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Aligning recommended ECE environmental indicators with corresponding Sustainable Development Goal indicators

Main outcomes of comparing methodologies and data requirements of 3 SDG indicators with the *ECE online Guidelines for the application of environmental indicators*

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15th Session of the Joint Task Force on Environmental Statistics and Indicators, 25-26 October 2018, Geneva

Initial mapping of ECE indicators with GG and SDG indicators in 2016

29 UNECE indicators can be used for the production of SDG indicators

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- In 2016 Secretariat mapped ECE environmental indicators with OECD GG and SDG indicators and presented the results to the JTF at its 11th session.
- Main results:
  - 29 of the indicators could be used or are supporting the production of SDG indicators. The greatest overlaps are with
    - B3 – GHG Emissions
    - C1, C2 and C3 (water resources, abstraction and use)
    - I4 – Waste generation
    - G1, G2, G3 and G4 (Energy consumption, supply, intensity and renewable energy consumption)
    - I3 and I4 (waste reuse and recycling, final waste disposal)

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Pilot testing the fitness of ECE environmental indicators for compiling selected tier I and tier II SDG indicators

2 water indicators, 1 energy indicator

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- **Tier system of the SDGs:**
  - **Tier 1**: Indicator is conceptually clear, has an internationally established methodology and standards are available, and data are regularly produced by countries for at least 50 per cent of countries and of the population in every region where the indicator is relevant.
  - **Tier 2**: Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries.
  - **Tier 3**: No internationally established methodology or standards are yet available for the indicator, but methodology/standards are being (or will be) developed or tested.

- **Selected indicators for the pilot testing:**
  - 6.4.1: Change in water-use efficiency over time (tier 2)
  - 6.4.2: Level of water stress: freshwater withdrawal as a proportion of available freshwater resources (tier 1)
  - 7.2.1: Renewable energy share in the total final energy consumption (tier 1)

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SDG metadata sheets

Available at https://unstats.un.org/sdgs/metadata

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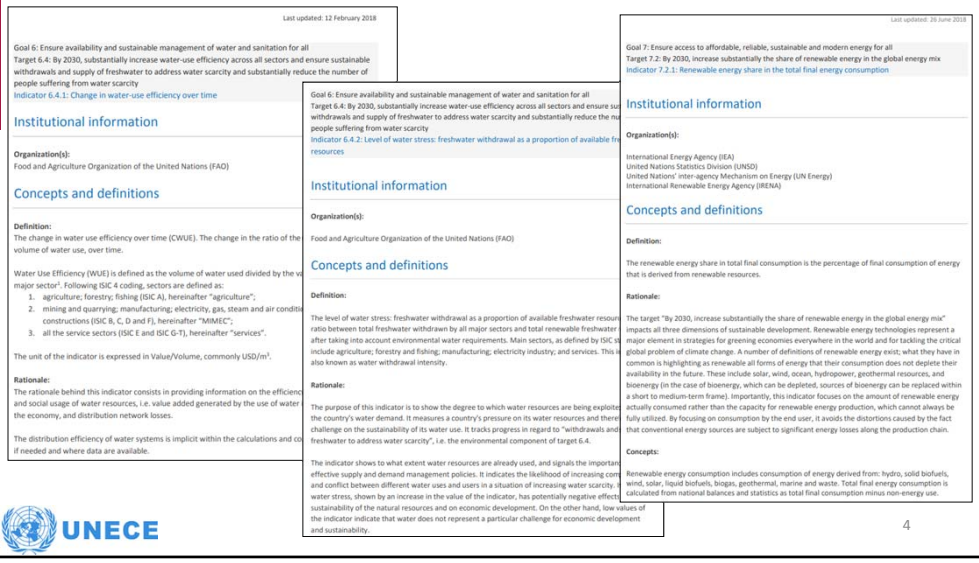
Last updated: 12 February 2018

Goal 6: Ensure availability and sustainable management of water and sanitation for all
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
Indicator 6.4.1: Change in water-use efficiency over time

Institutional information

Organization(s):
Food and Agriculture Organization of the United Nations (FAO)

Concepts and definitions

Definition:
The change in water use efficiency over time (CWUE). The change in the ratio of the volume of water use, over time.

