Training Program of AITRS for 2018-2019 within the Framework for Developing Statistics that Support the Sustainable Development Goals (SDGs) 2030 in the Arab Region

SDG Indicators under FAO Custodianship

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Programme Advisor, Office of the Chief Statistician
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

- 6.4.1 Change in water-use efficiency over time (Tier II)
- 6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources (Tier I)

They provide complementary information on the efficiency and sustainability of water use
WATER USE

- Crops and livestock account for 70% water withdrawals
- 95% in some developing countries
- Expected to increase as world population growth continues
- 2/3 of the world population could be living in water-stressed countries by 2025 if current consumption patterns continue
- Depending on diet, between 2,000 and 5,000 litres of water are needed to produce the food consumed daily by one person
- Water particularly critical issue in the Arab region – numerous ESCWA publications focus of water resource management, including a dedicated biennial Water Development Report
SDG INDICATOR 6.4.1
CHANGE IN WATER-USE EFFICIENCY OVER TIME
DEFINITION AND METHOD OF COMPUTATION

- Defined as the output (value added) of a given major industrial sector divided by the volume of water used, measured in USD/m³

- **Water use**: water that is directly abstracted or is received by an industry or households from another industry

- **Water abstraction**: water removed from a river, lake, reservoir or aquifer

- The terms water use and water abstraction are used to maintain consistency the terminology used in SEEA-Water. “Water abstraction” is a synonym of “water withdrawal”, as expressed in SDG target 6.4.

- Historical time series needed to measure the trend in water use efficiency over time
MAJOR INDUSTRIAL SECTORS

Three major sectors according to ISIC 4

- agriculture, forestry and fishing (ISIC 4-A)
- manufacturing, constructions, mining and quarrying (ISIC B, C, D and F)
- All the service sectors (ISIC E and ISIC G-T)
METHOD OF COMPUTATION

- The indicator is computed as the sum of the three economy sectors, weighted according to the proportion of water withdrawn by each sector over the total withdrawals. In formula:

\[ WUE = A_{we} \times PA + I_{we} \times PI + S_{we} \times PS \]

- The units of the indicator is expressed in value/volume, USD/m3
METHOD OF COMPUTATION

\[ WUE = A_{\text{we}} \times PA + I_{\text{we}} \times PI + S_{\text{we}} \times PS \]

- \( WUE \) = Water use efficiency
- \( A_{\text{we}} \) = Irrigated agriculture water use efficiency [USD/m³]
- \( I_{\text{we}} \) = Industrial water use efficiency [USD/m³]
- \( S_{\text{we}} \) = Services water use efficiency [USD/m³]
- \( PA \) = Proportion of water withdrawn by the agricultural sector over the total withdrawals
- \( PI \) = Proportion of water withdrawn by the industry sector over the total withdrawals
- \( PS \) = Proportion of water withdrawn by the service sector over the total withdrawals
LIMITATIONS

- Water use efficiency strongly influenced by the economic structure of a country (weight of water intensive sectors): comparison across countries of limited value

- Also change in water use efficiency influenced by both ‘real’ improvements, as well as by changes in the economic structure

- Positive trend does not necessarily indicate a decline in total water use: needs to be combined with the water stress indicator (6.4.2)

- Use of more disaggregated data at national level to help interpreting trends: e.g. water efficiency for energy and for the municipal distribution network
DATA SOURCE AND DATA COLLECTION

- Gross value added of each sector = National Accounts (NSO)
- Volume of water used by each sector = Administrative sources (relevant Ministry)
- Data on water withdrawal are compiled for many countries in FAO’s water database: AQUASTAT
- Data on value added is compiled in sectoral databases such as WB’s Databank and UNSD’s UNdata
- FAO (through AQUASTAT) will calculate the indicator at global, regional and country level on behalf of UN-Water
DISAGGREGATION

- The indicator covers agricultural, mining and manufacturing sectors, and also captures water supply efficiency of the water distribution network, so to provide the means for a more detailed analysis of the water use efficiency for national planning and decision-making.

- Disaggregation by sub-sector in agriculture may be needed to cover adequately water use for livestock and aquaculture.
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<td>United Arab Emirates</td>
<td>2007</td>
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CHARACTERISTICS OF THE AVAILABLE DATA

- The figures are calculated by FAO based on the latest available data on the numerator and the denominator.
- They are not published yet – FAO is validating the data with countries before publication.
- The data for Arab countries is largely outdated – the most recent figures are from 2012.
- The sticking point is the denominator: up-to-date water use data are lacking.
SDG INDICATOR 6.4.2
LEVEL OF WATER STRESS: FRESHWATER WITHDRAWAL AS A PROPORTION OF AVAILABLE FRESHWATER RESOURCES
CONCEPT AND DEFINITION

- **Concept:** 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 provides an estimate of pressure by all sectors on the country’s renewable freshwater resources.**

- **Definition:** the ratio between total freshwater abstracted (or withdrawn) by all major sectors and total renewable freshwater resources, after having taken into account environmental water requirements.

\[
\text{Stress (\%)} = \frac{\text{total freshwater withdrawn}}{(\text{total renewable freshwater resources} - \text{environment})} \times 100
\]
DEFINITION AND METHOD OF COMPUTATION

- The major sector may be defined as for Indicator 6.4.1 according to ISIC.

