Last updated: 09 October 2019  
  
Goal 12: Ensure sustainable consumption and production patterns  
  
Target: 12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses  
  
Indicator: 12.3.1 (a) Food loss index and (b) food waste index  
  
  
  
This metadata refers only to part (a) of the indicator 12.3.1: Food loss index.   
  
  
  
Institutional information  
  
  
  
Organization(s):  
  
Food and Agriculture Organization of the United Nations   
  
  
  
Concepts and definitions  
  
  
  
Definition:  
  
Index of the changes in the food losses percentages along the supply chain of key commodities over time.  
  
  
  
The indicator is computed as a ratio of Food Loss Percentages in the current year and the Food Loss Percentages in the base year according to a standard fixed-base index formula.   
  
  
  
FAO proposes to define food losses to be measured in the framework of SDG indicator 12.3.1 (a) as:   
  
Food losses are all the crop and livestock human-edible commodity quantities that, directly or indirectly, completely exit the post-harvest/slaughter production/supply chain by being discarded, incinerated or otherwise, and do not re-enter in any other utilization (such as animal feed, industrial use, etc.), up to, and excluding, the retail level. Losses that occur during storage, transportation and processing, also of imported quantities, are therefore all included. Losses include the commodity as a whole with its non-edible parts.  
  
  
  
The Food Loss Index scope within food chains is described as follows:  
  
The Food Loss Index for SDG monitoring and reporting purposes will be aligned with the Food Balance Sheets framework, starting with postharvest operations on the farm up to but not including the retail level,  
  
The scope of the index at the national level narrows down to 10 key commodities set by the countries in five headings for comparability.   
  
At country level, countries can include harvest losses in the scope of the index through ad hoc surveys and by adjusting the concept of production.   
  
Pre-harvest losses are covered by Target 1.5. Moreover, pre-harvest losses refer to the concept of potential production that cannot be used for the indicator.  
  
A separate Food Waste Index is being developed to cover food waste at the retail and consumption level.  
  
  
  
Rationale:  
  
The 2030 Sustainable Development Agenda has emphasized the importance of sustainable production and consumption systems as efficient food systems, on the supply side and the consumption side, contribute to food security and sustainability of natural resource since agriculture is a major user of land and water.   
  
  
  
The indicator looks at the trend in structural losses. It monitors progress on the supply side of food chains, as it measures if the share of agriculture production that does not reach the retail stage in 2030 has increased or decreased with respect to the base period and by how much. The numerator of the indicator indicates the level of losses and informs on the magnitude of the problem.  
  
A greater efficiency of the food supply chain has also implications for all producers whether looking at efficiency in large-scale producers for export markets or in small-scale production units relevant for poverty and food insecurity reduction goals.  
  
  
  
Concepts:  
  
The following concepts are adopted for the calculation of indicator 12.3.1:  
  
Quantitative food loss and waste – is the decrease in mass of food (FAO’s Conceptual Framework for Food Losses and Waste).  
  
Loss takes place from the point of maturity up to but excluding the retail stage (the meaning of ‘maturity’ for livestock and fish must be defined). For the indicator and the data collected loss is measured in percentage terms (id).  
  
Agriculture production data for crops refer to the actual harvested production from the field orchard or garden, excluding harvesting and threshing losses and that part of crop not harvested for any reason.  
  
The value of production which serves as weights is equal to production quantities multiplied by a reference price. The reference prices used in the GFLI are international dollar prices calculated using the Geary Khamis equation method and based on FAOSTAT production and produce price data. Value of production is also the default selection criteria for the ten key commodities by country.  
  
The FLI is based on the international Central Product Classification version 2.1 expanded. Commodities are then grouped according to FAO’s Food Groups used in the Supply Utilization Accounts and Food Balance Sheets and further grouped into fine main categories.  
  
  
  
Comments and limitations:  
  
Food losses are an extremely complex phenomenon to measure because they are multi-dimensional and data collection is costly.  
  
  
  
A major limitation is data availability. The reported data accounts for a small percentage or the data needs: only 23 countries out of 185 reported on losses in 2016 for one commodity or more and only 4.4% of loss factors in the SUA/FBS database are officially reported, all others being estimated  
  
  
  
The index is limited in scope as harvest losses cannot be included in the international indicator for comparability reasons. Moreover, the index covers ten key commodities in each country, because requesting regular loss data for a larger number of crops would be a difficult and unsustainable exercise for most countries.  
  
  
  
The index covers quantitative losses only, that challenging enough to measure. Qualitative and economic losses are also very relevant but less consistent out of the scope of the indicator.  
  
  
  
This indicator is particularly challenging for countries because it requires several surveys to collect all the necessary information along the supply chain. The most appropriate data sources would be an ensemble of surveys however, most countries lack the capacity and resources to carry out this exercise. A suite of statistical and modelling tools, combined where possible with administrative records will have to be used.  
  
  
  
Methodology  
  
  
  
Computation Method:  
  
SDG 12.3 for a single country, called Food Loss Index (FLI), is a fixed-based index as follows:  
  
  
  
  
  
Where:   
  
 is the average food loss percentage of the country in the current year  
  
 is the average food loss percentage of the country in the base year  
  
i = country,   
  
j = commodity, the GFLI will cover the top 10 commodities in five main categories  
  
t = year, 0 is the base year  
  
 is the loss percentage (estimated or observed) of commodity j in country i year t   
  
 is the production quantities by country, commodity in the base period  
  
 is the average 2004-2006 international price by commodity (at international $)   
  
  
  
  
  
  
  
The weights for the GFLI reflect the economic importance of the country’s agricultural value of production at international dollar prices relative to the rest of the world. For the FLI and FLP, the weights are the value of the focus commodities at international dollar prices. The weight is fixed in the reference year. The weighting pattern was chosen based on the efficiency of markets operating in economic terms, rather than based on contribution to diets (caloric or protein value), environmental factors or other non-market valued opportunity costs.   
  
  
  
Commodity Coverage  
  
One of the challenges in effectively measuring the progress of the FLI is the coverage of commodities. Countries will not be able to measure losses of all commodities in their production system and the key commodities can differ across countries, while international comparability is needed. The proposal for the index to cover ten commodities by country in five groups ensures the index relevance to the countries while providing some degree of international comparability.  
  
  
  
The default selection criterion for the priority commodities and the related FLI is to rank commodities by value of production in within each country and commodity group. The default process is to:  
  
• Compile value of production for every commodity  
  
• Group commodities by category and rank them  
  
• Select the top 2 in each group  
  
  
  
The default selection process is based on value of the commodity in international dollar prices in the base year. At national level, countries can use their own set of values, quantities or prices, or use different policy based criteria, as long as the main headings are covered.   
  
  
  
The five main headings, with two commodities per heading are:   
  
1. Cereals & Pulses  
  
2. Fruits & Vegetables  
  
3. Roots & Tubers and Oil-Bearing crops  
  
4. Animals Products  
  
5. Fish and Fish Products.  
  
  
  
Aggregating the loss percentages along the value chain for each commodity, country and year   
  
  
  
The objective of the FLI is to estimate losses at the national level from production to the retail level in line with the Food Balance Sheet conceptual framework. Using the index notation, these percentage losses are the where:  
  
  
  
 is the loss percentage (estimated or observed) of commodity j in country i year t   
  
  
  
When losses are not estimated for the entire tract of the supply chain, they can be broken by stage of the value chain. It is expected that the losses at each stage of the value chain are nationally representative, but that there are underlying distributions of different actors at each stage. The best method for estimating losses and ensuring comparability across stages and time is a sample survey using objective measurement.  
  
  
  
  
  
A simplified process is proposed to standardize losses and aggregate losses along the supply chain to obtain the overall percentage of production that does not reach the retail stage. The process assumes that measured losses at each point are independent of each other and works in the following way:  
  
 The percentage along the stages in the supply chain are applied to a reference quantity and subtracted from the remainder of the previous stage’s amount. This enables to take into account imports at the various stages of the supply chain (primary products at wholesale level, semi-processed products for further processing, etc.).  
  
At the end of the supply chain the remainder is then divided by the original reference quantity to convert back to a percentage.   
  
  
  
   
  
Starting Amount - Agriculture production  
  
1000  
  
   
  
  
  
Average Losses (%)  
  
Farm  
  
Transport  
  
Storage  
  
Wholesale  
  
Processing  
  
  
  
7.3  
  
1.5  
  
7.7  
  
0  
  
3.5  
  
Amount Lost  
  
73  
  
13.905  
  
70.308  
  
0  
  
29.497  
  
Amount Remaining  
  
927  
  
913.095  
  
842.787  
  
842.787  
  
813.289  
  
   
  
% of total supply still in the market  
  
81.3% = (813.289/1000) \*100   
  
% lost from farm to (but not including) retail  
  
18.7% = (1-0.813)\*100  
  
Table 1. Aggregation of Maize Loss percentages along the supply chain  
  
The 18.7% in the table would then be the reported quantity for that supply chain, for the country in the given year. This percentage would be applied to the production to calculate the quantity of losses to be reported in the Food Balance Sheets. The loss percentage would also be used in the Food Loss Index for the country, an applied to the base weights and then can be compared to the loss percentages times the weights in the base year to analyze the trends over time.  
  
  
  
Disaggregation:  
  
Sub-indicator 12.3.1 must be disaggregated by product and stage of the supply chain at the country level.   
  
Countries will likely gain the most value from the disaggregated Food Loss Percentage at the sub-national level by geographic area or agro-ecological zone, points of the value chain (farm, transport, markets, processers), economic sectors (small-holders or traditional sector versus large and commercial farms/firms).  
  
  
  
Treatment of missing values:  
  
  
  
At country level  
  
When no food loss is available at the country-commodity level, FAO developed a loss imputation model to estimate losses of all countries and commodities and compile the Global Food Loss Index for SDG regions and commodity groups.  
  
  
  
The model builds on loss data provided by the countries to the FAO within the annual Agriculture Production Questionnaires, loss factors available in the scientific literature and from case studies, and a set of 200+ explanatory variables.   
  
  
  
The model is a fixed effect model that selects the explanatory variables using a random forest algorithm. Where there is no information at all for a country-commodity combination, the model is applied to a cluster of commodities and the countries’ estimated loss percentages will be equal to the cluster’s at global level.  
  
  
  
  
  
At regional and global levels  
  
When loss data is insufficient to estimate even one country-commodity combination, the countries’ estimated loss percentages will be equal to the cluster’s at global level for all the ten commodities in that country basket.  
  
  
  
Regional aggregates:  
  
  
  
  
  
At regional and global level, the GFLI is computed as:   
  
  
  
  
  
  
  
by aggregating country indices using weights equal to the total value of agricultural production of each country (in the region or the world) in the base year.  
  
  
  
  
  
Sources of discrepancies:  
  
Not yet applicable  
  
  
  
Methods and guidance available to countries for the compilation of the data at the national level:  
  
  
  
The main source of loss data at the national level are:   
  
Official reports of loss estimates in the commodity balance sheets, Supply Utilization Accounts or Food Balance Sheets  
  
  
  
Data sources for agricultural production and on-farm losses are mainly national agricultural surveys that are conducted by the Ministry of Agricultural/Livestock and/or the National Statistical Office. The surveys are usually annual, and in the absence of direct measurements, results are based on interview-based data on lost quantities of crop, animals and animal products. Agricultural censuses, which FAO recommends conducting every ten years, may be the only available source of loss estimates in a number of countries that do not carry out annual surveys. Off-farm loss data along the value chain may be obtained through specialized surveys (supplemented by research) through the national agri-food industry system.   
  
  
  
The Guidelines for the measurement of harvest and post-harvest losses of grain produced by the Global Strategy are available at http://gsars.org/en/guidelines-on-the-measurement-of-harvest-and-post-harvest-losses/ with an on-line training course available at http://gsars.org/en/training-course-on-post-harvest-losses-english/#more-3855 . Additional material is available at http://www.fao.org/sustainable-development-goals/indicators/1231/en/   
  
  
  
Utilizations of interest here are those quantities destined for, among others, animal feed, for industrial uses (e.g. biofuel production), for national/enterprise/farm stocks, for seed (sowing for the successive agricultural cycle) – to be able to infer on quality and economic losses, that are not covered by the definition and data collection, and to assess the overall data consistency in the validation phase.  
  
  
  
These datasets (production, trade and utilizations including losses), once cross-checked and validated, form the basis for the compilation of the Food Balance Sheets (FBS). The FBS are an accounting framework whereby supply (production + imports + stock withdrawals) should equal utilization (export + food processing + feed + seed + industrial use + losses, etc.). It should be noted that, within the FBS framework, post-harvest/slaughter losses (up to the retail level) are considered as utilization, and thus a component in the balancing of the FBS. The FBS framework provides a snapshot of the agricultural supply situation at the national level, and allows for a cross-referenced structure whereby data, official or estimated/imputed, may be further analyzed and validated (e.g. animal numbers may result as being under-reported/estimated).   
  
  
  
The new FBS Guidelines for national compilation (completed recently in collaboration with the Global Strategy) and new compilation tool (R-based ‘shiny’ application).   
  
  
  
Detail on FBS methodology: http://www.fao.org/economic/ess/fbs/ess-fbs02/en/.   
  
The FBS Handbook shown here should not be confused with the recently completed FBS Guidelines. The Handbook is of a more technical nature and explains the methodology followed by FAO in compiling country FBS. The Guidelines on the other hand, while based on the Handbook, provide countries with a more revised and practical guidance and recommendations for compilation at the national level.   
  
  
  
Some FBS background text also available on FAOSTAT: http://www.fao.org/faostat/en/#data/FBS.  
  
  
  
  
  
  
  
Quality assurance  
  
  
  
For FAO, a sound statistical basis is essential in monitoring progress towards national and international development goals and targets. To this end, the organization developed a Quality Assurance Framework for the FAO Statistics system (FAO SQAF) consisting of a quality framework and a mechanism to ensure the compliance of FAO statistics to the quality framework itself. The SQAF is available at http://www.fao.org/3/i3664e/i3664e.pdf .  
  
  
  
With respect to officially reported loss data submitted by countries through the annual Agriculture Production Questionnaire, loss data is validated during the whole Supply Utilization Account/Food Balance Sheet processing and validation that entails a purely statistical approach based on outlier detection tests and validation routines and a consultative approach where countries are requested for additional information or clarifications. The same approach applies to the date received in 2019 though the ad hoc questionnaire on “Food Losses from Production to the Retail stage”.  
  
  
  
More generally FAO complies with “Guidelines on global data flows” approved by UNSC 2018 for the national data submitted to FAO for the SDGs Indicators Database. With respect to losses that is extremely scarce dataset (7% of reported records in FAOSTAT in the period 1990-2016), and to the extent that country data has to be estimated with an econometric model, the estimates are validated with countries via an email asking for an authorization to publish them.   
  
