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Methodology for assessing the EU Member States' status and progress towards the SDGs

This document describes in detail the approach applied for the SDG status and progress calculations of EU Member States (MS). The results of these calculations are presented in the <u>SDG country overview</u> on the Eurostat website as well as in the Commission's <u>European Semester country reports</u>.

Definitions

The **status** of each SDG in a MS is an aggregation of all the indicators of that goal relative to the other MS and the EU average, based on the most recent available annual data (the most recent year differs between indicators and might also differ between countries for the same indicator, depending on data availability). Thus, the status enables a comparison of countries for each SDG.

In contrast, the **progress** score of a MS is based on the average annual growth rates of all indicators in each SDG over the most recent five-year period. It provides an assessment of the country's performance over time. The progress calculation is identical to the assessment approach used for the EU throughout the EU SDG monitoring report (MR) and for calculating the EU's progress at goal level as presented in the MR synopsis. A country's progress score is not influenced by the performance of other MS.

The status calculation requires relative data that are comparable across countries (e.g. in % or per capita), while the progress can be calculated with both relative and absolute data. In a few cases, the status and progress calculations for the same indicator are consequently based on different units (e.g. data in % for the status calculation, and data in million people for the progress calculation).

Calculation of status score

The status score is a composite index including all indicators of a goal with equal weight. For each indicator, a country's status score is calculated relative to the range of values from the worst to the best performing country, whereby the worst country gets a score of 0 and the best country a score of 100. For each country, the status scores at indicator level are then aggregated at SDG level using the arithmetic mean, and this goal-level score is then put in relation to the EU aggregate status score of the same goal, to show how much (in %) a country's SDG status is above or below the EU average. The status calculation involves the following steps:

Steps at indicator level

1) Determining the desired direction: to be able to distinguish between the best and the worst country, we need to determine whether higher or lower indicator values are better, i.e. whether an indicator should increase or decrease to become more sustainable. The desired direction is given by the 2030 Agenda or the EU policy context.

2) Ensuring data comparability: in the next step, we verify whether the SDG indicator values are available in a relative unit that allows comparing different countries (e.g. in %, per capita, etc.). If this is not the case, we retrieve relative data from the source table or calculate it manually (e.g. dividing the data by population). In case a country's data availability is significantly worse than for other countries (e.g. most recent data refers to 2011, while most other countries have data up to 2021), this country is excluded from the status calculations. Likewise, in case country data are missing for an indicator (see e.g. the water quality indicators in SDG 6), the subsequent steps are performed on the remaining countries. No estimates are used in case of missing data for countries.

3) Excluding outliers: extreme values can distort the status calculation, especially for those countries whose rank (based on the data) is very close to the outlier country. Outlier values – both on the top and the bottom of the country distribution – thus need to be excluded from the calculation. If outliers are detected, the country involved gets the best/worst status score (100 or 0) for the corresponding indicator, and the status calculation (see next step) is only performed for the remaining country values. Outliers are identified by means of the interquartile range (IQR) method (¹). This method involves calculating the first and third quartiles of the country distribution, with the IQR representing the difference between these two values. The boundaries for identifying outliers are then determined by multiplying the IQR by the factor two and by subtracting/adding these values from/to the first/third quartile, respectively. Values below/above these thresholds are considered outliers and are

excluded during indexing, meaning that countries identified as outliers with this method are assigned the value of the next best/worst country for the indexing. Figure 1 illustrates the IQR calculations using the indicator 'Persons at risk of monetary poverty after social transfers' (sdg_01_20) as example.



Figure 1: Boxplot showing IQR calculations for indicator sdg_01_20

4) Calculating the countries' indicator status score: after excluding outlier values, the indicator status scores of the remaining countries are calculated with a min-max-normalisation, which sets each country's status score into a range from 0 (worst country) to 100 (best country).

Eq. 1a
$$X_{ic} = \frac{x_{ic} - min\{x_{ic}\}}{max\{x_{ic}\} - min\{x_{ic}\}} * 100$$

Eq. 1b
$$X_{ic} = \frac{max\{x_{ic}\} - x_{ic}}{max\{x_{ic}\} - min\{x_{ic}\}} * 100$$

where X_{ic} is the normalised value of indicator x_{ic} , with *i* being the indicator, *c* the country, and $max\{x_{ic}\}$ and $min\{x_{ic}\}$ being the maximum and minimum values of the indicator across all countries for the most recent year of available data. In line with step 1 (see above), equation (1a) is used when higher indicator values are better (e.g. employment rate), while equation (1b) is used when lower values are better

(e.g. greenhouse gas emissions per capita). Indicator status scores for the EU level are calculated in the same way, using the EU aggregate for each indicator and comparing it to the range of country values. The EU score is used later (in step 6 below) to calculate a country's status relative to the EU status.