- Builds on MDG indicator 7.5. New aspect: accounts for environmental water requirements.

- Environmental water requirements are established in order to protect the basic environmental services of freshwater ecosystems. They are the minimum quantities of water required to sustain freshwater and estuarine ecosystems.

- Methods of computation are extremely variable. FAO suggests the use of International Water Management Institute’s (CGIAR) Environmental Flow Calculator: www.iwmi.cgiar.org/resources/models-and-software/environmental-flow-calculators/
DEFINITION AND METHOD OF COMPUTATION

- It is proposed to classify the level of water stress in three main categories (levels): low, high and very high.

- **Low stress: 0 – 25%** (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).

- **High stress: 25 – 60%** (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).

- **Very high stress: > 60%**
DEFINITION AND METHOD OF COMPUTATION

- Stress (%) = total freshwater withdrawn / (total renewable freshwater resources - environment) * 100

- Numerator: Total freshwater withdrawn: The volume of freshwater extracted from its source: Rivers, Lakes and Aquifers

For agriculture, industries and municipalities

- Includes 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
DEFINITION AND METHOD OF COMPUTATION

- Stress (%) = total freshwater withdrawn / (total renewable freshwater resources - environment) * 100

- Denominator: total renewable freshwater resources: The sum of internal and external renewable water resources
  
  ✓ Internal renewable water resources = average annual flow of rivers and recharge of groundwater generated from endogenous precipitations for a given country
  
  ✓ External renewable water resources = flow of water entering the country, taking into consideration the flow reserved to upstream and downstream countries through agreements or treaties
*INDICATOR LIMITATIONS*

- Difficulty to obtain accurate, complete and up-to-date data
- The indicator does not account for seasonal variations in water resources
- The indicator does not capture water stress variations at sub-national level, which can potentially be vast: again because of lack of sub-national data
INDICATOR LIMITATIONS

The indicator can be higher than 100% when water withdrawal includes:

✔ secondary freshwater (water withdrawn previously and returned to the system)
✔ non-renewable water (fossil groundwater)
✔ when annual groundwater withdrawal is higher than annual replenishment (over-abstraction)
✔ when water withdrawal includes part or all of the water set aside for environmental water requirements.
DATA COLLECTION (PAST)

- Usually, three-five years are a minimum frequency to be able to detect significant changes
- Few countries actually publish water use data on a regular basis by sector
- FAO compiles data and calculates this indicator at the international level
- Data is collected through AQUASTAT country surveys since 1994 through official counterpart at country level
### 6.4.2 Level of Water Stress (2014)

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<td>Least Developed Countries (LDCs)</td>
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<td>Landlocked developing countries (LLDCs)</td>
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</tr>
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<tr>
<td>Latin America and the Caribbean</td>
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<tr>
<td>Northern America and Europe</td>
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<tr>
<td>World</td>
<td>12.8%</td>
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</table>
DATA COLLECTION (FUTURE)

- On 4 May 2018, FAO sent a letter to all countries requesting the appointment of a National Focal Point who will be responsible for completing FAO’s “Water and Agriculture” Questionnaire.

- Data collected through this questionnaire aim to provide a comprehensive picture of water resources and uses at the national and sub-national level.

- These data will be critical in calculating SDG indicators 6.4.1 and 6.4.2.
Dear 

As per decision of Member States, the responsibility for collecting, validating, producing and disseminating statistical information on food and agriculture is inscribed in Article 1 of the FAO Constitution. With your assistance, we are confident that we can live up to this mandate and produce comprehensive and internationally comparable data in these domains.

National data and information on water resources, water use and agricultural water management are key to monitor the water-related Sustainable Development Goals (SDG) indicators, and to provide policy makers with comprehensive information on the state of water management in their country in support of national policy formulation and assessment.

Data are collected, analysed and disseminated by FAO through the FAO Information System on Water and Agriculture - AQUASTAT (www.fao.org/wa/aquastat/index.stm), which provides the global public reference data platform on water and agriculture. In addition, the AQUASTAT Programme, in cooperation with FAO member states, monitors progress towards the achievement of the water-related SDG indicators 6.4.1 (water use efficiency) and 6.4.2 (water stress).

Disseminating reliable and regularly updated data is only possible with the active collaboration of member states in the data collection process. Therefore, FAO is establishing a global network of National Correspondents and Alternates to feed the AQUASTAT database with water and irrigation statistics on a regular basis. The National Correspondent will be in charge of coordinating within the country the provision of official national data and will play an important role in supporting FAO’s efforts to further harmonise water-related reporting, thereby reducing the reporting burden on countries. Detailed terms of reference for the AQUASTAT National Correspondent are attached to this letter.