  
  
In 2019, the available basic data still did not allow for the publication of the Food Loss Index at the country level but only at the regional level by commodity groups.   
  
Data Sources  
  
  
  
Description:  
  
Loss data collection is already taking place though FAO’s annual Agriculture Production Questionnaire in April every year.   
  
  
  
The loss section needs to be strengthened and broken down by stage of the value chain.   
  
For this reason it is foreseen that a separate data collection exercise may start after the indicator has been up-graded.  
  
  
  
Data Availability  
  
  
  
Description:  
  
Not yet applicable. Some data is provided from available suitable surveys in selected countries  
  
  
  
Calendar  
  
  
  
Data collection:  
  
 Loss data collection is already taking place though FAO’s annual Agriculture Production Questionnaire in May every year.   
  
   
  
 The loss section needs to be strengthened and broken down by stage of the value chain.   
  
 For this reason a separate data collection exercise took place in 2019 after the indicator had been up-graded.  
  
   
  
Data release:  
  
To be determined  
  
  
  
Data providers  
  
Given the various data sources, national data providers vary. Official information on food commodity production and utilization used by FAO to compile Food Balance Sheets is provided mainly by Statistical Units of the Ministry of Agriculture or the National Statistical Offices.  
  
  
  
Data compilers  
  
Food and Agricultural Organization of the United Nations, Statistics Division, Methodological Innovation Team and Crop Livestock and Food Balance Sheet team.  
  
References  
  
FAO, “FAO Approach for Monitoring SDG12.3: Measuring & Estimating Losses for Compiling the Global Food Loss Index”, Office of the Chief Statistician and Statistics Division, FAO, Rome, http://www.fao.org/3/CA2640EN/ca2640en.pdf   
  
  
  
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GSARS, “Guidelines on the measurement of harvest and post-harvest losses”, http://gsars.org/wp-content/uploads/2018/06/GS-PHL-GUIDELINES-completo-09.pdf , 2018.  
  
  
  
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URL:  
  
  
  
References:  
  
  
  
Related indicators as of February 2020  
  
NA.

Last updated: 20 April 2020  
  
Goal: 12 Ensure sustainable consumption and production patterns  
  
  
  
Target: 12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature  
  
  
  
Indicator: 12.8.1 Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment  
  
  
  
Institutional information  
  
  
  
Organization(s):  
  
UNESCO Institute for Statistics (UNESCO-UIS)  
  
UNESCO Education Sector, Division for Peace and Sustainable Development, Section of Education for Sustainable Development (UNESCO-ED/PSD/ESD)  
  
  
  
Concepts and definitions  
  
  
  
Definition:  
  
Indicator 4.7.1/12.8.1/13.3.1 measures the extent to which countries mainstream Global Citizenship Education (GCED) and Education for Sustainable Development (ESD) in their education systems. This is an indicator of characteristics of different aspects of education systems: education policies, curricula, teacher training and student assessment as reported by government officials, ideally following consultation with other government ministries, national human rights institutes, the education sector and civil society organizations. It measures what governments intend and not what is implemented in practice in schools and classrooms.   
  
  
  
For each of the four components of the indicator (policies, curricula, teacher education, and student assessment), a number of criteria are measured, which are then combined to give a single score between zero and one for each component. (See methodology section for full details.)  
  
  
  
The indicator and its methodology have been reviewed and endorsed by UNESCO’s Technical Cooperation Group on the Indicators for SDG 4-Education 2030 (TCG), which is responsible for the development and maintenance of the thematic indicator framework for the follow-up and review of SDG 4. The TCG also has an interest in education-related indicators in other SDGs, including global indicators 12.8.1 and 13.3.1. The TCG is composed of 38 regionally representative experts from UNESCO Member States (nominated by the respective geographic groups of UNESCO), as well as international partners, civil society, and the Co-Chair of the Education 2030 Steering Committee. The UNESCO Institute for Statistics acts as the Secretariat.  
  
  
  
Rationale:  
  
In order to achieve SDG targets 4.7, 12.8 and 13.3, it is necessary for governments to ensure that ESD and GCED and their sub-themes are fully integrated in all aspects of their education systems. Students will not achieve the desired learning outcomes if ESD and GCED have not been identified as priorities in education policies or laws, if curricula do not specifically include the themes and sub-themes of ESD and GCED, and if teachers are not trained to teach these topics across the curriculum.   
  
  
  
This indicator aims to give a simple assessment of whether the basic infrastructure exists that would allow countries to deliver quality ESD and GCED to learners, to ensure their populations have adequate information on sustainable development and lifestyles in harmony with nature. Appropriate education policies, curricula, teacher education, and student assessment are key aspects of national commitment and effort to implement GCED and ESD effectively and to provide a conducive learning environment.  
  
  
  
Each component of the indicator is assessed on a scale of zero to one. The closer to one the value, the better mainstreamed are ESD and GCED in that component. By presenting results separately for each component, governments will be able to identify in which areas more efforts may be needed.  
  
  
  
In 1974, UNESCO Member States adopted the Recommendation concerning Education for International Understanding, Co-operation and Peace and Education relating to Human Rights and Fundamental Freedoms, which encapsulates many of the aims of SDG targets 4.7, 12.8 and 13.3. Every four years countries report on the implementation of the Recommendation. This well-established formal mechanism will be the data source for indicator 4.7.1/12.8.1/13.3.1. The seventh quadrennial reporting round is scheduled to take place in 2020.  
  
  
  
Concepts:  
  
Global Citizenship Education (GCED) and Education for Sustainable Development (ESD) nurture respect for all, build a sense of belonging to a common humanity, foster responsibility for a shared planet, and help learners become responsible and active global citizens and proactive contributors to a more peaceful, tolerant, inclusive, secure and sustainable world. They aim to empower learners of all ages to face and resolve local and global challenges and to take informed decisions and actions for environmental integrity, economic viability and a just society for present and future generations, while respecting cultural diversity.  
  
Comments and limitations:  
  
The indicator is based on self-reporting by government officials. However, countries will be asked to provide supporting evidence in the form of documents or links (e.g. education policies or laws, curricula, etc.) to back up their responses. In addition, UNESCO will compare responses with available information from alternative sources and, if appropriate, raise queries with national respondents. At the end of the reporting cycle, country responses and the supporting documents will be made publicly available.  
  
  
  
Methodology  
  
  
  
Computation Method:  
  
  
  
Information collected with the questionnaire for monitoring the implementation by UNESCO Member States of the 1974 Recommendation concerning Education for International Understanding, Co-operation and Peace and Education relating to Human Rights and Fundamental Freedoms will be used for the construction of the global indicator. For each of the four components of the indicator (policies, curricula, teacher education, and student assessment), a number of criteria are measured, which are then combined to give a single score between zero and one for each component. Only information for primary and secondary education will be used for calculation of indicator 4.7.1/12.8.1/13.3.1.  
  
  
  
Laws and policies  
  
  
  
The following questions are used to calculate the policies component of the indicator:  
  
  
  
A2: Please indicate which GCED and ESD themes are covered in national or sub-national laws, legislation or legal frameworks on education.   
  
There are eight GCED/ESD themes (cultural diversity and tolerance, gender equality, human rights, peace and non-violence, climate change, environmental sustainability, human survival and well-being, and sustainable consumption and production) and two levels of government (national and sub-national) = 16 responses.  
  
Response categories are no = 0, yes = 1, and unknown, which is treated as zero. Blanks are also treated as zeros.   
  
If more than half of responses are unknown or blank the component score is not calculated.   
  
Note that ‘not applicable’ is used where only one level of government is responsible for education.  
  
  
  
Question score = simple mean of the 0 and 1 scores, excluding not applicables (i.e., if eight of the 16 responses are ‘not applicable’, the sum of the 0 and 1 scores is divided by 8 to get the mean and not by 16).  
  
  
  
A4. Please indicate which GCED and ESD themes are covered in national or sub-national education policies, frameworks or strategic objectives.   
  
There are eight GCED/ESD themes (cultural diversity and tolerance, gender equality, human rights, peace and non-violence, climate change, environmental sustainability, human survival and well-being, and sustainable consumption and production) = 8 responses.   
  
Response categories are no = 0, yes = 1, unknown (treated as zero), and not applicable, which is ignored. Blanks are also treated as zeros.   
  
If more than half of responses excluding not applicables are unknown or blank, the component score is not calculated.  
  
  
  
Question score = simple mean of the 0 and 1 scores.  
  
  
  
A5. Please indicate whether national or sub-national education policies, frameworks or strategic objectives on education provide a mandate to integrate GCED and ESD.   
  
  
  
There are two levels of government (national, sub-national) and five areas of integration (curricula, learning objectives, textbooks, teacher education, and student assessment) = 10 responses.   
  
Response categories are no = 0, yes = 1, unknown (treated as zero), and not applicable, which is ignored. Blanks are also treated as zeros.   
  
If more than half of responses excluding not applicables are unknown or blank, the component score is not calculated.   
  
Note that ‘not applicable’ is used where only one level of government is responsible for education.  
  
  
  
Question score = simple mean of the 0 and 1 scores, excluding not applicables (i.e., if five of the 10 responses are ‘not applicable’, the sum of the 0 and 1 scores is divided by 5 to get the mean and not by 10).  
  
  
  
E1. Based on your responses to questions in the previous section (laws and policies) please indicate to what extent global citizenship education (GCED) and education for sustainable development (ESD) are mainstreamed in education laws and policies in your country.   
  
  
  
There are two levels of government (national, sub-national) = 2 responses.   
  
Response categories are not at all = 0, partially = 1, extensively = 2, unknown (treated as zero), and not applicable, which is ignored. Blanks are also treated as zeros.   
  
If more than half of responses excluding not applicables are unknown or blank, the component score is not calculated.   
  
Note that ‘not applicable’ is used where only one level of government is responsible for education.  
  
  
  
Question score = half the simple mean of the 0, 1 and 2 scores, excluding not applicables (i.e., if one of the two responses is ‘not applicable’, the sum of the 0, 1 and 2 scores is divided by 2 to get half the mean and not by 4). The score is half the mean in order to ensure it lies between 0 and 1 as do the scores for the other three questions in this section.  
  
  
  
Policy component score = simple mean of the scores for questions A2, A4, A5 and E1 (except where the component score should not be calculated because too many responses were unknown or blank).  
  
  
  
Curricula  
  
  
  
The following questions are used to calculate the curricula component of the indicator:  
  
  
  
B2: Please indicate which GCED and ESD themes are taught as part of the curriculum.   
  
  
  
There are eight GCED/ESD themes (cultural diversity and tolerance, gender equality, human rights, peace and non-violence, climate change, environmental sustainability, human survival and well-being, and sustainable consumption and production) = 8responses.  
  
Response categories are no = 0, yes = 1, and unknown, which is treated as zero. Blanks are also treated as zeros.   
  
If more than half of responses are unknown or blank, the component score is not calculated.   
  
Note that responses to ‘other subjects, please specify’ in the question are ignored. If appropriate, during quality assurance answers in this category may be recoded to one of the other 12 subjects.  
  
  
  
Question score = simple mean of the 0 and 1 scores.  
  
  
  
B4. Please indicate the approaches used to teach GCED and ESD in primary and secondary education.   
  
  
  
There are four teaching approaches (GCED/ESD as separate subjects, cross-curricular, integrated, whole school) = 4 responses.   
  
Response categories are no = 0, yes = 1, and unknown, which is treated as zero. Blanks are also treated as zeros.   
  
If more than half of responses are unknown or blank the component score is not calculated.  
  
  
  
Question score = simple mean of the 0 and 1 scores.  
  
  
  
E1. Based on your responses to questions in the previous section (curricula) please indicate to what extent global citizenship education (GCED) and education for sustainable development (ESD) are mainstreamed in curricula in your country.   
  
  
  
There are two levels of government (national, sub-national) = 2 responses.  
  
Response categories are not at all = 0, partially = 1, extensively = 2, unknown (treated as zero), and not applicable, which is ignored. Blanks are also treated as zeros.   
  
If more than half of responses excluding not applicables are unknown or blank, the component score is not calculated.  
  
Note that ‘not applicable’ is used where only one level of government is responsible for education.  
  
  
  
Question score = half the simple mean of the 0, 1 and 2 scores, excluding not applicables (i.e., if one of the two responses is ‘not applicable’, the sum of the 0, 1 and 2 scores is divided by 2 to get half the mean and not by 4). The score is half the mean in order to ensure it lies between 0 and 1, as do the scores for the other three questions in this section.  
  
  
  
Curricula component score = simple mean of the scores for questions B2, B3, B4 and E1 (except where the component score should not be calculated because too many responses were unknown or blank).  
  
  
  
Teacher education  
  
  
  
The following questions are used to calculate the teacher education component of the indicator:  
  
  
  
C2: Please indicate whether teachers, trainers and educators are trained to teach GCED and ESD during initial or pre-service training and/or through continuing professional development.   
  
  
  
There are two types of training (initial/pre-service and continuing professional development) and two types of teachers (of selected subjects in which ESD/GCED are typically taught, and of other subjects) = 4 responses.   
  
Response categories are no = 0, yes = 1, and unknown, which is treated as zero. Blanks are also treated as zeros.   
  
If more than half of responses are unknown or blank, the component score is not calculated.  
  
  
  
Question score = simple mean of the 0 and 1 scores.  
  
  
  
C3. Please indicate on which GCED and ESD themes pre-service or in-service training is available for teachers, trainers and educators.   
  
  
  
There are eight GCED/ESD themes (cultural diversity and tolerance, gender equality, human rights, peace and non-violence, climate change, environmental sustainability, human survival and well-being, and sustainable consumption and production) = 8 responses.  
  
Response categories are no = 0, yes = 1 and unknown, which is treated as zero. Blanks are also treated as zeros.   
  
If more than half of responses are unknown or blank, the component score is not calculated.  
  
  
  
Question score = simple mean of the 0 and 1 scores.  
  
  
  
C4. Please indicate whether teachers, trainers and educators are trained to teach the following dimensions of learning in GCED and ESD.   
  
  
  
There are four learning dimensions (knowledge, skills, values, and attitudes/behaviours) = 4 responses.   
  
Response categories are no = 0, yes = 1, and unknown, which is treated as zero. Blanks are also treated as zeros.   
  
If more than half of responses are unknown or blank, the component score is not calculated.  
  
  
  
Question score = simple mean of the 0 and 1 scores.  
  
  
  
C5. Please indicate whether teachers, trainers and educators are trained to use the following approaches to teach GCED and ESD in primary and secondary education.   
  