Steps at goal level

5) Calculating average status score at goal level: for each country (and for the EU), the average status at goal level is calculated as the simple arithmetic mean over all indicators of that goal (including multi-purpose indicators). The status at goal level is only calculated if data are available for at least two-thirds of the indicators. Else, the respective SDG is not shown in the country's status/progress chart.

6) Calculating status relative to EU: in the final step, a country's status score at goal level is divided by the EU's status score of the same goal. This results in a figure expressed in % that illustrates how much a country's goal status is above or below (i.e. better or worse than) the EU status. In the example shown in Figure 2, the fictitious country's status for SDG 16 is 15 % above (i.e. better than) the EU.

Figure 2: Calculation of the status score for SDG 16 for a fictitious country



Note: the best and worst country values exclude outliers identified by means of the interquartile range (IQR) method.

Calculation of progress score

The progress score is an aggregate of the short-term (five-year) growth rates for all the indicators assessed for each goal. The methodology uses a scoring function and is identical to the calculation of progress at EU level for indicators without quantitative targets, resulting in values between + 5 (sustainable) and -5 (unsustainable), with 0 meaning no movement in either direction. It is important to note that the progress score calculation at MS level does not take into account any target values, since most EU policy targets are only valid at aggregate EU level. The progress calculation involves the following steps:

Steps at indicator level

1) Determining the desired direction: The 2030 Agenda or the EU policy context determine whether an indicator value should increase or decrease to show that the phenomena measured is becoming more sustainable.

2) Verifying data availability: in the next step, we verify whether a sufficiently long time series is available for each country to perform the compound annual growth rate (CAGR) calculation (see below), and whether the comparability of data within a country's time series is affected by breaks. For annual data, the short-term CAGR is calculated over the most recent 5 years of available data (meaning six subsequent reference years are needed). Longer or shorter time series are used when data are collected irregularly or when the time series contains breaks or data gaps.

In contrast to the status calculation, which looks at the performance of a country in relation to the other countries, the country's progress is calculated independently from the other countries. Thus, using relative data to ensure comparability of countries is not required and the detection of outliers in the distribution of all countries is unnecessary. The progress calculation usually uses the same measurement unit of the data that is used for the indicator evaluation at EU level. This means that for some indicators, the progress score calculation is based on a different unit than the status calculation. For example, for primary and final energy consumption (sdg_07_10 and sdg_07_11), the progress calculation is based on absolute data (million tonnes of oil equivalent), whereas the status calculation is based on relative data (tonnes of oil equivalent per capita).

3) Calculating the compound annual growth rate (CAGR): once the start and end year for the progress calculation have been fixed for each country, the compound annual growth rate (CAGR) is calculated with the following formula:

$$CAGR = \left(\frac{y_t}{y_{t_0}}\right)^{\frac{1}{t-t_0}} - 1$$
Eq. 2

where t_0 = base year, t = most recent year, y_{t0} = indicator value in base year, y_t = indicator value in most recent year. At this stage, some countries' progress scores need to be manually adjusted, for example when a country has already achieved the maximum possible value of an indicator (e.g. 100 % of young children participating in early childhood education) and has maintained this level over time. Also, the CAGR calculation is not possible in case the value in the base year (t₀) is zero, and it delivers wrong results when one of the values is negative and the other one is positive. In all these cases, the CAGR is manually set to + 100 % or – 100 %, depending on the desired direction of an indicator (as defined in step 1).

4) Transforming growth rates into scores: the indicator growth rates resulting from step 3 are converted into scores using the scoring function illustrated in Figure 3. This scoring function is identical to the one used for calculating goal-level scores at EU level (for indicators without targets). The scoring function is a linear transformation, with cut-off points set at growth rates (CAGR) of 2.0 % and – 2.0 %. Indicators with a growth rate of exactly 0.0 % receive a score of 0. Indicators with growth rates of 2.0 % or above in the desired direction receive a score of + 5, indicators with growth rates of 2.0 % or above in the wrong direction receive a score of -5.