In order to achieve this objective, we would appreciate it, if in consultation with the Water Authorities of your country, you could:

1. Nominate a National Correspondent and an Alternate who will act as official national counterparts for the AQUASTAT Programme.
2. Complete the attached “Water and Agriculture” Questionnaire 2018. Data collected through this questionnaire aim to provide a comprehensive picture of water resources and uses at the national and sub-national level, and to describe its major characteristics, trends, constraints and perspectives, with particular focus on the agricultural sector. The questionnaire is also designed to collect an annual basis a selection of SDG-related data on water resources, water use and water stress. Instructions are provided in the questionnaire itself. Particular attention should also be paid to complete the metadata section, in particular with regard to the data sources.

The contribution of AQUASTAT National Correspondents will be acknowledged and they will be invited to technical workshops and capacity development events organised and funded by FAO.

We would be grateful if you could appoint the National Correspondent and the Alternate at your earliest convenience, and preferably before 15th of May 2018. Please send the nominations to: aquastat@fao.org. For any question or additional information, you may wish to contact Irish Hoogerwerf (www.ishoogewerf.fao.org) and Vagnarie Giller (vagnarie.giller@fao.org).

We would like to receive the completed questionnaire by the 30th of May 2018 through the same email address (aquastat@fao.org). Should you have any questions, comments or difficulties in filling the questionnaire, do not hesitate to contact the AQUASTAT programme through the same addresses indicated above.

We thank you for your collaboration and look forward to hearing from you.

Yours sincerely,

Eduardo Monzier
Director, Land and Water Division
Department of Climate, Biodiversity, Land and Water

Pietro Germini
Chief Statistician
Chief Statistical Office
<table>
<thead>
<tr>
<th>Country</th>
<th>Nominated focal point?</th>
<th>Returned questionnaire?</th>
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<td>- Mohamed Abdoulkader Ahmed, Direction de la Statistique et des etudes Demographiques (DISED)</td>
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<tr>
<td>Egypt</td>
<td>- Safaa Sami Ahmed, Agriculture Statistics Department</td>
<td></td>
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<tr>
<td></td>
<td>- (Alternate) Ms Ghada El Saied Ebrahim</td>
<td></td>
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<tr>
<td>Iraq</td>
<td>- Rana Saadi Khaleel, Central Statistical Organization</td>
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<td>- Sona Abu Zahra, Department of Statistics</td>
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<td>▪ Aisha Mohammed Al Khatri, Ministry of Regional Municipalities &amp; Water</td>
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<td>UAE</td>
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<td>Yemen</td>
<td>▪ Mr Fuad Bassa, Ministry of Water and Environment</td>
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<td>Yemen</td>
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AQUASTAT

- The world’s most comprehensive database on water
- Compiled water use data needed for SDG indicators 6.4.1 and 6.4.2, but many other data as well
- Country profiles available including multiple water use variables
Les ressources en eau prélevées en 2012 sont estimées à 8 425 millions m³, dont 4 800 millions m³ provenant d’eau superficielle, 3 000 millions m³ d’eau souterraine, soit bien au-delà du volume renouvelable annuel, 615 millions m³ d’eau dessaliée (Eurostat, 2015) et 10 millions m³ d’eaux usées traitées directement utilisées. Les prélèvements attribués à chacun des secteurs n’est pas entièrement connu: la part de l’agriculture semble correspondre à 59 pour cent soit 4 990 millions m³ et la part des Industries à 5 pour cent, soit 415 millions m³. Le prélèvement des municipalités est donc estimé à 36 pour cent, soit 3 020 millions m³ (tableau 5 et figure 1).
HOW IS FAO SUPPORTING COUNTRIES

- An e-learning course on 6.4.2 is already available, whereas an e-learning course on 6.4.1 is currently being finalized.

- In 2017, FAO organized two workshops in Rome and Casablanca on SDG indicators 6.4.1 and 6.4.2 in which three Arab countries participated: **Algeria, Egypt, Morocco, Tunisia**.

- Further direct technical assistance can be provided upon request (country to submit a request to FAO’s Regional Office in Cairo).
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<tr>
<th>Country</th>
<th>FAO SDG indicator 6.4.1/6.4.2 workshop participant</th>
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</thead>
</table>
| Egypt    | Ms Nourhan Elsayed Abdullah Hassan, Central Agency for Public Mobilization and Statistics (CAPMAS)  
           Mr Tarek Elsayed Ahmed Kombaz: Ministry of water Resources and Irrigation |
| Algeria  | Mme Fatima Rahal Guermat, Office Nationale des Statistiques  
           Mme Hassina Hammouche Boudjena, Ministère des Ressources en Eau et de l'Environnement |
| Morocco  | M. ERRAJI, Centre Royale de Télédétection Spatiale  
           M. ZAROUALI Said, Haut Commissariat au plan  
           Mme SASSI Nouzha, Haut Commissariat au plan  
           Mme BOROUS Saida. Ministère Délégué chargé de l’Environnement  
           M. MALIKI Sliman, Ministère Délégué chargé de l’Environnement  
           Mme MOUHIB Hafssa |
| Tunisia  | M. CHOURA Abdeljabar, Bureau de l’Inventaire et des Recherches Hydrauliques |