  
  
There are four teaching approaches (GCED/ESD as separate subjects, cross-curricular, integrated, whole school) = 4 responses.   
  
Response categories are no = 0, yes = 1 and unknown, which is treated as zero. Blanks are also treated as zeros.   
  
If more than half of responses are unknown or blank, the component score is not calculated.  
  
  
  
Question score = simple mean of the 0 and 1 scores.  
  
  
  
E1. Based on your responses to questions in the previous section (teacher education), please indicate to what extent global citizenship education (GCED) and education for sustainable development (ESD) are mainstreamed in teacher education in your country.   
  
  
  
There are two levels of government (national, sub-national) = 2 responses.   
  
Response categories are not at all = 0, partially = 1, extensively = 2, unknown (treated as zero), and not applicable (which is ignored). Blanks are also treated as zeros.   
  
If more than half of responses excluding not applicables are unknown or blank, the component score is not calculated.  
  
Note that ‘not applicable’ is used where only one level of government is responsible for education.  
  
  
  
Question score = half the simple mean of the 0, 1 and 2 scores, excluding not applicables (i.e., if one of the two responses is ‘not applicable’, the sum of the 0, 1 and 2 scores is divided by 2 to get half the mean and not by 4). The score is half the mean in order to ensure it lies between 0 and 1, as do the scores for the other three questions in this section.  
  
  
  
Teacher education component score = simple mean of the scores for questions C2, C3, C4, C5 and E1 (except where the component score should not be calculated because too many responses were unknown or blank).  
  
  
  
Student assessment  
  
  
  
The following questions are used to calculate the student assessment component of the indicator:  
  
  
  
D2: Please indicate whether the GCED and ESD themes below are generally included in student assessments or examinations.   
  
  
  
There are eight GCED/ESD themes (cultural diversity and tolerance, gender equality, human rights, peace and non-violence, climate change, environmental sustainability, human survival and well-being, and sustainable consumption and production) = 8 responses.   
  
Response categories are no = 0, yes = 1 and unknown, which is treated as zero. Blanks are also treated as zeros.   
  
If more than half of responses are unknown or blank, the component score is not calculated.  
  
  
  
Question score = simple mean of the 0 and 1 scores.  
  
  
  
D3. Please indicate which of the dimensions of learning in GCED and ESD below are generally included in student assessments or examinations.   
  
  
  
There are four learning dimensions (knowledge, skills, values, and attitudes/behaviours) = 4 responses..  
  
Response categories are no = 0, yes = 1 and unknown, which is treated as zero. Blanks are also treated as zeros.   
  
If more than half of responses are unknown or blank, the component score is not calculated.   
  
  
  
Question score = simple mean of the 0 and 1 scores.  
  
  
  
E1. Based on your responses to questions in the previous section (student assessment), please indicate to what extent global citizenship education (GCED) and education for sustainable development (ESD) are mainstreamed in student assessment in your country.   
  
  
  
There are two levels of government (national, sub-national) = 2 responses.   
  
Response categories are not at all = 0, partially = 1, extensively = 2, unknown (treated as zero), and not applicable, which is ignored. Blanks are also treated as zeros.   
  
If more than half of responses excluding not applicables are unknown or blank, the component score is not calculated.   
  
Note that ‘not applicable’ is used where only one level of government is responsible for education.  
  
  
  
Question score = half the simple mean of the 0, 1 and 2 scores, excluding not applicables (i.e., if one of the two responses is ‘not applicable’, the sum of the 0, 1 and 2 scores is divided by 2 to get half the mean and not by 4). The score is half the mean in order to ensure it lies between 0 and 1, as do the scores for the other three questions in this section.  
  
  
  
Student assessment component score = simple mean of the scores for questions D2, D3 and E1 (except where the component score should not be calculated because too many responses were unknown or blank).  
  
  
  
The component scores all lie between zero and one and are presented as a dashboard of four scores. They are not combined to create a single overall score for the indicator. The higher the score, the more GCED and ESD are mainstreamed in the given component. In this way, users can make a simple assessment in which component area more efforts may be needed.   
  
  
  
Disaggregation:  
  
None.  
  
  
  
Treatment of missing values:  
  
  
  
 At country level  
  
A small number of missing values – unknown responses and/or blanks – are treated as zeros in the calculation of the question scores. Where they represent more than 50% of the responses to a single question, the component score is not calculated. In such cases, the component score will be presented as missing when results are disseminated.  
  
  
  
 At regional and global levels  
  
Regional and global values are not calculated.  
  
  
  
Regional aggregates:  
  
Regional aggregates are not calculated.  
  
  
  
Sources of discrepancies:  
  
There should be no difference as the indicator values are calculated from the responses submitted by countries. If any changes are proposed to responses as a result of quality assurance procedures, these will be communicated to and verified with countries.  
  
  
  
Methods and guidance available to countries for the compilation of the data at the national level:  
  
Countries wishing to calculate this indicator for themselves should follow the steps described in the ‘Computation Method’ section above.  
  
The questionnaire for the monitoring of the implementation of the 1974 Recommendation concerning Education for International Understanding, Co-operation and Peace and Education relating to Human Rights and Fundamental Freedoms is approved by the Member States of the Executive Board of UNESCO. The questionnaire contains guidelines for completion and a glossary of key terms. In addition, UNESCO provides direct support to Member States in completing the questionnaire and responds to queries in a quality and timely manner.   
  
  
  
Quality assurance  
  
UNESCO will review country responses for consistency and credibility and, if necessary, queries will be raised with national respondents. To assist with this, from 2020, countries will be asked to provide, in addition to completed questionnaires, supporting evidence of their responses in the form of documents or links (e.g. to education policies, laws, curricula, etc.). These will be made publicly available along with completed questionnaires after results are published. UNESCO will also take into account alternative sources of information, where available. These may include national responses to similar intergovernmental consultation processes, such as the Council of Europe’s consultations on the Charter on Education for Democratic Citizenship and Human Rights Education, the UN Economic Commission for Europe’s consultations on the Strategy for Education for Sustainable Development, or other information on ESD and GCED in countries’ national education systems.   
  
Any proposed changes to response values in the questionnaire as the result of quality assurance procedures will be communicated to and verified with countries by UNESCO. Final results will be shared with countries before publication (i) by UNESCO with the national data providers and (ii) by the UIS with education statistics and SDG indicator focal points as part of its annual SDG indicator verification exercise.   
  
  
  
Data Sources  
  
  
  
Description:  
  
Responses to the quadrennial reporting by UNESCO Member States on the implementation of the 1974 Recommendation concerning Education for International Understanding, Co-operation and Peace and Education relating to Human Rights and Fundamental Freedoms. The next round of reporting is scheduled to take place in 2020. (See methodology section for details of questions asked.)  
  
  
  
Collection process:  
  
Responses are submitted by national governments, typically by officials in Ministries of Education. Respondents are asked to consult widely across other government ministries, with national human rights institutes, the education sector and civil society organizations in compiling their responses. Respondents are also asked to submit supporting evidence in the form of documents or links (e.g. to education policies or laws, curricula, etc.), which will be made publicly available at the end of the reporting cycle.  
  
  
  
Responses will be reviewed by UNESCO for consistency and credibility and, if necessary, queries will be raised with national respondents. Where feasible, reference will be made to national documents and links supplied by respondents and to available alternative sources of information.   
  
  
  
Any proposed changes in response values in the questionnaire as the result of quality assurance procedures will be communicated and verified with countries by UNESCO. Final results will be shared with countries before publication (i) by UNESCO with the national data providers and (ii) by the UIS with education statistics and SDG indicator focal points as part of its annual SDG indicator verification exercise.  
  
  
  
Data Availability  
  
  
  
Description:  
  
During the last consultation on the implementation of the 1974 Recommendation concerning Education for International Understanding, Co-operation and Peace and Education relating to Human Rights and Fundamental Freedoms carried out in 2016, 83 countries provided reports: Central and Southern Asia (6), Eastern and South-Eastern Asia (8), Europe and Northern America (29), Latin America and the Caribbean (14), Northern Africa and Western Asia (10), Oceania (4), and sub-Saharan Africa (12).  
  
  
  
Time series:  
  
The first data will be available for 2020. It may be possible to produce estimates for some countries for 2016 but this work has not yet been carried out.  
  
  
  
Calendar  
  
Data collection:  
  
 Next round in 2020, followed by 2024.  
  
   
  
Data release:  
  
Q2 of 2021 (from 2020 reporting round).  
  
  
  
Data providers  
  
Requests for reports are submitted to Ministers Responsible for Relations with UNESCO who are typically Education Ministers. Reports are usually completed by government officials in Ministries of Education. Countries are requested to consult widely before submitting their reports. To assist with this, requests for reports are also copied to NGOs in official partnership with UNESCO and to OHCHR. Prior to release of the results, national data providers and national statistical offices are invited to review the results and, if appropriate, raise any concerns.  
  
  
  
Data compilers  
  
UNESCO’s Sections for Education for Sustainable Development and Global Citizenship and Peace Education.  
  
  
  
References  
  
URL: To be provided later when links to the 2020 round of reporting are available.   
  
  
  
References: To be provided later when links to the 2020 round of reporting are available.  
  
  
  
  
  
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Last updated: 03 June 2020  
  
Goal 12: Ensure sustainable consumption and production patterns  
  
Target: 12.b Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products  
  
Indicator: 12.b.1 Implementation of standard accounting tools to monitor the economic and environmental aspects of tourism sustainability  
  
  
  
Institutional information  
  
  
  
Organization(s):  
  
World Tourism Organization (UNWTO)  
  
  
  
Concepts and definitions  
  
  
  
Definition:  
  
The indicator “Implementation of standard accounting tools to monitor the economic and environmental aspects of tourism sustainability” relates to the degree of implementation in countries of the Tourism Satellite Account (TSA) and the System of Environmental and Economic Accounts (SEEA) tables that are to date considered most relevant and feasible for monitoring sustainability in tourism. These tables are:  
  
TSA Table 1 on inbound tourism expenditure  
  
TSA Table 2 on domestic tourism expenditure  
  
TSA Table 3 on outbound tourism expenditure  
  
TSA Table 4 on internal tourism expenditure  
  
TSA Table 5 on production accounts of tourism industries  
  
TSA Table 6 domestic supply and internal tourism consumption  
  
TSA Table 7 on employment in tourism industries  
  
SEEA table water flows  
  
SEEA table energy flows  
  
SEEA table GHG emissions  
  
SEEA table solid waste  
  
  
  
The TSA tables should be implemented following the Tourism Satellite Account: Recommended Methodological Framework 2008 and the environmental tables should be implemented following the System of Economic-Environmental Accounting 2012.  
  
  
  
  
  
  
Rationale:  
  
The UNWTO Committee on Statistics, the leading international group in tourism statistics composed of experts from countries and international organizations, has since 2016 identified important difficulties with the original indicator:   
  
The indicator does not track the target well.  
  
The indicator is not statistically based. There is no internationally agreed statistical framework or concepts/definitions that can be applied to “sustainable tourism strategies or policies and implemented action plans”.   
  
It is not clear what the relationship/boundary is between the three different instruments mentioned: “strategies”, “policies”, and “implemented action plans”. For example, a tourism master plan may contain elements of all three - would this count as 1 or 3?   
  
There is no statistical infrastructure in place in countries for collecting this information, and it would seem difficult to develop it due to the above mentioned issues;  
  
The absence of internationally agreed definitions on these concepts and of related statistical processes would mean that data collection, should it take place, would be affected by each country respondent’s interpretation of the terms “strategies”, “policies”, and “implemented action plans”. This would be accentuated by the fact that country officials would need to be asked to self-assess their countries’ situation, leading to a significant respondent bias.   
  
  
  
It is thus proposed to focus on the target ("develop and implement tools to monitor sustainable [tourism])” and monitor the stage of implementation in countries of the main accounting tools to date for the international monitoring of key sustainability aspects of tourism which are:  
  
countries’ Tourism Satellite Account based on the Tourism Satellite Account: Recommended Methodological Framework 2008 (TSA: RMF 2008) and   
  
countries’ water, energy, GHG emissions and waste accounts based the System of Environmental-Economic Accounting (SEEA).   
  
   
  
This yields a statistically-based indicator for monitoring target 12.b. by tracking the degree of implementation in countries of the TSA and SEEA tables that are most relevant and feasible for monitoring sustainability in tourism.  
  
  
  
This is in line with the Measuring the Sustainability of Tourism (MST) programme of work launched by UNWTO with the support of UNSD which includes the Statistical Framework for Measuring the Sustainability of Tourism (SF-MST) currently under development as requested by the UN Statistical Commission in its 48th Session (7-10 March 2017). The SF-MST integrates tourism statistics with other economic, social and environmental information and provides a coherent base for deriving indicators that are relevant for monitoring and analysing the sustainability of tourism. Development of SF-MST is also supported by the UNWTO General Assembly, the highest international body in tourism.   
  
MST is led by the Working Group of Experts on MST, set up jointly by UNWTO and UNSD, which reports to the UNWTO Committee on Statistics. MST has a special sub-group on SDG indicators, led by Statistics Austria, which advices the UNWTO Committee on Statistics on how to best monitor tourism within the SDGs and has been active in the preparation of this metadata.  
  
  
  
  
  
Concepts:  
  
The concepts and template presentation tables related to Tourism Satellite Accounts can be found in the Tourism Satellite Account: Recommended Methodological Framework 2008 (TSA: RMF 2008) which provides the common conceptual framework for constructing a TSA. It adopts the basic system of concepts, classifications, definitions, tables and aggregates of the System of National Accounts 2008 (SNA 2008). The UN Statistical Commission took note of the TSA: RMF 2008 document at its 39th session (26-29 February 2008). It updates and replaces the previous TSA:RMF 2000 which was approved by the United Nations Statistical Commission at its 31st session (29 February-3 March 2000).  
  
  
  
The concepts and template presentation tables related to water, energy, GHG emission and solid waste can be found in System of Environmental-Economic Accounting - Central Framework is an international statistical standard for measuring the environment and its relationship with the economy. It contains an internationally agreed set of standard concepts, definitions, classifications, accounting rules and tables to produce internationally comparable statistics. The UN Statistical Commission adopted the SEEA Central Framework at its 43rd session (28 February – 2 March 2012).   
  
  
  
Comments and limitations:  
  
The indicator in principle does not account for varying degrees of consolidation (from experimental to full-fledged) in the implementation of TSA and SEEA which might differ considerably between countries.   
  