Figure 3: Scoring function for indicators without quantitative target

Steps at goal level

5) Calculating average progress score at goal level: for each country, the average progress at goal level is calculated as the simple (arithmetic) mean over all indicators of that goal (including multi-purpose indicators). Progress at goal level is only calculated if country data are available for at least two-thirds of the goal's indicators. If the share is below this threshold, the goal is not shown in the country's status/progress chart. Figure 4 presents an example of the calculation of the progress score for a fictitious country and a fictitious goal containing four indicators (for all of which an increase is the desired direction). It shows how the indicator growth rates are transformed into scores between + 5 and - 5, which are then averaged at goal level.





Interpretation of status/progress charts

In the <u>SDG country overview</u> and in the Commission's <u>European Semester country</u> reports, countries' progress scores are plotted against their status scores. The vertical axis shows the status of the SDGs in the depicted country relative to the EU average. SDGs in the upper part of the graph have a status above the EU average, SDGs in the lower part have a status below the EU average. The right side of the graph displays SDGs where the country has made progress whereas the left side indicates movements away from the SDGs. This results in four quadrants, which can be characterised as shown in Figure 5.



Figure 5: Interpretation of status/progress charts

- I. The country is progressing towards the SDG, and the country's average score for the SDG is above the EU average.
- II. The country is progressing towards the SDG, but the country's average score for the SDG is below the EU average.
- III. The country is moving away from the SDG, but the country's average score for the SDG is above the EU average.
- IV. The country is moving away from the SDG, and the country's average score for the SDG is below the EU average.

Adjustments applied to the status/progress calculations for the 2025 SDG monitoring exercise

Indicator selection

As mentioned above, an average status and progress at goal level is only calculated if for a country data are available for at least two-thirds of the indicators of that goal (including multi-purpose indicators). As some indicators do not have country-level data, the set of indicators for the status/progress calculations at country level has been adjusted and is thus not identical to the set of indicators for the EU-level assessment. Below, the exceptions applied to the status/progress calculations of countries for the 2025 monitoring are described. Indicators that entirely lack country-level data are not considered for determining whether country data are available for at least two-thirds of the indicators of a goal.

- **SDG 2:** when available, country data for the <u>farmland bird index</u> from table env_bio2 are included in the status and progress calculations.
- SDG 4: the indicator Share of individuals having at least basic digital skills (sdg_04_70) is excluded from the status and progress calculations since it only has data for two years (2021 and 2023). For the indicator Low achieving 15-year-olds in reading, mathematics or science (sdg_04_40), only one of the three subject categories 'mathematics' is used for the progress and status calculation.
- **SDG 5:** the indicator **Gender-based violence against women (sdg_05_11)** is excluded from the status and progress calculations since it only has data for a single year (2021).
- SDG 10: the indicators Disparities in GDP per capita (sdg_10_10), Disparities in household income per capita (sdg_10_20) and Asylum applications (sdg_10_60) are excluded from the status and progress calculations. For the first two indicators (sgd_10_10 and sdg_10_20), this is because the calculation of disparities is only relevant at EU level (since the indicators monitor inequalities between countries). The third indicator (sdg_10_60) is excluded because the desired direction is unclear (it is also not evaluated at EU level for the same reason).
- SGD 12: the indicator Consumption of hazardous chemicals (sdg_12_10) is excluded from the calculations because it does not have country-level data.

- SDG 14: the indicators Estimated trends in fish stock biomass (sdg_14_21), Estimated trends in fishing pressure (sdg_14_30) and Mean surface seawater acidity (sdg_14_50) are excluded from the calculations because the scope of the data is not applicable to individual countries.
- SDG 15: the indicators Common bird index (sdg_15_60) and Grassland butterfly index (sdg_15_61) are excluded from the calculations because they do not have country-level data.
- **SDG 17:** the indicator **EU financing to developing countries (sdg_17_20)** is excluded from the status and progress calculations since it only has absolute data (EUR million) that are not comparable across countries.

