

PROPORTION OF TOTAL WATER RESOURCES USED		
Freshwater	Water Quantity	Core indicator

1. INDICATOR

(a) **Name:** Proportion of total water resources used; also known as Total water withdrawal as percent of total renewable water resources.

(b) **Brief Definition:** Total annual volume of groundwater and surface water withdrawn from their sources for human use (in the agricultural, domestic and industrial sectors), expressed as a percentage of the total volume of water available annually through the hydrological cycle (total renewable water resources). The terms water resources and water use are understood as freshwater resources and freshwater use.

(c) **Unit of Measurement:** %.

(d) **Placement in the CSD Indicator Set:** Freshwater/Water Quantity.

2. POLICY RELEVANCE

(a) **Purpose:** The purpose of this indicator is to show the degree to which total renewable water resources are being exploited to meet the country's water demands. It is an important measure of a country's vulnerability to water shortages.

(b) **Relevance to Sustainable/Unsustainable Development (theme/sub-theme):** The indicator can show to what extent freshwater resources are already used, and the need for adjusted supply and demand management policy. When the indicator is calculated by sector, it can reflect the extent of water resource scarcity with increasing competition and conflict between different water uses and users. Scarce water could have negative effects on sustainability constraining economic and regional development, and leading to loss of biodiversity. Sustainability assessment of changes in the indicator is linked to total renewable water resources. The indicator's variation between countries as well as in time is a function of climate, population, and economic development, as well as the economic and institutional capacity to manage water resources and demand.

(c) **International Conventions and Agreements:** For international water law, see reference in section 6(a) below. International water sharing agreements also exist between many countries.

(d) **International Targets/Recommended Standards:** No specific international target exists other than those set by international treaties between countries.

The indicator is included in the revised MDG monitoring framework, presented in 2007 to the General Assembly, to monitor the Millennium Development Goal Nr. 7 (Ensure environmental sustainability) and the associated target "Integrate the principles of

sustainable development into country policies and programmes and reverse the loss of environmental resources”.

(e) Linkages to Other Indicators: The indicator's interpretation would benefit from linkage with established water vulnerability indicators, such as freshwater resources *per capita*, measures of the country's economy, such as Gross Domestic Product (GDP) (by industry), and poverty incidence as an indicator of equity of access. The indicator also needs to be matched with population, social and economic indicators, irrigation as a percentage of arable land, and drought frequency. Interpretation will benefit from linking this indicator with groundwater reserves and unused buffer water resources.

3. METHODOLOGICAL DESCRIPTION

(a) Underlying Definitions and Concepts: The *total renewable water resources* are defined as the sum of internal renewable water resources and incoming flow originating outside the country, taking into consideration the quantity of flows reserved to upstream and downstream countries through formal or informal agreements or treaties and reduction of flow due to upstream withdrawal. This gives the maximum theoretical amount of water actually available for the country. The in this definition mentioned *internal renewable water resources* is defined as the average annual flow of rivers and recharge of groundwater generated from endogenous precipitation. For total renewable water resources, no differentiation has been made between surface water and groundwater. This approach brings a number of limitations which are described below.

(b) Measurement Methods: The indicator measures total water abstractions divided by total renewable water resources.

(c) Limitations of the Indicator: This indicator has several important limitations, most of them related to the computation of *total renewable water resources*:

- Accurate and complete data are scarce.
- Local sub-national variation of water resources and water use abstractions could be considerable, and this indicator does not reflect the local or individual river basin situation.
- Seasonal variation in water resources is not reflected. There is no consideration of distribution among uses and policy options for mitigating scarcity, for example, re-allocation from agricultural to other uses
- Total renewable water resources do not consider water quality and its suitability for use.
- Since abstraction can occur from fossil groundwater (considered being non-renewable) the indicator can, in principle, be greater than 1.

<http://www.iucn.org/themes/wcpa/index.html>

(d) Status of the Methodology: Not available.

(e) Alternative Definitions/Indicators: The indicator could consider withdrawals and water resources at the basis of a river basin. It could also take into account the efficiency of use and economic and environmental water costs and values. The data for

such calculations, however, are not readily available. For some countries, calculation of the indicator at sub-national levels would be more appropriate. The indicator could be disaggregated to show total renewable water resources, withdrawals for different users, and efficiencies for these different users.

4. ASSESSMENT OF DATA

(a) Data Needed to Compile the Indicator: Annual water withdrawals divided by total renewable water resources. Current water uses need to be known.

(b) National and International Data Availability and Sources: Data is available for most countries, at the national level. Data consistency is a problem in AQUASTAT (see 4(c) below) as the data are estimated by country level at various periods, they are sometimes interpolated and national data on withdrawals are sometimes biased and could be intentionally over- or underestimated.

(c) Data References: Recent data are available at the country level and recorded by the Food and Agriculture Organization (FAO) of the United Nations in AQUASTAT (<http://www.fao.org/ag/aquastat/>).

5. AGENCIES INVOLVED IN THE DEVELOPMENT OF THE INDICATOR

(a) Lead Agency: The lead agency is the Food and Agriculture Organization of the United Nations (FAO). The contact point is the Assistant Director-General, Sustainable Development Department, FAO; fax no. (39 06) 570 53064.

(b) Other Organizations: Not available.

6. REFERENCES

(a) Readings:

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World Water Assessment Programme (WWAP). 2003. Water for people, water for life. *The United Nations World Water Development Report 1*. 576 pp.

World Water Assessment Programme (WWAP). 2006. Water, a shared responsibility. *The United Nations World Water Development Report 2*. 584 pp.

(b) Internet site:

FAO AQUASTAT. <http://www.fao.org/nr/water/aquastat/main/index.stm>