  
  
Methodology  
  
  
  
Computation Method:  
  
Implementation of standard accounting tools to monitor the economic and environmental aspects of tourism sustainability = total number of tables produced by countries out of the tables identified below:  
  
  
  
TSA Table 1 on inbound tourism expenditure  
  
TSA Table 2 on domestic tourism expenditure  
  
TSA Table 3 on outbound tourism expenditure  
  
TSA Table 4 on internal tourism expenditure  
  
TSA Table 5 on production accounts of tourism industries  
  
TSA Table 6 domestic supply and internal tourism consumption   
  
TSA Table 7 on employment in tourism industries  
  
SEEA table water flows  
  
SEEA table energy flows  
  
SEEA table GHG emissions  
  
SEEA table solid waste  
  
  
  
  
  
  
Disaggregation:  
  
Disaggregation of the different TSA tables and SEEA tables (water flows, energy flows, GHG emissions and solid waste), and disaggregation by standard (TSA and SEEA), will be possible.   
  
  
  
Treatment of missing values:  
  
n/a  
  
  
  
At country level  
  
n/a  
  
  
  
At regional and global levels  
  
n/a  
  
  
  
Regional aggregates:  
  
n/a  
  
  
  
Sources of discrepancies:  
  
Discrepancies might arise from the varying degrees of consolidation in the implementation of TSA and SEEA in countries.   
  
  
  
Methods and guidance available to countries for the compilation of the data at the national level:  
  
In relation to the TSA, the methodology is described in the Tourism Satellite Account: Recommended Methodological Framework 2008. UNWTO, in collaboration with UNSD, is currently developing a Compilation Guide for the TSA that will be available for all countries in the course of 2020.   
  
  
  
In relation to the SEEA, the methodology is described in the System of Environmental-Economic Accounting (SEEA) Central Framework.  
  
  
  
Quality assurance  
  
Data will be verified by UNWTO and any issues will be resolved through written communication with countries. In the case of the availability of TSA tables, it would also be possible to cross-validate with the information reported to UNWTO on SDG indicator 8.9.1 (Tourism Direct GDP) and the indicators collected via UNWTO´s annual data collection. The availability reported on SEEA tables can also be cross-checked with information available to UNSD.   
  
  
  
  
  
Data Sources  
  
  
  
Description:  
  
The indicator is sourced from countries’ Tourism Satellite Account and Environmental-Economic Accounts.  
  
  
  
Collection process:  
  
UNWTO sends a short questionnaire to countries to obtain information on the number of relevant TSA and SEEA tables produced by countries.   
  
  
Data Availability  
  
  
  
Description:  
  
While SEEA and TSA tables are currently not compiled everywhere, ALL countries are able to provide information on this indicator. Those States where no tables are compiled report a value of zero (0). In the first data collection exercise initiated in 2019, UNWTO received over 100 country responses. These include countries in all regions. The data has already been uploaded on the SDG Global Database.   
  
  
  
  
  
Time series:  
  
Data is available from 2008 onwards.  
  
  
  
Calendar  
  
  
  
Data collection:  
  
 The exercise to collect data on TSA and SEEA tables implementation directly from countries through a UNWTO questionnaire was launched in August 2019 for the data available up to the end of the previous year.  
  
  
  
Data release:  
  
First release will be in February 2020.  
  
  
  
Data providers  
  
For the TSA: National Statistics Offices and/or National Tourism Administrations.  
  
For the SEEA: National Statistics Offices and/or environment ministries.  
  
  
  
Data compilers  
  
World Tourism Organization (UNWTO) with input and in coordination with the UN Statistics Division especially with respect to the SEEA data.  
  
  
  
References  
  
  
  
URL:  
  
https://www.unwto.org/methodology  
  
https://seea.un.org/content/seea-central-framework  
  
  
  
References:  
  
Commission of the European Communities, Organization for Economic Cooperation and Development, United Nations and World Tourism Organization (2010), Tourism Satellite Account: Recommended Methodological Framework 2008  
  
System of Environmental-Economic Accounting (SEEA)  
  
  
  
Related indicators  
  
8.9.1 Tourism Direct GDP (indicator derived from the TSA).  
  
15.9.1 Progress towards national targets established in accordance with Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011-2020

Last updated: September 2019  
  
Goal 12: Ensure sustainable consumption and production patterns  
  
Target 12.6: Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle  
  
Indicator 12.6.1 Number of companies publishing sustainability reports  
  
  
  
Institutional information  
  
  
  
Organization(s):  
  
United Nations Conference on Trade and Development (UNCTAD)  
  
UN Environment (United Nations Environment Programme/UNEP)  
  
  
  
Concepts and definitions  
  
  
  
Definition:   
  
Sustainability Reports:   
  
For the purposes of this indicator, ‘sustainability reports’ will not be limited to stand-alone sustainability reports produced by companies, but will be considered as ‘reporting sustainability information’ and expanded to other forms of reporting sustainability information, such as publishing sustainability information as part of the company’s annual reports or reporting sustainability information to the national government. This is to ensure that the focus of the indicator is on tracking the publishing of sustainability information, rather than on the practice of publishing stand-alone sustainability reports. It also ensures that the indicator interpretation is aligned with the wording of Target 12.6 which refers to promoting “the integration of sustainability information into the annual reporting cycle of companies”.   
  
  
  
Not every report called ‘Sustainability Report’ will be counted towards the indicator. In order to be counted, they will have to comply with a ‘minimum requirement’ in terms of sustainability disclosures reported on (see below).  
  
  
  
Company:  
  
While many companies report at the group level, many of their impacts will be local, and some subsidiaries or franchises produce separate sustainability reports. As a practice that should be encouraged, and one that is useful to monitor, is therefore proposed to count both the group and subsidiary/franchise level separately, as separate entities. “Company” can therefore apply to either the parent company, or a franchise or subsidiary, depending on their reporting practices.  
  
  
  
Rationale:  
  
While the private sector has a critical role to play in the attainment of the SDGs, Target 12.6 and Indicator 12.6.1 are the only ones specifically monitoring the practices of private sector entities. While Indicator 12.6.1 counts the number of companies producing “sustainability reports”, the custodian agencies consider the indicator an important opportunity not only to monitor and promote the growth in sustainability reporting globally, but also to monitor and promote high quality reporting, promote the integration of sustainability information into the annual reporting cycle of companies, and promote sustainability practices by companies (as mentioned in the Target under which the indicator falls). Attempts have therefore been made to integrate all of these aspects into the methodology, to the extent possible.  
  
  
  
Given the above, the custodian agencies propose an approach whereby:  
  
Rather than simply counting the number of companies publishing stand-alone sustainability reports, the indicator methodology will focus on the sustainability information published by a company, whether in the form of a stand-alone sustainability report, or integrated within other company reports, such as the annual report. Therefore, in this respect, for the purposes of this indicator, ‘sustainability report’ can refer to a stand-alone sustainability report, or sustainability information reported under other formats, such as integrated into the company’s annual report.  
  
Not every document entitled ‘sustainability report’ will be counted towards the indicator, given that the quality of these reports varies greatly, and that many may not contain meaningful information on all aspects of sustainability (governance, economic, social and environmental).  
  
A minimum requirement is therefore proposed, whereby for a company to be counted towards the indicator, it must have published information on a set of key disclosure elements covering the company’s governance practices as well as economic, social and environment impacts. This will ensure that companies who produce sustainability reports that are weak in terms of their disclosure will not be counted and should promote more rigorous reporting.  
  
  
  
Concepts:  
  
It is proposed that, to be counted towards the indicator, companies must publish information that meets a “Minimum requirement” of disclosure. A core set of economic, environmental, social and governance disclosures of sustainability information is therefore identified. In defining these disclosure elements, the custodian agencies attempted to align with the disclosures that appear in existing related reporting frameworks, including the IIRC reporting framework, the Global Reporting Initiative Standard (GRI), the Sustainability Accounting Standards Board (SASB) (see Annex I for a comparison of the various sustainability disclosures contained under each.  
  
  
  
It also attempts to align with the UNCTAD Core Indicators for company reporting on the contribution towards the attainment of the Sustainable Development Goals. UNCTAD has prepared Guidance on Core indicators for entity reporting on the contribution towards the attainment of the Sustainable Development Goals (SDGs) to support entities in the provision of information under indicator 12.6.1 and governments in assessing the private sector contribution to the SDGs. The Guidance reflects the Agreed Conclusions of the thirty-fourth session of the Intergovernmental Working Group of Experts on International Standards of Accounting and Reporting (ISAR), which in 2017 requested UNCTAD to develop the guiding document. The UNCTAD Guidance includes detailed definitions and data sources for the core indicators in the company accounts to assist the entities in the reporting.  
  
  
  
The purpose is not to create a new reporting standard or framework, but to ensure that the minimum requirement for Indicator 12.6.1 is aligned with existing global frameworks currently used by companies, so that they may continue to use these frameworks and be counted towards the indicator.  
  
While establishing a minimum requirement in terms of reporting ensures that only companies disclosing meaningful information on all aspects of sustainability are counted towards the indicator, it could be perceived as giving the message that the minimum suffices and that companies do not need to go beyond it.   
  
  
  
Therefore, it is proposed that the methodology include an advanced level, with a further set of disclosure elements which would further provide impetus for examining and reporting on the sustainability practices and impacts of the company. These include: 1) stakeholder engagement, 2) assessing impacts beyond the company boundaries and along the supply chain; 3) supplier and consumer engagement on sustainability issues; 4) procurement and sourcing practices; and 5) environmental performance information in the form of intensity values to be monitored over time, such as consumption of energy, water or materials per unit of production or per unit of profit.  
  
  
  
Having different levels will also allow for information to be collected on the degree of reporting of different companies, including whether the same companies produce more ambitious reports, and go further in their sustainability practices with time, such as through supplier engagement. It would allow for companies who are beginning to produce sustainability reports to be counted towards the indicator once they achieve the minimum level, but provide incentive, through their inclusion in the indicator count, for them to work towards more ambitious reporting and demonstrate their progress over time.  
  
  
  
Comments and limitations: N/A  
  
  
  
Methodology  
  
Computation Method:  
  
Companies will be counted towards the indicator if they publish sustainability information covering the following sustainability disclosures:  
  
  
  
Minimum Requirement:  
  
Institutional and governance:   
  
Materiality assessment\*   
  
Sustainability strategy and/or principles related to sustainability  
  
Management approach to address materiality topics  
  
Governance structure, including for economic, environmental and social issues  
  
Key impacts, risks, opportunities   
  
Anti-fraud, anti-corruption and anti-competitive behaviour practices  
  
  
  
Economic:  
  
Direct measure of economic performance (revenue, net profit, value added, payouts to shareholders)  
  
Indirect measure of economic performance (community investment, investment in infrastructure or other significant local economic impact)  
  
  
  
Environmental:  
  
Energy consumption and energy efficiency  
  
Water consumption, wastewater generation, integrated water resource management practices, or water recycling/re-use and efficiency  
  
Greenhouse gas emissions  
  
Other emissions and effluents, including Ozone-depleting substances, Nitrogen Oxides (NOX), Sulphur Oxides (SOX), and chemicals  
  
Waste generation, including hazardous wastes  
  
Waste minimisation and recycling practices  
  
Use and/or production of hazardous chemicals and substances  
  
  
  
Social:  
  
Occupational health and safety  
  
Total number of employees, by contract type and gender  
  
Employee training   
  
Unfair and illegal labour practices and other human rights considerations  
  
Diversity, equal opportunity and discrimination in governance bodies and among employees  
  
Worker rights and collective agreements  
  
  
  
  
  
Advanced level requirement:  
  
As for minimum requirement, with the following additional disclosures and/or indicators:   
  
  
  
Institutional and governance:   
  
Details of supply chain  
  
Details of stakeholder engagement surrounding sustainability performance  
  
Details of remuneration  
  
  
  
Economic  
  
Sustainable public procurement policies and practices  
  
Percentage or proportion of local suppliers/procurement  
  
Charitable donations  
  
  
  
Environmental  
  
Supplier environmental assessment  
  
Material consumption, sourcing of materials and reclaimed or recycled materials used  
  
Energy intensity and renewable energy sources  
  
Water intensity and Integrated water resource management  
  
GHG intensity  
  
Waste intensity  
  
Biodiversity impacts  
  
Supplier and consumer/customer engagement on environmental issues  
  
  
  
Social  
  
Supplier social assessment  
  
Local community impacts  
  
Supplier and consumer engagement on sustainability issues  
  
  
  
Advanced level requirement:  
  
As for minimum requirement, with the following additional disclosures and/or indicators:   
  
  
  
Institutional and governance:   
  
Details of supply chain  
  
Details of stakeholder engagement surrounding sustainability performance  
  
Details of remuneration  
  
  
  
Economic  
  
Sustainable public procurement policies and practices  
  
Percentage or proportion of local suppliers/procurement  
  
Charitable donations  
  
  
  
Environmental  
  
Supplier environmental assessment  
  
Material consumption, sourcing of materials and reclaimed or recycled materials used  
  
Energy intensity and renewable energy sources  
  
Water intensity and Integrated water resource management  
  
GHG intensity  
  
Waste intensity  
  
Biodiversity impacts  
  
Supplier and consumer/customer engagement on environmental issues  
  
  
  
Social  
  
Supplier social assessment  
  
Local community impacts  
  
Supplier and consumer engagement on sustainability issues  
  
The methodology will make allowance for application of the ‘comply or explain’ principle for the minimum standard, which allows reporting entities to highlight why certain disclosures are not relevant for their specific company and make it more accessible to small companies. However, this would not apply to issues that have been identified as material to the company, on which they are expected to report.  
  
  
  
  
  
Disaggregation:  
  
The platform will generate the following information for each country, then aggregate per sub-region, region and globally (avoiding double-counting of companies during the aggregation):   
  
Total number of companies publishing reports that:  
  
Meet the minimum requirements   
  
Meet the advanced level requirement  
  
  
  
Inclusion of a company under a specific country  
  
It is proposed that:  
  
Multi-national companies are included in the country in which they are listed, or in the country where the head office is found.   
  
When a multinational company produces specific separate reports, with disaggregated information per country, for the different countries they operate in, these would be counted separately under the indicator count for each country.  
  
  
  
Data disaggregated per company size  
  
Company sizes are currently defined differently in different jurisdictions. For Indicator 12.6.1, a simple split of ‘large’ and ‘small’ could be proposed, with large being more than 250 employees, and small and medium being less than 250 employees. This is in line with the Global Reporting Initiative (GRI), UN Global Compact definitions, and is the most frequent definition at the national level in terms of employee number. No minimum turnover requirement is prescribed due to the wide variation in turnover of companies of this size between countries.   
  