Differences in measurement units

Agricultural real factor income per annual work unit (AWU) (sdg 02 20)

In addition to the above-mentioned exceptions, the following table lists the indicators for which different units are used for a country's status and progress calculations. As mentioned above, the calculation of a country's progress score is based on the same measurement unit as the EU-level assessment, and in case this is an absolute unit that is not comparable between countries, the calculation of the status score needs to use a different (relative) measurement unit for the same indicator.

progress calculations								
Indicator	Absolute unit for progress calculation	Relative unit for status calculation						
Persons at risk of poverty or social exclusion (sdg_01_10)	Million persons	% of population						
Persons at risk of monetary poverty after social transfers (sdg_01_20)	Million persons	% of population						
Severe material and social deprivation (sdg_01_31)	Million persons	% of population						
Persons living in households with very low work intensity (sdg_01_40)	Million persons aged less than 65	% of population aged less than 65						

Chain-linked

2015=100

volumes. index

Table 1: Indicators for which measurement units differ between status and progress calculations

EUR, chain

(2015)

linked volumes

Indicator	Absolute unit for progress calculation	Relative unit for status calculation
Government budget appropriations or outlays on R&D (sdg_02_30)	Million euro	Euro per inhabitant
Ammonia emissions from agriculture (sdg_02_60)	Million tonnes	Kg per hectare of utilised agricultural area
Primary energy consumption (sdg_07_10)	Million tonnes of oil equivalent (Mtoe)	Tonnes of oil equivalent (Toe) per inhabitant
Final energy consumption (sdg_07_11)	Million tonnes of oil equivalent (Mtoe)	Tonnes of oil equivalent (Toe) per inhabitant
Patent applications to the European Patent Office (sdg_09_40)	Number	Number per million inhabitants
Soil sealing index (sdg_11_32)	Index 2006=100	% of total surface
Road traffic deaths (sdg_11_40)	Number	Rate
Premature deaths due to exposure to fine particulate matter (PM _{2.5}) (sdg_11_52)	Number	Rate
Raw material consumption (sdg_12_21)	Thousand tonnes	Tonnes per inhabitant
Consumption footprint (sdg_12_31)	Planetary boundaries	Per inhabitant
Gross value added in environmental goods and services sector (sdg_12_61)	Million euro	% of GDP
Net greenhouse gas emissions (sdg_13_10)	Index 1990 = 100	Tonnes per inhabitant
Net greenhouse gas emissions from land use and forestry (sdg_13_21)	Million tonnes of CO ₂ equivalent	Tonnes of CO ₂ equivalent per km ²

Indicator	Absolute unit for progress calculation	Relative unit for status calculation
Climate-related economic losses (sdg_13_30)	Million euro	Euro per inhabitant
Contribution to the international 100bn USD commitment on climate related expending (sdg_13_50)	Million euro	% of GNI (²)
Marine waters affected by eutrophication (sdg_14_60)	Km²	% of EEZ
Drought impact on ecosystems (sdg_15_42)	Km²	% of country area
Estimated severe soil erosion by water (sdg_15_50)	Km²	% of the non- artificial erodible area
General government total expenditure on law courts (sdg_16_30)	Million euro	Euro per inhabitant

Example of status and progress calculation for a country

This section illustrates the status and progress calculations described above based on the example of SDG 2 for Sweden from the 2025 monitoring. Table 2 shows the data for Sweden used for the status and progress calculations, including the best and worst country values used for the relative status assessment (including specification of outliers that were excluded before the calculations).

Table 2: Data for status & progress calculations for Sweden, 2025 countrychart

Indicator	Most recent year for SE (t)	t-5 years for SE (t ₀)	Value for SE in (t) (absolute / relative)	Value for SE in (t ₀) (absolut e / relative)	Best country (relative unit only)	Worst country (relative unit only)
Obesity rate (sdg_02_10)	2022	2017	17.2 %	17.4 %	7.1 % (Italy)	26.1 % (Malta)
Agricultural real factor	2024	2019	36 931 EUR per AWU	27 544 EUR per AWU	53 567 EUR per	3 508 EUR per

