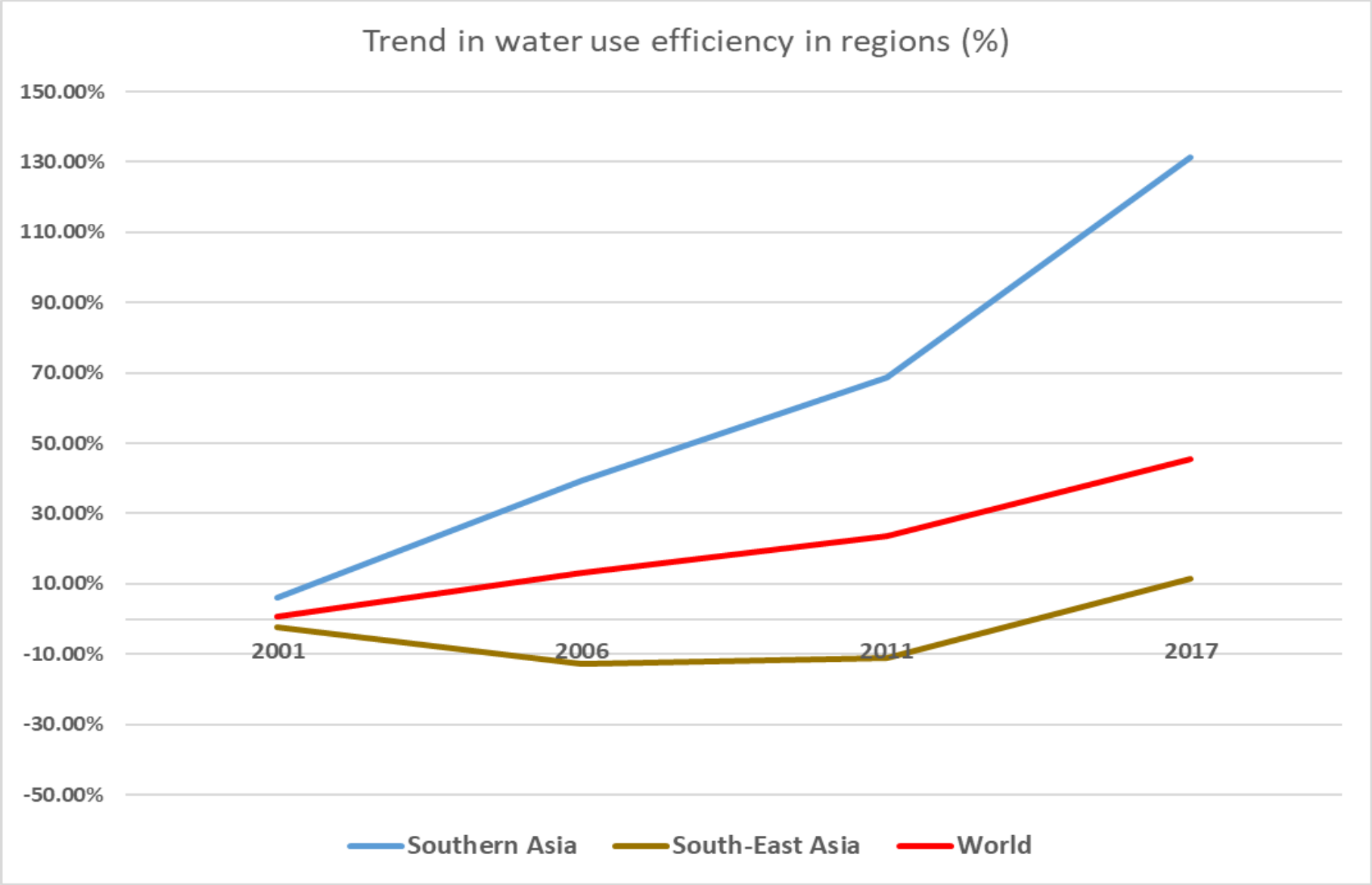


# 2020 AQUASTAT data collection

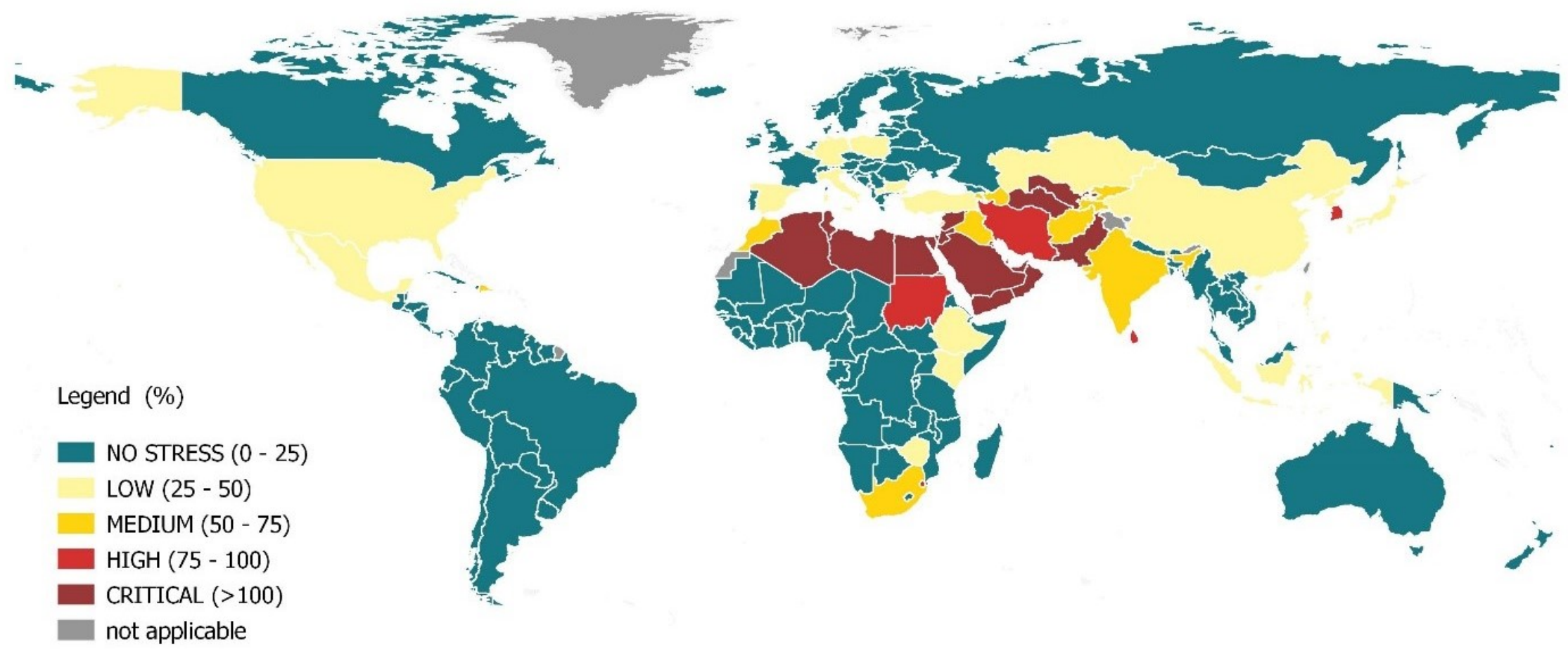
- Annual questionnaire sent to 194 countries
- 62 questionnaires received (Nov 2020) - 32%