This is the definition of a company size that will be used by the custodian agencies for aggregation and comparability of data and analysis of trends at sub-regional, regional and global levels. However, definitions of company size used by national governments when carrying out their own analysis and presenting their Voluntary National Reviews could be different, in line with their national definitions.  
  
  
  
Data disaggregated per sector  
  
  
  
We propose to use the International Standard Industrial Classification of All Economic Activities (ISIC) (first level classification) to provide information on the number of companies publishing sustainability reports per industry.  
  
A. Agriculture, forestry and fishing  
  
B. Mining and quarrying  
  
C. Manufacturing  
  
D. Electricity, gas, steam and air conditioning supply  
  
E. Water supply; sewerage, waste management and remediation activities  
  
F. Construction  
  
G. Wholesale and retail trade; repair of motor vehicles and motorcycles  
  
H. Transportation and storage  
  
I. Accommodation and food service activities  
  
J. Information and communication  
  
K. Financial and insurance activities  
  
L. Real estate activities  
  
M. Professional, scientific and technical activities  
  
N. Administrative and support service activities  
  
O. Public administration and defense; compulsory social security  
  
P. Education  
  
Q. Human health and social work activities  
  
R. Arts, entertainment and recreation  
  
S. Other service activities  
  
T. Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use  
  
U. Activities of extraterritorial organizations and bodies  
  
  
  
Proportion of reports that have undergone verification/assurance of complete report  
  
  
  
Complete list of accepted assurance standards and tools to be defined.  
  
  
  
Treatment of missing values:  
  
The analytics will be carried out in all official UN languages and a variety of other languages, but not all national languages will be covered. Therefore there could be some reports that cannot be captured for this reason.   
  
  
  
Regional aggregates:  
  
The data will be aggregated at the sub-regional, regional and global levels. In doing so, double-counting will be avoided, so a company may appear under several countries, but will only be counted once at regional and global levels.  
  
  
  
Sources of discrepancies: N/A  
  
  
  
Data Sources  
  
Description:  
  
Existing global and national repositories of sustainability reports (see tentative list in Annex II)  
  
Data provided by national governments   
  
  
  
Collection process:  
  
The custodian agencies propose to establish a global platform or database which would:   
  
Collate and analyse sustainability reports through advanced analytics to determine coherence with the minimum requirement and advanced level  
  
Provide country specific information   
  
Aggregate data at sub-regional, regional and global levels (avoiding double-counting of the same companies)  
  
Disaggregate data (company size, per industry)  
  
  
  
The Custodian Agencies will mine existing global and national-level report aggregators, to analyse the reports included in their databases. A preliminary list of repositories is included in Annex II.  
  
Provision will also be made for manual submission by individual report generators. This is particularly important for small companies whose reports may not be included in the global databases.  
  
Advanced analytics will scan the report content and determine their compliance with the minimum standard or advanced level. They will also assign each company to a country according to the criteria listed above, to determine the number of companies per country publishing sustainability information.   
  
This information will be communicated to each government individually, for their validation. They will also have the opportunity to seek clarification, contest the information, or provide complementary data to the custodian agencies for inclusion in the indicator count.  
  
The platform will also automate the aggregation of data to obtain a global figure as well as data per UN sub-region and region for inclusion in the Global SDGs Database, and as a basis for the analysis of progress carried out annually for the United Nations Sustainable Development Goals Report and Secretary General’s Report on Progress towards the Sustainable Development Goals.  
  
The platform will be online and open access. It will include filters so that governments or other stakeholders will eb able to filter the information themselves, per country, sector, company size or disclosure element, to obtain the desired information.  
  
  
  
While the platform will provide data for each country, this will be sent to each government for review and verification. Each government will be able to propose amendments to the data should they have further information to complement that provided by the database.  
  
While common definitions of company size, industries (defined below), etc. are required to be used by the custodian agencies for analysis and aggregation at regional and global levels and reporting to the SDGs Report, national governments may choose to use different definitions for their own analysis and reporting, such as for their Voluntary National Reviews (VNRs). Filters will be included on the online platform for the database which will allow governments and other users to filter information according to their own national definitions.  
  
  
  
Data Availability  
  
Description:  
  
Data will be made available for all member states that have companies publishing sustainability information, as defined by the indicator.   
  
  
  
Time series:  
  
The reporting on this indicator will be annual, given that most companies publish sustainability information on an annual basis.  
  
  
  
Calendar  
  
Data collection:  
  
First data collection: Expected in early 2020 for 2019 company reports  
  
Annually thereafter  
  
   
  
Data release:  
  
First reporting cycle: 2020  
  
Annually thereafter  
  
  
  
Data providers  
  
See list of repositories and databases in Annex II, plus governments that have complementary information.  
  
  
  
Data compilers  
  
UN Environment (United Nations Environment Programme) and United Nations Conference on Trade and Development (UNCTAD)  
  
  
  
References  
  
  
  
References: N/A  
  
  
  
Related indicators as of February 2020  
  
  
  
N/A  
  
Annex 1: Comparison of related Reporting Frameworks used to define minimum requirement  
  
  
  
Level  
  
Disclosure for indicator 12.6.1  
  
UNCTAD Core indicators towards reporting on the SDGs  
  
UNGC Principles  
  
IIRC  
  
GRI  
  
SASB Sector Specific Frameworks   
  
Minimum requirements  
  
Institutional and governance:   
  
  
  
  
  
  
  
  
  
  
  
  
  
Materiality assessment   
  
Sustainability strategy and/or principles related to sustainability  
  
Management approach to address material topics  
  
  
  
Principle 7: Businesses should support a precautionary approach to environmental challenges;  
  
  
  
Principle 8: undertake initiatives to promote greater environmental responsibility; and  
  
Guiding Principles:  
  
Strategic focus and future orientation  
  
Connectivity of information  
  
Stakeholder relationships  
  
Materiality  
  
Conciseness  
  
Reliability and completeness  
  
Consistency and comparability  
  
  
  
Reporting Principles:  
  
Stakeholder inclusiveness  
  
Sustainability context  
  
Materiality  
  
Completeness  
  
  
  
102: General disclosures:  
  
102-2:   
  
a. A description of the organisation’s activities  
  
b. primary brands, products and services, including an explanation of any products or services that are banned in certain markets  
  
102-11: Precautionary Principle or approach  
  
102-13: a. A list of the main membership of industry or other associations, and national or international advocacy organisations  
  
102-16: Values, principles, standards and norms of behaviour  
  
102-47: a. A list of the material topics identified in the process for delivering report content   
  
  
  
103-1 Explanation of the material topic and its boundary  
  
103-1 a: An explanation of why the topic is material  
  
103-1-b: The boundary of the material topic, which includes a description of:  
  
i. where the impacts occur  
  
ii. the organisation’s involvement with the impacts. For example, whether the organisation has caused or contributed to the impacts, or is directly linked to the impacts through its business relationships.  
  
c. Any specific limitation regarding the boundary topic.   
  
103-2 the Management approach and its components  
  
103-3 Evaluation of management approach  
  
   
  
Business Ethics  
  
  
  
Governance structure, including for economic, environmental and social issues  
  
D1: Corporate Governance Disclosures  
  
D.1.1. Number of board meetings and attendance rate  
  
D.1.2. Number and percentage of female board members   
  
D.1.3. Board members by age range  
  
D.1.4. Number of meetings of audit committee and attendance rate  
  
D.1.5. Compensation: total compensation per board member (both executive and non-executive directors)  
  
  
  
Content elements:  
  
Organizational overview and external environment  
  
Governance  
  
Business model  
  
Strategy and resource allocation  
  
Performance  
  
Basis of presentation  
  
102: General disclosures  
  
102-14: Statement from the most senior decision-maker of the organisation (such as CEO, chair, or equivalent senior position) about the relevance of sustainability to the organisation and its strategy for addressing sustainability.   
  
102-17: Mechanisms for advice and concerns about ethics  
  
102-18: Governance structure   
  
102-20: Executive-level responsibility for economic, environmental and social topics   
  
102-19: Delegating authority  
  
102-22: Composition of the highest governance body and its committee  
  
102-23: Chair of the highest governance body  
  
102-24: Nominating and selecting the high governance body  
  
102-26: Role of highest governance body in setting purpose, values and strategy  
  
102-27: Collective knowledge of highest governance body  
  
102-28: Evaluating the high governance body's performance  
  
102-32: Highest governance body's role in sustainability report  
  
  
  
  
  
Key impacts, risks, opportunities  
  
  
  
  
  
Content elements:  
  
Risks and opportunities  
  
Outlook (challenges and uncertainties)   
  
  
  
102: General disclosures  
  
102-15: Key impacts, risks and opportunities  
  
102-25: Conflicts of interest  
  
102-29: Identifying and managing economic, environmental and social impacts  
  
102-30: Effectiveness of risk management process  
  
102-31: Review of economic, environmental and social topics  
  
102-33: Communicating critical concerns  
  
102-34: Nature and total number of critical concerns  
  
102-46: Defining report content and topic boundaries  
  
102-47: List of material topics  
  
102-44: Key topics and concerns raised  
  
307: Environmental Compliance  
  
307-1: Non-compliance with environmental laws and regulations  
  
Business model resilience   
  
Climate Change Adaptation   
  
Critical Incident Risk  Management   
  
Systemic Risk Management   
  
Management of the  Legal & Regulatory Environment    
  
Investment, Credit, and Underwriting ESG Risks  (Financial sector only)  
  
  
  
Anti-fraud, anti-corruption and anti-competitive behaviour practices  
  
D.2 Anti-corruption practices  
  
D.2.1. Amount of fines paid or payable due to settlements  
  
D.2.2. Average number of hours of training on anti-corruption issues, per year per employee  
  
  
  
Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery  
  
  
  
  
  
205: Anti-corruption  
  
205-1: Operations assessed for risks related to corruption  
  
205-2: Communication and training about anti-corruption policies and procedures  
  
205-3: Confirmed incidents of corruption and actions taken  
  
206: Anti-competitive behaviour  
  
206-1: Legal actions for anti-competitive behaviour, anti-trust and monopoly practices  
  
  
  
  
  
Competitive Behaviour  
  
  
  
Economic  
  
  
  
  
  
  
  
  
  
  
  
  
  
Direct measure of economic performance (revenue, net profit, value added, payouts to shareholders)  
  
  
  
A.1 Revenue and/or (net) value added  
  
A.1.1. Revenue   
  
A.1.2. Value added  
  
A.1.3. Net value added  
  
  
  
  
  
  
  
201: Economic performance  
  
201-1: Direct economic value generated and distributed  
  
201-2: Financial implications and other risks and opportunities due to climate change  
  
201-3: Defined benefit plan obligations and other retirement plans  
  
201-4: Financial assistance received from government  
  
  
  
  
  
  
  
Indirect measure of economic performance (community investment, investment in infrastructure or other significant local economic impact)  
  
A.2.1. Taxes and other payments to government  
  
A.3.1 Green investment A.3.2. Community Investment  
  
  
  
  
  
  
  
203: Indirect economic impacts   
  
203-1: Infrastructure investments and services supported  
  
203-2: Significant indirect economic impacts  
  
415-1: Political contributions  
  
  
  
  
  
Environmental  
  
  
  
  
  
  
  
  
  
  
  
  
  
Energy consumption and energy efficiency  
  
  
  
B.5 Energy consumption  
  
B.5.1. Renewable energy  
  
B.5.2. Energy efficiency  
  
  
  
Principle 9: encourage the development and diffusion of environmentally friendly technologies.  
  
  
  
302: Energy  
  
302-1: Energy consumption within the organisation  
  
302-2: Energy consumption outside the organisation  
  
302-3: Energy intensity  
  
302-4: Reduction of energy consumption  
  
302-5: Reductions in energy requirements of products and services  
  
Energy management  
  
  
  
Water consumption and water efficiency  
  
B.1 Sustainable use of water  
  
B.1.2. Water use efficiency   
  
  
  
  
  
  
  
303: Water  
  
303-1: Water withdrawal by source  
  
  
  
Water and Wastewater  Management    
  
  
  
  
  
Wastewater generation  
  
  
  
  
  
  
  
306: Effluents and waste  
  
306-1: Water discharge by quality and destination  
  
306-3: Significant spills  
  
306-5: Water bodies affected by water discharges and/or runoff  
  
Water and Wastewater Management    
  
  
  
  
  
Greenhouse gas emissions  
  
B.3 Greenhouse gas emissions   
  
B.3.1. Greenhouse gas emissions (scope 1)  
  
B.3.2. Greenhouse gas emissions (scopes 1 and 2)  
  
  
  
  
  
  
  
305: Emissions  
  
305-1: Direct (Scope 1) GHG emissions  
  
305-2: Energy indirect (Scope 2) GHG emissions  
  
305-3: Other indirect (Scope 3) GHG emissions  
  
305-4: GHG emissions intensity  
  
305-5: Reduction of GHG emissions  
  
Climate impacts/GHG emissions  
  
  
  
  
  
Other emissions and effluents, including Ozone-depleting substances, Nitrogen Oxides (NOX), Sulphur Oxides (SOX), and chemicals  
  
  
  
B.4.1. Ozone-depleting substances and chemicals  
  
  
  
  
  
305: Emissions  
  
305-6: Emissions from ozone depleting substances (ODS)  
  
305-7: Nitrogen oxides (NOX), sulphur oxides (SOX), and other significant air emissions  
  
  
  
Air quality  
  
  
  
  
  
Waste generation, including hazardous wastes  
  
B.2.3. Hazardous waste  
  
  
  
  
  
306: Effluents and waste  
  
306-1: Water discharge by quality and destination  
  
306-2: Waste by type and disposal method  
  
306-3: Significant spills  
  
306-4: Transport of hazardous waste  
  
306-5: Water bodies affected by water discharges and/or runoff  
  
  
  
Waste and Hazardous  Materials Management   
  
  
  
  
  
Waste minimisation and recycling practices  
  
B.2 Waste management   
  
B.2.1. Reduction of waste generation  
  
B.2.2. Waste reused, remanufactured and recycled   
  
  
  
  
  
306-2: Waste by type and disposal method  
  
  
  
Waste and Hazardous Materials Management   
  
  
  
  
  
Use and/or production of hazardous chemicals and substances  
  
B.4 Chemicals, including pesticides and ozone-depleting substances  
  
B.4.1..Ozone-depleting substances and chemicals  
  
  
  
  
  
  
  
  
  
Materials Sourcing   
  
  
  
Social  
  
  
  
  
  
  
  
  
  
  
  
  
  
Occupational health and safety, reporting as injuries, fatalities and/or training and interventions  
  
C.3 Employee health and safety  
  
C.3.1. Expenditures on employee health and safety as a proportion of revenue  
  
C.3.2. Frequency /incident rates of occupational injuries  
  
Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights;  
  
  
  
Principle 2: make sure that they are not complicit in human rights abuses;  
  
  
  
Principle 4: the elimination of all forms of forced and compulsory labour;  
  
  
  
Principle 5: the effective abolition of child labour;  
  
  
  
403: Occupational health and safety  
  
403-1: Workers representation in formal joint management-worker health and safety committees  
  
403-2: Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities  
  
403-3: Workers with high incidence or high risk of disease fatalities  
  
403-4: Health and safety topics covered in formal agreements with trade unions  
  
Employee Health & Safety Management  
  
  
  
Total number of employees, by contract type and gender  
  
C.1 Gender equality   
  
C.1.1. Proportion of women in managerial positions  
  
  
  
  
  
405-2: Ratio of basic salary and remuneration of women to men  
  
102-8: Information on employees and other workers  
  
a. Total number of employees by employment contract (permanent and temporary), by gender.  
  
b. Total number of employees by employment contract (permanent and temporary), by region.  
  
c. Total number of employees by employment type (full-time and part-time), by gender  
  
d. Whether a significant portion of the organisation’s activities are performed by workers who are not employees. If applicable, a description of the nature and scale of work performed by workers who are not employees  
  
202-1 Ratios of standard entry level wage by gender compared to local minimum wage  
  
202-2 proportion of senior management hired from the local community  
  
  
  
  
  
Employee training  
  
C.2 Human capital   
  
C.2.1. Average hours of training per year per employee  
  
C.2.2: Expenditure on employee training per year per employee   
  
C.2.3. Employee wages and benefits as a proportion of revenue, with breakdown by employment type and gender  
  
   
  
  
  
404: Training and education  
  
404-1: Average hours of training per year per employee  
  
404-2: Programs for upgrading employee skills and transition assistance programs  
  
404-3: Percentage of employees receiving regular performance and career development reviews  
  
Labor Practices and Compensation    
  
  
  
  
  
Unfair and illegal labour practices and other human rights considerations  
  
  
  
  
  
  
  
401: Employment  
401-1: New employee hires and employee turnover  
  
401-2: Benefits provided to full-time employees that are not provided to temporary or part time employees.  
  