Water Use Efficiency (WUE) is defined as the volume of water used divided by the value major sector[1]. Following ISIC 4 coding, sectors are defined as:
1. agriculture; forestry; fishing (ISIC A), hereinafter "agriculture";
2. mining and quarrying; manufacturing; electricity, gas, steam and air conditi constructions (ISIC B, C, D and F), hereinafter "MIMEC";
3. all the service sectors (ISIC E and ISIC G-T), hereinafter "services".

The unit of the indicator is expressed in Value/Volume, commonly USD/m³.

Rationale:
The rationale behind this indicator consists in providing information on the efficienc and social usage of water resources, i.e. value added generated by the use of water the economy, and distribution network losses.

The distribution efficiency of water systems is implicit within the calculations and co if needed and where data are available.

Goal 6: Ensure availability and sustainable management of water and sanitation for all
Target 6.4: By 2030, substantially increase water-use efficiency across all sectors and ensure su withdrawals and supply of freshwater to address water scarcity and substantially reduce the nu people suffering from water scarcity
Indicator 6.4.2: Level of water stress: freshwater withdrawal as a proportion of available fre resources

Institutional information

Organization(s):

Food and Agriculture Organization of the United Nations (FAO)

Concepts and definitions

Definition:

The level of water stress: freshwater withdrawal as a proportion of available freshwater resourc ratio between total freshwater withdrawn by all major sectors and total renewable freshwater after taking into account environmental water requirements. Main sectors, as defined by ISIC st include agriculture; forestry and fishing; manufacturing; electricity industry; and services. This i also known as water withdrawal intensity.

Rationale:

The purpose of this indicator is to show the degree to which water resources are being exploite the country's water demand. It measures a country's pressure on its water resources and there challenge on the sustainability of its water use. It tracks progress in regard to "withdrawals and freshwater to address water scarcity", i.e. the environmental component of target 6.4.

The indicator shows to what extent water resources are already used, and signals the importan effective supply and demand management policies. It indicates the likelihood of increasing com and conflict between different water uses and users in a situation of increasing water scarcity. water stress, shown by an increase in the value of the indicator, has potentially negative effects sustainability of the natural resources and on economic development. On the other hand, low values of the indicator indicate that water does not represent a particular challenge for economic development and sustainability.

Last updated: 26 June 2018

Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all
Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix
Indicator 7.2.1: Renewable energy share in the total final energy consumption

Institutional information

Organization(s):

International Energy Agency (IEA)
United Nations Statistics Division (UNSD)
United Nations' inter-agency Mechanism on Energy (UN Energy)
International Renewable Energy Agency (IRENA)

Concepts and definitions

Definition:

The renewable energy share in total final consumption is the percentage of final consumption of energy that is derived from renewable resources.

Rationale:

The target "By 2030, increase substantially the share of renewable energy in the global energy mix" impacts all three dimensions of sustainable development. Renewable energy technologies represent a major element in strategies for greening economies everywhere in the world and for tackling the critical global problem of climate change. A number of definitions of renewable energy exist; what they have in common is highlighting as renewable all forms of energy that their consumption does not deplete their availability in the future. These include solar, wind, ocean, hydropower, geothermal resources, and bioenergy (in the case of bioenergy, which can be depleted, sources of bioenergy can be replaced within a short to medium-term frame). Importantly, this indicator focuses on the amount of renewable energy actually consumed rather than the capacity for renewable energy production, which cannot always be fully utilized. By focusing on consumption by the end user, it avoids the distortions caused by the fact that conventional energy sources are subject to significant energy losses along the production chain.

Concepts:

Renewable energy consumption includes consumption of energy derived from: hydro, solid biofuels, wind, solar, liquid biofuels, biogas, geothermal, marine and waste. Total final energy consumption is calculated from national balances and statistics as total final consumption minus non-energy use.

