

# Indicator 6.4.2

### Contents

- [Indicator Name, Target and Goal](#)
- [Definition and Rationale](#)
- [Data Sources and Collection Method](#)
- [Method of Computation and Other Methodological Considerations](#)
- [Data Disaggregation](#)
- [References](#)
- [International Organization\(s\) for Global Monitoring](#)

## Indicator Name, Target and Goal

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

**Target 6.4:** By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

**Goal 6:** Ensure availability and sustainable management of water and sanitation for all

## Definition and Rationale

### Definition:

This indicator is defined as the ratio of total freshwater withdrawn by all major sectors to total renewable freshwater resources, after taking into account environmental flows requirements. It is expressed as a percentage.

### Concepts:

*Total freshwater withdrawal (TFWW)* is the volume of freshwater extracted from its source (rivers, lakes, aquifers) for the following three main sectors: agriculture, industries and services (including municipalities and domestic water withdrawal). It is estimated at the country level and on an annual basis. The category of freshwater withdrawal includes withdrawals from surface freshwater, groundwater and fossil groundwater. It does not include direct use of non-conventional water, i.e. treated wastewater, agricultural drainage water and desalinated water.

*Major sectors* refer to agriculture, forestry and fishing (ISIC A), mining and quarrying, manufacturing, construction and energy (ISIC B, C, D and F), and all the services sectors (ISIC E, G-U) including water collection, treatment and supply industry, as defined by the International Standard Industrial Classification (ISIC) – revision 4.

*Total renewable freshwater resources (TRWR)* is the sum of internal and external renewable freshwater resources. *Internal resources* refer to the long-term average annual flow of rivers and recharge of groundwater, generated from endogenous precipitation, minus the overlap between surface water and groundwater. *External resources* refer to the part of a country's long-term average annual renewable water resources that are not generated in the country, considering the quantity of flows reserved to upstream and downstream countries through agreements or treaties.

*Environmental flows requirements (EFR)* are quantities and timing of freshwater flows required to sustain freshwater ecosystems and the human livelihood and well-being that depend on them. For the purpose of Indicator 6.4.2, the concept is limited to water volumes and excludes any considerations of water quality and resulting ecosystem services.

### Rationale and Interpretation:

This indicator measures the degree to which a country's water resources are being exploited to meet its water demand. It measures the pressure on its water resources and therefore the challenge on the sustainability of its water use. Indicator 6.4.2 tracks progress towards Target 6.4 and addresses the environmental dimension of water scarcity.

A low level of water stress indicates a situation where the combined withdrawal by all sectors is marginal in relation to the resources, and has therefore little potential impact on the sustainability of the resources or on the potential competition between users. A high level of water stress indicates a situation where the combined withdrawal by all sectors represents a substantial share of the total renewable freshwater resources, with potentially larger impacts on the sustainability of the resources and potential situations of conflicts and competition between users.

Water stress occurs when the ratio is above 25 percent, which is the threshold of initial water stress.

## Data Sources and Collection Method

Data for this indicator are usually collected by national ministries and institutions having water-related issues in their mandate, such as ministries of water resources, agriculture, or environment. The computation of this indicator requires data from different sectors and sources. It is crucial that national coordination is in place to assure timely and consistent collection of data. However, one national institution should be identified and appointed with the task of compiling the indicator. That institution carries out an in-depth review of all the national, sub-national and basin unit sources of relevant data using available information resources. The most advisable units to be used are river basins, aggregated according to the circumstances of each country. Data are mainly published within national water resources and irrigation master plans, national statistical yearbooks and other reports (such as those from projects, international surveys or results and publications from national and international research centres).

## Method of Computation and Other Methodological Considerations

### Computation Method:

Water stress indicator is calculated using the following formula:

$$\text{Water Stress} = \frac{TFWW}{TRWR - EFR} \times 100$$

where *TFWW* is the total freshwater withdrawn; *TRWR* is the total renewable freshwater resources; and *EFR* is the environmental flows requirement component. All variables are expressed in km<sup>3</sup>/year.

### Comments and limitations:

Water withdrawal as a percentage of renewable water resources is a good indicator of pressure on limited water resources, one of the most important natural resources. However, it only partially addresses the issues related to sustainable water management. Supplementary indicators that capture the multiple dimensions of water management and combine data on water demand and supply, behavioural changes with regard to water use and the availability of appropriate infrastructure, should be defined or consulted simultaneously.

Other limitations to this indicator might be represented by the difficulty to obtain accurate, complete and up-to-date data; large variations of sub-national data; lack of account of seasonal variations in water resources; lack of consideration to the distribution among water resources; lack of consideration of water quality and its suitability for use.

Some of these issues can be resolved through disaggregation of the index at the level of hydrological units and by distinguishing between different sectors demanding water. However, care needs to be taken to avoid double counting due to the complexity of water flows. Other SDG 6 indicators also provide complementary information.

The data for this indicator should be collected annually. However, a reporting period up to three years can still be considered acceptable.

**Proxy, alternative and additional indicators:** N/A

## Data Disaggregation

This indicator can be disaggregated by sectors, and sectoral demand of water can be used to determine the proportion of contribution of economic sectors to the overall water stress.

Besides sectoral disaggregation, actions to reduce water stress can benefit from temporally and spatially disaggregated data. Spatial disaggregation of the indicator at subnational level is highly advisable wherever possible and is particularly important for larger countries or those with marked differences in climate or population density within their territory. It increases indicator's usefulness for policy purposes.

Data at country level, averaged over one or more years, give an overview of situation of water stress. However, such overview may hide specific situations that only exist for part of the year, part of the country or both. Countries may decide to undertake detailed temporal disaggregation. This is especially relevant for countries with high intra-annual/seasonal variations in water resources and water use patterns.

## References

**Official SDG Metadata URL**

<https://unstats.un.org/sdgs/metadata/files/Metadata-06-04-02.pdf>

**Internationally agreed methodology and guideline URL**

<http://www.unwater.org/publications/step-step-methodology-monitoring-water-stress-6-4-2/>

**Other references**

*FAO SDG Portal and E-Learning:*

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*Additional References:*

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**Country examples**

N/A

## International Organization(s) for Global Monitoring

This document was prepared based on inputs from Food and Agriculture Organization of the United Nations (FAO).

For focal point information for this indicator, please visit <https://unstats.un.org/sdgs/dataContacts/>