401-3 Parental leave  
  
403-1: Workers representation in formal joint management   
  
402: Labour/management relations  
  
402-1: Minimum notice periods regarding operational charges   
  
408: Child labour  
  
408-1: Operations and suppliers at significant risk for incidents of child labour  
  
409: Forced or compulsory labour  
  
409-1: Operations and suppliers at significant risk for incidents of forced or compulsory labour'  
  
410: Security practices  
  
410-1: Security personnel trained in human rights policies or procedures  
  
411: Rights of indigenous peoples  
  
411-1: Incidents of violations involving rights of indigenous peoples   
  
412: Human rights assessment  
  
412-1: Operations that have subject to human rights reviews or impact assessments  
  
412-2: Employee training on human rights policies or procedures  
  
412-3: Significant investment agreements and contracts that include human rights clauses or that underwent human rights screening  
  
  
  
Human rights  
  
  
  
Diversity, equal opportunity and discrimination   
  
  
  
Principle 6: the elimination of discrimination in respect of employment and occupation.  
  
  
  
405: Diversity and equal opportunity  
  
405-1: Diversity of governance bodies and employees  
  
406: Non-discrimination  
  
406-1: Incidents of discrimination and corrective action taken  
  
Employee Recruitment, Engagement, and Diversity    
  
  
  
  
  
Workers rights and collective agreements  
  
C.4 Collective agreements   
  
C.4.1. Percentage of employees covered by collective agreements  
  
Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining  
  
  
  
  
  
407: Freedom of association and collective bargaining  
  
407-1: Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk  
  
  
  
Level  
  
Disclosure for indicator 12.6.1  
  
UNCTAD Core indicators towards reporting on the SDGs  
  
UNGC Principles  
  
IIRC  
  
GRI  
  
SASB Sector Specific Frameworks  
  
Advanced Level   
  
  
  
As for Minimum standard, with the following additional disclosures and/or indicators:  
  
Details of supply chain  
  
  
  
  
  
  
  
102: General disclosures  
  
102-9: a. A description of the organisation’s supply chain, including its main elements as they relate to the organisation’s activities, primary brands, products and services  
  
102-10: Significant changes to the organisation and its supply chain  
  
  
  
308: Supplier environmental assessment  
  
308-1: New suppliers that were screened using environmental criteria  
  
308-2: Negative environmental impacts in the supply chain and actions taken  
  
103  
  
Supply Chain Management    
  
  
  
  
  
Details of stakeholder engagement surrounding sustainability performance  
  
  
  
  
  
Guiding Principles:  
  
Stakeholder relationships  
  
  
  
Reporting Principles:  
  
•Stakeholder inclusiveness  
  
102: General disclosures  
  
102-21: Consulting stakeholders on economic, environmental and social topics   
  
102-40: List of stakeholder groups  
  
102-42: Identifying and selecting stakeholders  
  
102-43: Approach to stakeholder engagement  
  
  
  
  
  
Details of remuneration  
  
C.3 Human capital   
  
C.2.3. Employee wages and benefits as a proportion of revenue, with breakdown by employment type and gender  
  
  
  
  
  
102: General disclosures  
  
102-35: Remuneration policies  
  
102-36: Process for determining remuneration  
  
102-37: Stakeholders' involvement in remuneration  
  
102-38: Annual total compensation ratio  
  
102-39: Percentage increase in annual total compensation ratio  
  
  
  
  
  
Economic  
  
  
  
  
  
  
  
  
  
  
  
  
  
Sustainable public procurement policies and practices  
  
Percentage or proportion of local suppliers/procurement  
  
Charitable donations  
  
A.3 New investment/expenditures  
  
A.3.1. Green investment  
  
A.3.2. Community investment  
  
A.3.3. Total expenditures on research and development  
  
A.4 Total local supplier/purchasing programmes   
  
A.4.1. Percentage of local procurement  
  
  
  
  
  
204: Procurement practices  
  
204-1: Proportion of spending on local suppliers  
  
  
  
  
  
  
  
Environmental  
  
  
  
  
  
  
  
  
  
  
  
  
  
Supplier environmental assessment  
  
  
  
  
  
  
  
308: Supplier environmental assessment  
  
308-1: New suppliers that were screened using environmental criteria  
  
308-2: Negative environmental impacts in the supply chain and actions taken  
  
  
  
  
  
Material consumption, sourcing of materials and reclaimed or recycled materials used  
  
  
  
  
  
  
  
301: Materials  
  
301-1: Materials used by weight or volume  
  
301-2: Recycled input materials used  
  
301-3: Reclaimed products and their packaging materials  
  
Materials Sourcing  
  
  
  
Energy intensity and renewable energy sources  
  
  
  
B.5 Energy consumption  
  
B.5.1. Renewable energy  
  
  
  
Principle 9: encourage the development and diffusion of environmentally friendly technologies.  
  
  
  
302: Energy  
  
302-3: Energy intensity  
  
302-4: Reduction of energy consumption  
  
302-5: Reductions in energy requirements of products and services  
  
Energy management  
  
  
  
Water intensity and integrated water resources management  
  
B.1 Sustainable use of water  
  
B.1.1. Water recycling and reuse  
  
B.1.3. Water stress  
  
  
  
  
  
303: Water  
  
303-1: Water withdrawal by source  
  
303-2: Water sources significantly affected by withdrawal of water  
  
303-3: Water recycled and reused  
  
Water and Wastewater  Management    
  
  
  
  
  
GHG Emissions intensity  
  
  
  
  
  
  
  
305: Emissions  
  
305-4: GHG emissions intensity  
  
  
  
  
  
  
  
Waste intensity  
  
B.2 Waste management   
  
B.2.1. Reduction of waste generation  
  
B.2.2. Waste reused, re-manufactured and recycled  
  
B.2.3: Hazardous waste  
  
  
  
  
  
306-2: Waste by type and disposal method  
  
  
  
Waste and Hazardous Materials Management   
  
  
  
  
  
Biodiversity impacts  
  
  
  
  
  
  
  
304: Biodiversity  
  
304-1: Operational sites owned, leased, managed in or adjacent to, protected areas and areas of high biodiversity value outside protected areas  
  
304-2: Significant impacts of activities, products and services on biodiversity  
  
304-3: Habitats protected or restored  
  
304-4: IUCN Red List species and national conservation list species with habitats in areas affected by operations  
  
Ecosystem Impacts   
  
  
  
  
  
Social  
  
  
  
  
  
  
  
  
  
  
  
  
  
Supplier social assessment  
  
  
  
  
  
  
  
414: Supplier social assessment  
  
414-1: New suppliers that were screened using social criteria  
  
414-2: Negative social impacts in the supply chain and actions taken  
  
  
  
  
  
Local community impacts  
  
A.3.2 Community Investment  
  
  
  
  
  
203: Indirect economic impacts   
  
203-2: Significant indirect economic impacts  
  
413: Local communities  
  
413-1: Operations with local community engagement, impact assessments and development programmes  
  
413-2: Operations with significant actual and potential negative impacts on local communities  
  
  
  
  
  
  
  
Supplier and consumer engagement on sustainability issues  
  
  
  
  
  
  
  
416: Customer health and safety  
  
417: Marketing and labelling  
  
417-1: Requirements for product and service information and labelling  
  
417-2: Incidents of non-compliance concerning products and service information and labelling  
  
417-3: Incidents of non-compliance concerning marketing communications  
  
418: Customer policy  
  
418-1: Substantiated complaints concerning breaches of customer privacy and losses of customer data  
  
Customer welfare    
  
Access and affordability (of products from the health care sector only)  
  
  
  
  
  
Annex 2: Global and national repositories to mine for global 12.6.1 Database  
  
  
  
Name  
  
Web address  
  
Country  
  
Focus  
  
Website language(s)  
  
Report language(s)  
  
Run by  
  
Quality criteria applied  
  
Separate or Integrated reports (or both)  
  
Access  
  
Aggregation on company type/size  
  
Quantity of reporting companies  
  
Corporate Social Responsibility Centre  
  
http://www.csrcp.com/index.php/reporting-data-base/search-reports   
  
Pakistan  
  
National  
  
EN  
  
EN  
  
Other  
  
No  
  
Separate reports  
  
Free  
  
No  
  
around 50 reports  
  
Sustainability Reports  
  
http://www.sustainability-reports.com/   
  
Netherlands  
  
Mostly national  
  
EN  
  
NL, EN, DE, FR  
  
Business/sectoral  
  
No  
  
Both  
  
Free  
  
No  
  
around 250 reports  
  
Duurzaamheidsverslag  
  
http://www.duurzaamheidsverslag.nl/bedrijf/   
  
Netherlands  
  
Mostly national  
  
NL  
  
NL, EN, FR, DE  
  
Business/sectoral  
  
No  
  
Both  
  
Free  
  
No  
  
around 250 reports  
  
Responsabilitata Sociala  
  
http://www.responsabilitatesociala.ro/   
  
Romania  
  
National  
  
RO  
  
RO  
  
Other  
  
No  
  
Separate reports  
  
Free  
  
No  
  
around 40 companies  
  
Corporate Register  
  
http://corporateregister.com/  
  
Global  
  
Global  
  
EN  
  
Multiple, only reports in Latin scripts  
  
Business/sectoral  
  
No  
  
Both  
  
Partly free  
  
No  
  
83,368 reports of 13,842 organizations  
  
Online Reports Database  
  
http://www.online-report.com/report-type/sustainability-report/   
  
Global  
  
Mostly Europe  
  
EN  
  
Mostly EN  
  
Business/sectoral  
  
No  
  
Both  
  
Free  
  
No  
  
Around 700 reports  
  
Global Reporting Initiative  
  
http://database.globalreporting.org/   
  
Global  
  
Global  
  
EN  
  
Multiple   
  
Other  
  
Yes, mixed  
  
Both  
  
Free  
  
No  
  
10,407 organizations, 39,024 reports  
  
British Library  
  
http://www.bl.uk/reshelp/findhelprestype/coannrep/companyreports.html   
  
United Kingdom  
  
National  
  
EN  
  
EN  
  
Government  
  
No  
  
Both  
  
Otherwise restricted  
  
No  
  
Unknown  
  
MIT Dewey Annual Reports collection  
  
http://libguides.mit.edu/c.php?g=176014&p=1160945   
  
United States  
  
National  
  
EN  
  
EN  
  
Other  
  
No  
  
Separate reports  
  
Free  
  
No  
  
Around 33,000  
  
Thomson Reuters Eikon  
  
http://financial.thomsonreuters.com/en/products/tools-applications/trading-investment-tools/eikon-trading-software.html  
  
United States  
  
Global  
  
EN  
  
EN  
  
Business/sectoral  
  
No  
  
Both  
  
Paid  
  
No  
  
6000 companies, around 2500 sust report per year  
  
Annual Reports  
  
http://www.annualreports.com/   
  
United States  
  
Global  
  
EN  
  
EN  
  
Business/sectoral  
  
No  
  
Both  
  
Free  
  
No  
  
Around 53,000  
  
Order Annual Reports  
  
https://www.orderannualreports.com/   
  
United States  
  
Global   
  
EN  
  
EN  
  
Business/sectoral  
  
No  
  
Both  
  
Otherwise restricted  
  
No  
  
Undisclosed  
  
Financial Times Company Content Hub  
  
http://markets.ft.com/research/Markets/Company-Content   
  
United Kingdom (Nikkei)  
  
Global  
  
EN  
  
EN  
  
Business/sectoral  
  
No  
  
Both  
  
Free  
  
No  
  
Undisclosed  
  
Northcote  
  
http://www.northcote.co.uk/   
  
United Kingdom   
  
National  
  
EN  
  
EN  
  
Business/sectoral  
  
No  
  
Both  
  
Otherwise restricted  
  
No  
  
Undisclosed  
  
Annual Reports at Academic Business Libraries  
  
https://apps.lib.purdue.edu/abldars/index.php   
  
United States  
  
National  
  
EN  
  
EN  
  
Government  
  
No  
  
Separate reports  
  
Otherwise restricted  
  
No  
  
Unknown  
  
The Public Register  
  
http://www.prars.com/search/alpha/A   
  
United States  
  
North America  
  
EN  
  
EN  
  
Business/sectoral  
  
No  
  
Both  
  
Otherwise restricted  
  
No  
  
>400  
  
GRI Sustainability Disclosure Database  
  
http://database.globalreporting.org/   
  
Global  
  
Global  
  
EN  
  
various  
  
Other  
  
No  
  
Separate reports  
  
Free  
  
No  
  
>38,000  
  
NSE Infobase Corporate Social Responsibility Database  
  
http://www.nseinfobase.com/single-product15.aspx   
  
India  
  
India  
  
EN  
  
EN  
  
Business/sectoral  
  
No  
  
Separate reports  
  
Paid  
  
  
  