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6.4.1: Change in water-use efficiency over time
Calculation of the indicator

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Calculation of the indicator

- Measures the relative change of Water Use Efficiency (WUE)
- WUE is defined as the volume of water used divided by the value added of a given major sector:
  - Agriculture; forestry; fishing (ISIC A)
  - Mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; constructions (ISIC B, C, D and F) – "MIMEC"
  - All the service sectors (ISIC E and ISIC G-T)
- WUE is computed as the sum of the three sectors, weighted according to the proportion of water used by each sector over the total use.

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6.4.1: Change in water-use efficiency over time
Data needs and open questions

STATISTICS

Data needs

- Annual quantity of water use for the 3 sectors
- Value added for each of the sectors.
- For the calculation of the GVA produced by irrigated agriculture additional statistics on the irrigated land, total arable land and permanent crops.

Open questions

- Is water used for cooling and hydropower generation taken into account?
- There are several inconsistencies in the SDG metadata sheet:
  - Calculation formula for WUE is value/volume (should be volume/value)
  - "MIMEC" is defined by ISIC in one part of the document, but excludes economic units connected to public water supply network in another part of the document

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6.4.1: Change in water-use efficiency over time

Table C3 – *Total Water Use* provides most of the required data

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Data availability from ECE guidelines

Time series data on the indicators for 1990-2013, Table C-3 Total water use:

		Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	200
			Freshwater available									
1	Freshwater abstracted (= Table C-2, row 4)	million m^3										
2	Desalinated water	million m^3										
3	Reused water	million m^3										
4	Imports of water	million m^3										
5	Exports of water	million m^3										
6	**Total freshwater available** (Rows 1 + 2 + 3 + 4 - row 5)	million m^3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/
7			Freshwater use									
8	Losses of water during transport	million m^3										
9	**Total freshwater use** (Row 6 - row 8)	million m^3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/
10			*of which used by*									
11	*Households*	million m^3										
12	*Agriculture, forestry and fishing (ISIC 01-03)*	million m^3										
13	*of which (of row 12) used for:* Irrigation in agriculture	million m^3										
14	*Manufacturing (ISIC 10-33)*	million m^3										
15	*Electricity industry (ISIC 351)*	million m^3										
16	*Other economic activities*	million m^3										
17			Freshwater use per GDP									
		billion										

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6.4.1: Change in water-use efficiency over time

Table C3 – *Total Water Use* provides most of the required data

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SDG 6.4.1 data requirement	Statistics available from ECE Indicator sheet C3 (Total water use)	Comments
Annual quantity of water used in agriculture, forestry and fishing (ISIC A)	Row 12: Water used by agriculture, forestry and fishing (ISIC 01-03)	Conceptually identical, data from the ECE indicator production sheet can be used directly.
Annual quantity of water used by mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; constructions (ISIC B, C, D and F), hereinafter "MIMEC"	Row 14: Manufacturing (ISIC 10-33) Row 15: Electricity industry (ISIC 351) Row 16: Other economic activities	It is not possible to compile this from the ECE indicator production sheet as the economic activities gas, steam and air conditioning supply as well as mining and construction are aggregated together in row 16. Furthermore, it remains unclear how the SDG indicators treats water used for cooling and for hydropower generation.
Service sectors (ISIC E and ISIC G-T)	Row 16: Other economic activities	It is not possible to compile this from the ECE indicator production sheet as "service sectors" is not shown separately.