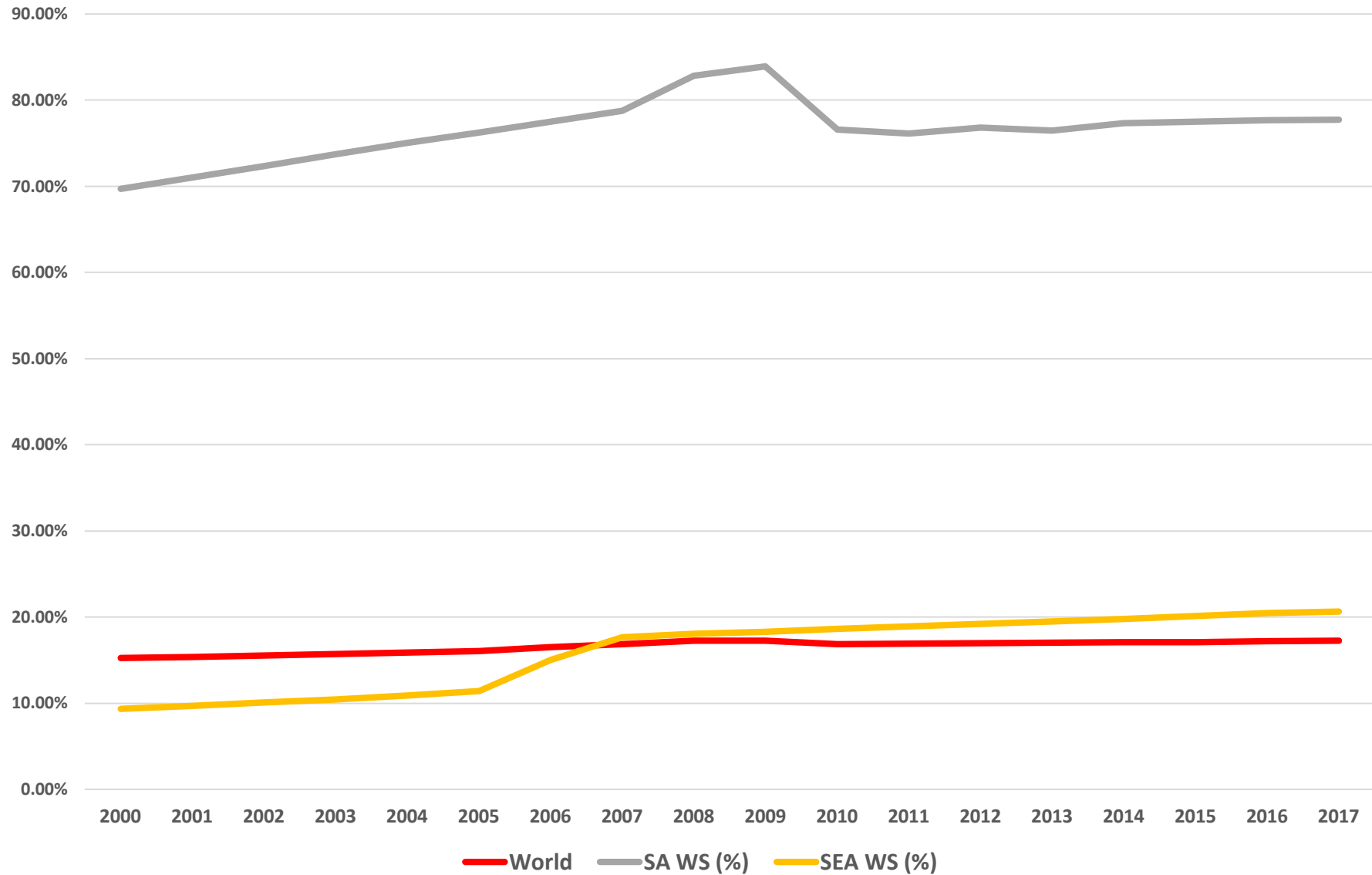
# Water-use efficiency



Level of water stress - SDG 6.4.2 by country (AQUASTAT, year 2017)



# Water stress



# AQUASTAT - FAO's Global Information System on Water and Agriculture

	Overview	Databases	Geospatial Information	Profiles	Data Analysis	Activities	Publications
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## Highlights

Country Statistics

Water Scarcity

Maps

The geographic representations employed on this map do not imply the expression of any opinion whatsoever on the part of FAO.

Country Profiles

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Thank you!

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<http://www.fao.org/aquastat/>