  
  
NSE Infobase Annual Reports Database  
  
http://www.nseinfobase.com/single-product6.aspx   
  
India  
  
India  
  
EN  
  
EN  
  
Business/sectoral  
  
No  
  
Separate reports  
  
  
  
  
  
  
  
Online Reports Database  
  
https://www.online-report.com/   
  
Austria/Italy  
  
Mostly Europe  
  
EN  
  
Mostly EN  
  
Business/sectoral  
  
No  
  
Both  
  
Free  
  
No  
  
469 annual reports, 104 sust reports  
  
CSR Hub  
  
https://www.csrhub.com/   
  
Global  
  
Global  
  
EN  
  
EN  
  
Business/sectoral  
  
No  
  
Both  
  
Paid  
  
No  
  
>17000 companies rated  
  
Raporty Społecze  
  
http://raportyspoleczne.pl/biblioteka-raportow/   
  
Poland  
  
National  
  
PL  
  
PL  
  
Mixed  
  
No  
  
Separate reports  
  
Free  
  
No  
  
231 reports  
  
Integrated Reporting Examples Database  
  
http://examples.integratedreporting.org/home   
  
United Kingdom  
  
Global  
  
EN  
  
EN  
  
Other  
  
No  
  
Integrated reports  
  
Free  
  
No  
  
Few hundred   
  
IRAS Reports database  
  
http://www.iras.co.za/frmResources.aspx?SubPageID=15   
  
South Africa  
  
National  
  
EN  
  
EN  
  
Business/sectoral  
  
No  
  
Both  
  
Otherwise restricted  
  
No  
  
few hundred   
  
Materials and Quantitative Indicators Database  
  
http://www.sustainabilityreport.cn/   
  
China  
  
National  
  
CN  
  
CN  
  
Business/sectoral  
  
No  
  
Separate reports  
  
Free  
  
No  
  
3722 companies, 11128 reports  
  
Deutscher Nachhaltigkeitskodex  
  
http://www.deutscher-nachhaltigkeitskodex.de/en/database/database.html  
  
Germany  
  
National  
  
DE, EN  
  
DE, EN  
  
Government  
  
Yes, mixed  
  
Separate reports  
  
Free  
  
No  
  
few hundred   
  
Nachhaltigheitsberichte.at  
  
http://www.nachhaltigkeitsberichte.at/  
  
Austria   
  
National  
  
DE   
  
DE   
  
Other  
  
Yes, mixed  
  
Separate reports  
  
Free  
  
No  
  
less than a hundred  
  
Unternehmen Verantwortung Gesellschaft e.V.  
  
http://www.csr-vision.net  
  
Germany  
  
National  
  
DE  
  
DE  
  
Other  
  
No  
  
Separate reports  
  
Free  
  
No  
  
less than a hundred  
  
Lebensart VerlagsGmbH  
  
http://www.businessart.at/nachhaltigkeitsberichte  
  
Austria  
  
National  
  
DE  
  
DE  
  
Other  
  
No  
  
Separate reports  
  
Free  
  
No  
  
around a hundred  
  
BCSD Portugal   
  
http://www.bcsdportugal.org/publicacoes/relatorios  
  
Portugal  
  
National  
  
PT  
  
PT  
  
Mixed  
  
Yes, mixed  
  
Separate reports  
  
Free  
  
No  
  
less than a hundred  
  
EIDER   
  
http://www.stats.environnement.developpement-durable.gouv.fr/Eider/  
  
France  
  
National/regional  
  
FR  
  
FR  
  
Government  
  
Yes, mixed  
  
Both  
  
Free  
  
No  
  
>5,000  
  
RSE et PED  
  
http://www.rse-et-ped.info/rse/4-rapports-annuels-rse/  
  
France  
  
Global (developing countries)  
  
FR  
  
FR  
  
Mixed  
  
Yes, mixed  
  
Both  
  
Free  
  
No  
  
Undisclosed  
  
EDGAR (Electronic Data Gathering, Analysis, and Retrieval) U.S. Securities and Exchange Commission (SEC)  
  
https://www.sec.gov/edgar/searchedgar/companysearch.html  
  
USA  
  
National  
  
EN  
  
EN  
  
Government  
  
Yes  
  
Both  
  
Free  
  
No  
  
21 million filings from companies

Last updated: 12 February 2018  
  
  
  
Goal 12: Ensure sustainable consumption and production patterns  
  
Target 12.2: By 2020, achieve the sustainable management and efficient use of natural resources.  
  
Indicator 12.2.1: Material Footprint, material footprint per capita, and material footprint per GDP  
  
  
  
Institutional information  
  
  
  
Organization(s):  
  
United Nations Environment Programme (UNEP)  
  
   
  
Concepts and definitions  
  
  
  
Definition:  
  
Material Footprint (MF) is the attribution of global material extraction to domestic final demand of a country. The total material footprint is the sum of the material footprint for biomass, fossil fuels, metal ores and non-metal ores.   
  
  
  
Rationale:  
  
Material footprint of consumption reports the amount of primary materials required to serve final demand of a country and can be interpreted as an indicator for the material standard of living/level of capitalization of an economy. Per-capita MF describes the average material use for final demand.   
  
  
  
Concepts:  
  
Domestic Material Consumption (DMC) and MF need to be looked at in combination as they cover the two aspects of the economy, production and consumption. The DMC reports the actual amount of material in an economy, MF the virtual amount required across the whole supply chain to service final demand. A country can, for instance have a very high DMC because it has a large primary production sector for export or a very low DMC because it has outsourced most of the material intensive industrial process to other countries. The material footprint corrects for both phenomena.   
  
  
  
Comments and limitations:  
  
The global material flows database is based on country material flow accounts from the European Union and Japan and estimated data for the rest of the world.   
  
  
  
Methodology  
  
  
  
Computation Method:  
  
It is calculated as raw material equivalent of imports (RMEIM) plus domestic extraction (DE) minus raw material equivalents of exports (RMEEX). For the attribution of the primary material needs of final demand a global, multi-regional input-output (MRIO) framework is employed. The attribution method based on I-O analytical tools is described in detail in Wiedmann et al. 2015. It is based on the EORA MRIO framework developed by the University of Sydney, Australia (Lenzen et al. 2013) which is an internationally well-established and the most detailed and reliable MRIO framework available to date.   
  
  
  
Disaggregation:  
  
The MF indicator can be disaggregated to four main material categories, a varying number of economic sectors whose expenditure require materials and to three domestic final demand sectors (household consumption, government consumption and capital investment) and foreign final demand (i.e. exports).   
  
  
  
Treatment of missing values:  
  
  
  
At country level  
  
A zero is imputed when no positive real value was officially recorded, in the base data sets used, for any of the underlying components which make up this aggregated total. Thus “0.0” can represent either NA, or a genuine 0.0, or (crucially) a combination of both, which is a common situation. This allows for values to be easily aggregated into further aggregations; however, it should be thus noted that due to imputing missing values as ‘0.0’, the aggregations may represent a lower value than actual situation.   
  
  
  
At regional and global levels  
  
Similarly, missing values are imputed as zero in the regional and global aggregations. However, in the case where no data is available at all for a particular country then the per capita and per GDP estimates are weighted averages of the available data.   
  
  
  
Regional aggregates:  
  
See: http://uneplive.unep.org/media/docs/graphs/aggregation\_methods.pdf  
  
  
  
Sources of discrepancies:  
  
  
  
Data Sources  
  
  
  
Description:  
  
The global material flows database is based on country material flow accounts from the European Union and Japan and estimated data for the rest of the world. Estimated data is produced on the bases of data available from different national or international datasets in the domain of agriculture, forestry, fisheries, mining and energy statistics. International statistical sources for DMC and MF include the IEA, USGS, FAO and COMTRADE databases.   
  
  
  
Collection process:  
  
The IRP Global Material Flows and Resource Productivity working group compiles the data from countries and from other sources.  
  
  
  
Data Availability  
  
  
  
Description:  
  
The data covers more than 170 countries.   
  
  
  
Time series:  
  
The data set covers each nation individually, over a time period of 47 years (1970-2017).  
  
  
  
Calendar  
  
  
  
Data collection:  
  
 Under discussion  
  
   
  
Data release:  
  
11 September 2017  
  
Data providers  
  
National Statistical Offices   
  
  
  
Data compilers  
  
UNEP, OECD and EUROSTAT  
  
  
  
References  
  
  
  
URL:  
  
  
  
References:  
  
EUROSTAT (2013). Economy-wide material flow accounts. Compilation guide 2013.  
  
Wiedmann, T., H. Schandl, M. Lenzen, D. Moran, S. Suh, J. West, K. Kanemoto, (2013) The Material Footprint of Nations, Proc. Nat. Acad. Sci. Online before print.  
  
Lenzen, M., Moran, D., Kanemoto, K., Geschke, A. (2013) Building Eora: A global Multi-regional Input-Output Database at High Country and Secotr Resolution, Economic Systems Research, 25:1, 20-49.   
  
  
  
Related indicators as of February 2020  
  
Indicator 8.4.1

Last updated: May 2020  
  
  
  
Goal 12. Ensure sustainable consumption and production patterns  
  
Target: 12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production  
  
Indicator: 12.a.1 Installed renewable energy-generating capacity in developing countries (in watts per capita)  
  
  
  
Institutional information  
  
  
  
Organization(s):  
  
International Renewable Energy Agency (IRENA)  
  
  
  
Concepts and definitions  
  
  
  
Definition:  
  
The indicator is defined as the installed capacity of power plants that generate electricity from renewable energy sources divided by the total population of a country. Capacity is defined as the net maximum electrical capacity installed at the year-end and renewable energy sources are as defined in the IRENA Statute (see concepts below).   
  
  
  
Rationale:  
  
The infrastructure and technologies required to supply modern and sustainable energy services cover a wide range of equipment and devices that are used across numerous economic sectors. There is no readily available mechanism to collect, aggregate and measure the contribution of this disparate group of products to the delivery of modern and sustainable energy services. However, one major part of the energy supply chain that can be readily measured is the infrastructure used to produce electricity.   
  
   
  
Renewables are considered a sustainable form of energy supply, as their current use does not usually deplete their availability to be used in the future. The focus of this indicator on electricity reflects the emphasis in the target on modern sources of energy and is particularly relevant for developing countries where the demand for electricity is often high and its availability is constrained. Furthermore, the focus on renewables reflects the fact that the technologies used to produce renewable electricity are generally modern and more sustainable than non-renewables, particularly in the fastest growing sub-sectors of electricity generation from wind and solar energy.  
  
  
  
The division of renewable electricity capacity by population (to produce a measure of Watts per capita) is proposed to scale the capacity data to account for the large variation in needs between countries. It uses population rather than GDP to scale the data, because this is the most basic indicator of the demand for modern and sustainable energy services in a country.  
  
  
  
This indicator should also complement indicators 7.1.1 and 7.2. With respect to electricity access, it will provide additional information to the proportion of people with electricity access by showing how much infrastructure is available to deliver that access (in terms of the amount of capacity per person). The focus on renewable capacity will also add-value to the existing renewables indicator (7.2) by showing how much renewable energy is contributing to the need for improved electricity access.   
  
  
  
Concepts:  
  
Electricity capacity is defined in the International Recommendations for Energy Statistics or IRES (UN, 2018) as the maximum active power that can be supplied continuously (i.e., throughout a prolonged period in a day with the whole plant running) at the point of outlet (i.e., after taking the power supplies for the station auxiliaries and allowing for the losses in those transformers considered integral to the station). This assumes no restriction of interconnection to the network. It does not include overload capacity that can only be sustained for a short period of time (e.g., internal combustion engines momentarily running above their rated capacity).  
  
  
  
The IRENA Statute defines renewable energy to include energy from the following sources: hydropower; marine energy (ocean, tidal and wave energy); wind energy; solar energy (photovoltaic and thermal energy); bioenergy; and geothermal energy.  
  
  
  
Comments and limitations:  
  
At present, electricity only accounts for about one-quarter of total energy use in the World and an even lower share of energy use in most developing countries. The focus of this indicator on electricity capacity does not capture any trends in the modernisation of technologies used to produce heat or provide energy for transport.  
  
  
  
However, with the growing trend towards electrification of energy end-uses, the focus here on electricity may become less of a weakness in the future and may also serve as a general indicator of the progress towards greater electrification in developing counties. That, in itself, should be seen as a shift towards the use of more modern technology to deliver sustainable energy services.  
  
  
  
Furthermore, as reflected in many national policies, plans and targets, increasing the production of electricity and, in particular, renewable electricity, is seen by many countries as a first priority in their transition to the delivery of more modern and sustainable energy services. Thus, this indicator is a useful first-step towards measuring overall progress on this target that reflects country priorities and can be used until other additional or better indicators can be developed.  
  
  
  
Methodology  
  
  
  
Computation Method:  
  
For each country and year, the renewable electricity generating capacity at the end of the year is divided by the total population of the country in that year.  
  
  
  
Disaggregation:  
  
IRENA’s renewable capacity data is available for every country and area in the world from the year 2000 onwards. These figures can also be disaggregated by technology (solar, hydro, wind, etc.) and by on-grid and off-grid capacity.  
  
  
  
Treatment of missing values:  
  
  
  
At country level  
  
At the country level, electricity capacity data is sometimes missing for two reasons:  
  
  
  
Delays in responding to IRENA questionnaires or publication of official data. In such cases, estimates are made so that global and regional totals can be calculated. The most basic treatment is to repeat the value of capacity from the previous year. However, IRENA also checks unofficial data sources and collects data about investment projects (see Indicator 7.a.1). These other sources can be used to identify if any new power plants have been commissioned in a year and are used where available to update the capacity value at the end of a year. Any such estimates are eventually replaced by official or questionnaire data when that becomes available.  
  
Off-grid capacity data is frequently missing from national energy statistics, or is presented in non-standard units (e.g. numbers of mini-hydro plants in a country rather than their capacity in MW). Where official data is not available, off-grid capacity figures are collected by IRENA from a wide variety of other official and unofficial sources in countries (e.g. development agencies, government departments, NGOs, project developers and industry associations) and this information is added to the capacity database to give a more complete picture of developments in the renewable energy sector in a country. This data is peer reviewed each year through an extensive network of national correspondents (the REN21 Network) and is checked with IRENA country focal points when they attend IRENA meetings and training workshops.  
  
  
  
At regional and global levels  
  
See above. Regional and global totals are only estimated to the extent that figures for some countries may be estimated in each year. (See also data availability below).   
  