Indicator	Most recent year for SE (t)	t-5 years for SE (t ₀)	Value for SE in (t) (absolute / relative)	Value for SE in (t ₀) (absolut e / relative)	Best country (relative unit only)	Worst country (relative unit only)
income (sdg_02_20)					AWU (Denmark)	AWU (Romania)
Gov. support to agri R&D (sdg_02_30)	2023	2018	49.4 mio EUR / 4.7 EUR per capita	42.8 mio EUR / 4.2 EUR per capita	23.6 EUR per capita (Netherlan ds)	0.2 EUR per capita (Poland)
Organic farming (sdg_02_40)	2022	2017	19.9 %	19.2 %	25.7 % (Austria; 2020 data)	0.6 % (Malta)
Pesticides (sdg_02_53)	2022	2017	90 index	95 index	38 index (Luxembou rg)	109 index (Denmark)
Ammonia emissions (sdg_02_60)	2022	2017	44 188 tonnes / 14.8 kg/ha	45 487 tonnes / 15.1 kg/ha	6.4 kg/ha (Latvia)	43.8 kg/ha (Belgium) because Malta (133.7), Cyprus (61.3) and Netherlan ds (58.3) are outliers
Nitrate in groundwater (sdg_06_40)	2022	2017	N/A	N/A	0.16 mg (Finland)	34.89 mg (Bulgaria) because Malta (58.21) and Spain (49.76) are outliers
Soil erosion (sdg_15_50)	2016	2010	2 501.5 km² / 0.68 %	2 527.4 km² / 0.68 %	0 % (Denmark & Estonia)	15.5 % (Austria) because Italy (24.93 %) and Slovenia

Indicator	Most recent year for SE (t)	t-5 years for SE (t ₀)	Value for SE in (t) (absolute / relative)	Value for SE in (t ₀) (absolut e / relative)	Best country (relative unit only)	Worst country (relative unit only)
						(18.99 %) are outliers
Farmland bird index (sdg_15_60 / env_bio2)	2022	2017	78.7 index	79.8 index	107.4 index (Ireland; 2016 data)	45.2 index (Lithuania)

Based on the data in the table above, the following status and progress scores are calculated for Sweden per indicator (note that if both absolute and relative data are given in the table above, the CAGR calculations are based on the absolute values, while the status calculations use the relative data):

- Obesity rate (sdg_02_10)
 - CAGR (2017-2022) = -0.2% → Progress score = 0.58
 - Status score (2022) = 46.8
- Agricultural real factor income (sdg_02_20)
 - \circ CAGR (2019-2024) = 6.0% → Progress score = 5.00
 - Status score (2024) = 66.8
- Gov. support to agri R&D (sdg_02_30)
 - CAGR (2018-2023) = $2.9\% \rightarrow$ Progress score = 5.00
 - Status score (2023) = 19.2
- Organic farming (sdg_02_40)
 - CAGR (2017-2022) = 0.8% → Progress score = 2.00
 - Status score (2022) = 77.1

- Pesticides (sdg_02_53)
 - CAGR (2017-2022) = -1.1% → Progress score = 2.69
 - Status score (2022) = 26.8
- Ammonia emissions (sdg_02_60)
 - CAGR (2017-2022) = -0.6% → Progress score = 1.44
 - Status score (2022) = 77.5
- Nitrate in groundwater (sdg_06_40)
 - No data for Sweden → indicator is excluded for status & progress calculations for this country
- Soil erosion (sdg_15_50)
 - CAGR (2010-2016) = -0.2% → Progress score = 0.43
 - Status score (2016) = 95.6
- Farmland bird index (sdg_15_60 / env_bio2)
 - CAGR (2017-2022) = -0.3% → Progress score = -0.68
 - Status score (2022) = 53.9

The calculation of the goal-level scores using the arithmetic mean over all abovementioned indicators results in the following SDG 2 scores for Sweden:

- SDG 2 progress score: 2.06
- SDG 2 status score: 58.0, which is 13.8% above the EU score of 51.0

The progress and status (relative to the EU) scores are reflected in the SDG 2 position in Sweden's country graph in Figure 6.



Figure 6: Sweden's status & progress scores (MR 2022)

Notes

(¹) See <u>Hoaglin, D. C., Iglewicz, B., & Tukey, J. W. (1986). Performance of Some Resistant Rules for</u> Outlier Labeling. *Journal of the American Statistical Association*, 81(396), 991-999 and <u>Hoaglin, D. C.,</u> & Iglewicz, B. (1987). Fine-Tuning Some Resistant Rules for Outlier Labeling. *Journal of the American Statistical Association*, 82(400), 1147-1149.

(²) Data in this unit are not available in table sdg_13_50 but have been calculated manually using GNI data from table nasa_10_nf_tr.