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6.4.1: Change in water-use efficiency over time

Conclusions

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Main conclusions

- The SDG metadata sheet leaves important conceptual questions open
- Statistics from ECE indicator sheet C3 can be used to a certain extent, more disaggregation might be necessary
- Statistics on irrigated areas, total arable land, crops and GVA has to be taken from agriculture statistics and SNA

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

Calculation of the indicator

STATISTICS

Calculation of the indicator

- Ratio between total freshwater withdrawn (TWW) by all major sectors and total renewable freshwater resources (TRWR), after taking into account environmental water requirements (Env.):
  - Stress (%) = TWW / (TRWR - Env.) * 100
- Main sectors (defined by ISIC) – different from indicator 6.4.1:
  - Agriculture
  - Forestry and fishing
  - Manufacturing
  - Electricity industry
  - Services

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

Data needs and open questions

STATISTICS

Data needs

- Total freshwater withdrawn (abstracted) per year
- Total renewable freshwater resources: long-term annual average (LTAA)
- Environmental water requirements

Open questions

- Are water abstractions for cooling and hydropower generation included in the calculation of the indicator?
- How to calculate the environmental water requirements?

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

Tables *C1 – Renewable freshwater resources* and *C2 – Freshwater abstraction* provide statistics needed for this indicator

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Time series data on the indicators for 1990-2013, Table C-1: Renewable freshwater resources:

		Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	Precipitation	million m^3											
2	Actual evapotranspiration	million m^3											
3	Internal flow (Row 1 - row 2)	million m^3	n/a	n/a									
4	Inflow of surface and groundwaters from neighbouring countries	million m^3											
5	**Renewable freshwater resources** (Row 3 + Row 4)	million m^3	**n/a**	**n/a**									
6	Outflow of surface and groundwaters to neighbouring countries	million m^3											
7	Outflow of surface and groundwaters to the sea	million m^3											

No LTAA values!

This is not the same as the SDG indicator!

Time series data on the indicators for 1990-2013, Table C-2 Freshwater abstraction:

		Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007
			Surface and groundwater abstracted									
1	Fresh surface water abstracted	million m^3										
2	Fresh groundwater abstracted	million m^3										
3			**Freshwater abstracted**									
4	**Freshwater abstracted** (Row 1 + row 2)	million m^3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5			*of which abstracted by*									
6	Water supply industry (ISIC 36)	million m^3										
7	Households	million m^3										
8	Agriculture, forestry and fishing (ISIC 01-03)	million m^3										
9	Manufacturing (ISIC 10-33)	million m^3										
10	Electricity industry (ISIC 351)	million m^3										
11	Other economic activities	million m^3										
12			**Water exploitation index (WEI)**									
13	Renewable freshwater resources (=Table C-1, row 5)	million m^3										
14	Water exploitation index (Row 4 / row 13)	%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

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

Conclusions

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Main conclusions

- SDG metadata sheet leaves some conceptual and methodological questions open
- One could expect that the statistics on water abstraction quantities and total renewable water resources needed for the calculation of SDG indicator 6.4.2 are available from the ECE indicator sheets C1 and C3.
- In any case, indicator sheet C1 would need an additional column to provide information on LTAA values (similar to the OECD/Eurostat Joint Questionnaire in Inland Waters)

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7.2.1: Renewable energy share in the total final energy consumption

Calculation of the indicator

STATISTICS

Calculation of the indicator

- Percentage of final consumption of energy that is derived from renewable resources:
  - Hydro
  - solid biofuels
  - Wind
  - Solar
  - liquid biofuels
  - Biogas
  - Geothermal
  - Marine
  - Waste

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7.2.1: Renewable energy share in the total final energy consumption

Data needs and relevant UNECE indicator sheets

STATISTICS

Data needs

- Total final energy consumption
- Energy consumption from renewable sources

Relevant ECE indicator sheets

- G1 – Final energy consumption
- G4 – Renewable energy supply by energy product

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7.2.1: Renewable energy share in the total final energy consumption

Relevant UNECE indicator sheets

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Time series data on the indicators for 1990-2013, Table G-1. Final energy consumption:

		Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007
1	**Total final energy consumption**	ktoe										
							of which					
2	*Industry*	ktoe										
3	*Industry* (Row 2 / row 1)	%										
4	*Transport*	ktoe										
5	*Transport* (Row 4 / row 1)	%										
6	*Households*	ktoe										
7	*Households* (Row 6 / row 1)	%										
8	*Commercial and public services*	ktoe										
9	*Commercial and public services* (Row 8 / row 1)	%										
10	*Agriculture, forestry and fishery*	ktoe										
11	*Agriculture, forestry and fishery* (Row 10 / row 1)	%										
12	*Non-specified*	ktoe										
13	*Non-specified* (Row 12 / row 1)	%										
14	*Non-energy use*	ktoe										
15	*Non-energy use* (Row 14 / row 1)	%										

Time series data on the indicators for 1990-2013, Table G-4. Renewable energy supply

		Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	20
1	Total primary energy supply (= Table G-2, row 6)	ktoe											
								of which					
2	*Hydropower*	ktoe											
3	*Hydropower* (Row 2 / row 1)	%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n
4	*Biomass*	ktoe											
5	*Biomass* (Row 4 / row 1)	%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n
6	*Biofuels*	ktoe											
7	*Biofuels* (Row 6 / row 1)	%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n
8	*Wind power*	ktoe											
9	*Wind power* (Row 8 / row 1)	%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n
10	*Solar power*	ktoe											
11	*Solar power* (Row 10 / row 1)	%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n
12	*Geothermal energy*	ktoe											
13	*Geothermal energy* (Row 12 / row 1)	%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n
14	*Other renewables (specify in footnote)*	ktoe											
15	*Other renewables* (Row 14 / row 1)	%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n

It is supply, not consumption

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7.2.1: Renewable energy share in the total final energy consumption

Conclusions

STATISTICS

Main conclusions

- It is not possible to calculate the SDG indicator directly by using these two indicator sheets as additional calculation steps are required to calculate the final consumption of energy from indicator sheet G4 which is about renewable energy supply
- Should be calculated from the energy balances
- ECE indicator sheets on energfy can be considered as another product that can be produced from energy balances, but full consistency is needed. Proposed amendments (see ECE/CEP-CES/GE.1/2017/3):
  - Revising the currently used definition for final energy consumption.
  - Separating the non-energy uses from final energy consumption.
  - Reviewing the used classification of energy products to be fully consistent with the Standard International Energy Product Classification (SIEC).
  - Considering imports and exports of electricity and heat separately

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Overall conclusions from the pilot exercise

Conclusions 1/2

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- **Currently none of the 3 selected SDG indicators can be solely calculated from the ECE environmental indicator production sheets:**
  - Some methodological questions remain open.
  - Non-environmental statistics is needed in addition to compile the indicator (e.g. GVA).
  - Further disaggregation of the used industry classification needed.
  - Some aggregates are missing (e.g. LTAA in indicator C1).
  - Alternative (better) data sources exist to calculate the indicator (e.g. energy balances).
- **There is value in fully aligning the ECE indicator production sheets with the SDG indicators**
  - In many countries the ECE Guidelines for the application of environmental indicators provide the only source for official environment statistics.
  - ECE indicator production sheets have been designed for multi-purpose use and efforts made by ECE member States in establishing a SEIS in Europe and Central Asia to ensure that environmental indicators are readily available and accessible for various users and reporting purposes.

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Overall conclusions from the pilot exercise

Conclusions 1/2

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- **Some modifications of ECE indicator production sheets are recommended:**
  - Better clarification of some of the used concepts and how they relate to the concepts used for SDG indicators (e.g. definition of water use)
  - Further disaggregation of sectors
  - Review of the used classifications (e.g. SIEC)
  - Adding additional data items (e.g. LTAA).
- **Review all ECE indicator production sheets to make them consistent with SDG data requirements**
  - Start with SDG tier 1 indicators
  - Provide feedback to the relevant custodian agencies
- **Take into account the revisions of data collections of other international organisations (Eurostat, OECD, UNSD, IEA)**
- **Pilot of data flows from countries to custodian agencies may provide additional information for improving both SDG metadata and ECE online guidelines**

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Thank you very much for your attention!

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