  
  
Regional aggregates:  
  
Regional and global totals are calculated by summing the renewable generating capacity for a region or the World and dividing that by the corresponding figure for total population.  
  
  
  
Sources of discrepancies:  
  
The main source of discrepancies between different sources of electricity capacity data are likely to be due to the under-reporting or non-reporting of off-grid capacity data (see above) or slight variations in the definition of installed capacity. IRENA uses the IRES definition of capacity agreed by the Oslo Group on Energy Statistics, while some countries and institutions may use slightly different definitions of capacity to reflect local circumstances (e.g. the reporting of derated rather than maximum net installed capacity or the reporting of built rather than commissioned capacity at year-end).  
  
  
  
Methods and guidance available to countries for the compilation of the data at the national level:  
  
Guidance for the collection of electricity capacity data is provided by the International Recommendations for Energy Statistics. IRENA also produces methodological guidance for countries, specifically about how to measure renewable energy and collect renewable energy data. This is supported by a comprehensive programme of regional renewable energy statistics training workshops and ongoing communications with countries as part of the annual questionnaire cycle.   
  
  
  
Quality assurance:  
  
IRENA data are compiled from national sources following the United Nations Fundamental Principles of Official Statistics: https://unstats.un.org/unsd/dnss/gp/fundprinciples.aspx.   
  
  
  
Consultation/validation process with countries for adjustments and estimates  
  
All countries are invited to provide their capacity data or at least review the data that IRENA has compiled (from other official and unofficial sources) through an annual process of data collection using the IRENA Renewable Energy Questionnaire. This process is reinforced through IRENA’s renewable energy statistics training workshops, which are held twice a year in different (rotating) regions. To date, over 200 energy statisticians have participated in these workshops, many of whom provide renewable energy data to IRENA. In addition, IRENA’s statistics are presented each year to member countries at one of IRENA’s three governing body meetings, where discrepancies or other data issues can be discussed with country representatives.  
  
  
  
Data Sources  
  
  
  
Description:  
  
IRENA’s electricity capacity database contains information about the electricity generating capacity installed at the year-end, measured in MW. The dataset covers all countries and areas from the year 2000 onwards. The dataset also records whether the capacity is on-grid or off-grid and is split into 36 different renewable energy types that can be aggregated into the six main sources of renewable energy.   
  
  
  
Collection process:  
  
The capacity data is collected as part of IRENA’s annual questionnaire cycle. Questionnaires are sent to countries at the start of a year asking for renewable energy data for two years previously (i.e. at the start of 2019, questionnaires ask for data for the year 2017). The data is then validated and checked with countries and published in the IRENA Renewable Energy Statistics Yearbook at the end of June. To minimise reporting burden, the questionnaires for some countries are pre-filled with data collected by other agencies (e.g. Eurostat) and are sent to countries for them to complete any additional details requested by IRENA.  
  
  
  
At the same time as this, preliminary estimates of capacity for the previous year are also collected from official sources where available (e.g. national statistics, data from electricity grid operators) and from other unofficial sources (mostly industry associations for the different renewable energy sectors). These are published at the end of March.   
  
  
  
Population data:  
  
For the population part of this indicator, IRENA uses a 6-source consolidation by the World Bank, which is available through the World Bank’s World Development Indicators database. The indicator reflects the residents in a country or area regardless of legal status or citizenship. The values are midyear estimates.  
  
  
  
The World Bank publishes more information about this indicator in their metadata:  
  
https://databank.worldbank.org/reports.aspx?source=2&type=metadata&series=SP.POP.TOTL  
  
Data Availability  
  
  
  
Description:  
  
The total number of capacity records in the database (all developing countries/areas, all years since 2000, all technologies) is 11,000. In terms of numbers of records, 3,120 (28%) are estimates and 740 (7%) are from unofficial sources. The remaining records (65%) are all from returned questionnaires or official data sources.   
  
  
  
However, in terms of the amount of capacity covered in the database, the shares of data from estimated and unofficial sources is only 5% and 1% respectively. The large difference between these measures is due to the inclusion of off-grid capacity figures in the database. The amount of off-grid generating capacity in a country is quite frequently estimated by IRENA, but the amounts of off-grid capacity recorded in each case is often relatively small.  
  
  
  
Time series:  
  
Renewable generating capacity data is available from 2000 onwards.   
  
  
  
Calendar  
  
  
  
Data collection:  
  
 Capacity data is recorded as a year-end figure. The data is collected in the first six months of every year  
  
   
  
Data release:  
  
Estimates of generating capacity for a year are published at the end of March in the following year. Final figures for the year before that are published at the end of June.  
  
  
  
Data providers  
  
  
  
Renewable energy generating capacity:  
  
National Statistical Offices and National Energy Agencies of Ministries (the authority to collect this data varies between countries). Data for preliminary estimates may also be collected from industry associations, national utility companies or grid operators.  
  
  
  
Population:  
  
The World Bank consolidates and publishes population data coming from the following data providers:  
  
United Nations Population Division. World Population Prospects.   
  
Census reports and other statistical publications from national statistical offices  
  
Eurostat: Demographic Statistics  
  
United Nations Statistical Division. Population and Vital Statistics Report  
  
U.S. Census Bureau: International Database  
  
Secretariat of the Pacific Community: Statistics and Demography Programme.  
  
Data compilers  
  
  
  
International Renewable Energy Agency (IRENA).  
  
  
  
References  
  
  
  
IRENA Statistical Yearbooks: https://www.irena.org/Statistics.   
  
  
  
Related indicators  
  
  
  
Not applicable.

Last updated: November 2019  
  
  
  
  
Goal 12: Ensure sustainable consumption and production patterns  
  
Target: 12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses  
  
Indicator: 12.3.1 (a) Food loss index and (b) food waste index  
  
  
  
This metadata refers only to part (b) of the indicator 12.3.1: Food waste index.   
  
  
  
Institutional information  
  
  
  
Organization(s):  
  
United Nations Environment Programme (UNEP)   
  
  
  
Concepts and definitions  
  
  
  
Definition:   
  
The indicator aims to measure the total amount of food that is wasted in tonnes. It complements SDG 12.3.1(a) on Food Loss (which is under the custodianship of FAO). Both indicators look to divide the food value chain and measure the efficiency of the food system.   
  
  
  
Level I indicators   
  
Food waste in the waste stream  
  
Estimated from a global model, based on regional coefficients for food waste in the total waste stream.  
  
Level II indicators   
  
Food waste generation by supply chain stage  
  
Collect data on food waste generation from supply chain stages based on national priorities  
  
  
  
A full methodology for this indicator is available in the document entitled, “Measuring Waste in the Context of the SDGs”.  
  
  
  
Rationale:  
  
According to an FAO publication in 2011, approximately one-third of all food is lost or wasted. This results in economic loss and increased pressure on food systems. Reducing food waste is critical to maximizing the value of agricultural land and ensuring that natural resources are used in a sustainable way. This indicator will not only help countries identify where food is lost and wasted but also it can provide information which Governments, citizens and the private sector can take in order to reduce food waste.  
  
  
  
Concepts:  
  
Food: Any substance—whether processed, semi-processed, or raw—that is intended for human consumption. “Food” includes drink and any substance that has been used in the manufacture, preparation, or treatment of food. “Food” also includes material that has spoiled and is therefore no longer fit for human consumption. It does not include cosmetics, tobacco, or substances used only as drugs. It does not include processing agents used along the food supply chain, for example, water to clean or cook raw materials in factories or at home.  
  
  
  
Inedible (or non-edible) parts: Components associated with a food that, in a particular food supply chain, are not intended to be consumed by humans. Examples of inedible parts associated with food could include bones, rinds, and pits/stones. “Inedible parts” do not include packaging. What is considered inedible varies among users (e.g., chicken feet are consumed in some food supply chains but not others), changes over time, and is influenced by a range of variables including culture, socio-economic factors, availability, price, technological advances, international trade, and geography.   
  
  
  
Municipal Solid Waste (MSW) includes waste originating from households, commerce, and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings). It also includes bulky waste (e.g., old furniture, mattresses) and waste from selected municipal services, e.g., waste from park and garden maintenance, waste from street cleaning services (street sweepings, the content of litter containers, market cleansing waste), if managed as waste. Further information on municipal solid waste is defined in the SDG indicator methodology for 11.6.1.  
  
  
  
Comments and limitations:   
  
The challenge resulting from the flexible three-level approach to presenting a methodology is one of consistency and comparability. Can one compare between levels or across methods? Not directly and not without caveats. It is possible to compare at regional levels where the random error is relatively high (e.g. around 25%) for each country but it would not be appropriate to compare countries against each other unless there was a much greater difference in their estimates than the combined amount of error. The approach to consistency is one of transparency against a framework.  
  
  
  
Different methods of quantification can also be used for other relevant and related purposes (for example, “where are the greatest opportunities within the waste that is produced to reduce it?”). Taking in-home consumption as an example, it is difficult to obtain reasons for discarding food (and therefore the opportunities for influencing citizen behaviour) without the use of diaries or ethnography. However, direct weighing of waste volumes could give a significantly more accurate quantity.  
  
  
  
Methodology  
  
Computation Method   
  
A full methodology for this indicator is available in the document entitled, “Measuring Waste in the Context of the SDGs”.  
  
For the purpose of this indicator, the methodology aims to estimate the amount of food in total waste stream.  
  
  
  
For level 1, the global modeling approach will estimate a proportion of food in the total waste stream data (e.g. municipal solid waste, MSW) and apply the proportion to the total. The work on this model will utilize the existing efforts to compile information for SDG 11.6.1 on municipal solid waste management and will utilize existing information on global waste, including World Bank publication “What a Waste 2.0, A Global Snapshot of Solid Waste Management to 2050”. Some countries publish data on the ratio of food waste to the total MSW. The existing data will be used to create a regional coefficient for each SDG sub-region. These regional coefficients will then be applied to the data for 11.6.1 and What a Waste data to fill data gaps. (Not that when a country reports data then no global estimation will be done, the country data will be used directly.)   
  
  
  
For level 2, countries should identify the scope of which stages of the supply chain can be covered and estimate the total amount of food wasted for each supply chain stream. The amount of food waste within a stage of the food supply chain shall be established by measuring food waste generated by a sample of food business operators or households in accordance with any of the following methods or a combination of those methods or any other method equivalent in terms of relevance, representativeness and reliability.  
  
  
  
Stages of the food supply chain  
  
Methods of measurement  
  
Primary production  
  
- Direct measurement  
  
-Mass balance  
  
  
  
-Questionnaires and interviews  
  
-Coefficients and production statistics  
  
-Waste composition analysis  
  
Processing and manufacturing  
  
  
  
  
  
  
  
  
  
Retail and other distribution of food  
  
  
  
  
  
-Waste composition analysis  
  
-Counting/ scanning  
  
  
  
Restaurants and food services  
  
  
  
  
  
  
  
  
  
-Diaries  
  
Households  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
Disaggregation:  
  
Ideally, food waste would be disaggregated by edible and inedible parts (Note that it is important to take into account the difference between countries in terms of inedible parts. Nicholes et al. provides some insight into differences between countries.   
  
Disaggregation of food waste by destination is important for understanding the best way to optimize the use of food waste for fertilizer. This includes:   
  
Co-digestion/anaerobic digestion,  
  
Composting/aerobic process,  
  
Controlled combustion,  
  
Land application,  
  
Landfill,  
  
Refuse/discards/litter,  
  
  
  
Treatment of missing values:  
  
Missing values are not imputed for national figures. However, UNEP is using a global modeling approach for level 1 (this is due to the lack of data on this topic and the interest in having data that can be used for high-level tracking).  
  
   
  
Regional aggregates:  
  
The data will be aggregated at the sub-regional, regional and global levels. For the aggregation methods, please see http://uneplive.unep.org/media/docs/graphs/aggregation\_methods.pdf.   
  
  
  
Sources of discrepancies:   
  
As mentioned, waste statistics involve a large number of national and sub-national stakeholders which may create discrepancies. Additionally, there are a number of challenges related to the following:  
  
Variations in waste over time can have a significant impact on estimated quantities of waste when short studies (e.g. a week) are used to represent a longer time period (a year)  
  
The specific time of year when a study takes place which may affect the waste produced;  
  
Natural variation over time in amounts of waste generated by single entities (e.g. households or restaurants).   
  
At a national level, countries may have to rely on other entities to measure their own waste and report to the government, which would then be collated and analysed to estimate the total amount. How the data is collected would vary by the food chain stage as the way food waste is generated in each stage varies. For example, a large formal retailer (supermarket chain) may keep records of stock unsold and discarded which could be reported. On the other hand, a government requesting reporting from households may have to issue guidance to local municipalities and prescribe a quantification method e.g. a food waste diary. The reported quantities may require scaling if a government cannot obtain reports from the entire population of the food chain stage i.e. it is unlikely that every household in the country would report.  
  
  
  
Data Sources  
  
Description:  
  
Data provided by national governments, including NSOs and Ministries of Environment  
  
  
  
Collection process:  
  
UNEP is exploring the use of the UNSD/UNEP Questionnaire on Environment Statistics for data collection. Additional data will be collected through directly by UNEP.  
  
  
  
Data Availability  
  
Description:  
  
All countries that reply to the questionnaire.   
  
  
  
Time series:  
  
The UNSD/UNEP Questionnaire is sent to countries every 2 years requesting annual data.  
  
  
  
Calendar  
  
Data collection:  
  
The UNSD/UNEP Questionnaire is every 2 years.   
  
   
  
Data release:  
  
First SDG reporting cycle: 2020  
  
  
  
Data providers  
  
National Statistical Systems   
  
  
  
Data compilers  
  
UNSD and UNEP   
  
References  
  
  
  
References:   
  
Measuring Waste in the Context of the SDGs (UNEP, forthcoming)  
  
  
  
  
  
Related indicators as of February 2020  
  
  
  
11.6.1, 12.5.1

Last updated: 16 October 2018  
  
  
  
Goal 12: Ensure sustainable consumption and production patterns  
  
Target 12.c: Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities  
  
Indicator 12.c.1: (a) Amount of fossil-fuel subsidies as a percentage of GDP; and (b) amount of fossil-fuel subsidies as a proportion of total national expenditure on fossil fuels  
  
  
  
Institutional information  
  
  
  
Organization(s):  
  
UN Environment (United Nations Environment Programme)  
  
  
  
Concepts and definitions  
  
  
  
Definition:  
  
In order to measure fossil fuel subsidies at the national, regional and global level, three sub-indicators are recommended for reporting on this indicator: 1) direct transfer of government funds; 2) induced transfers (price support); and as an optional sub-indicator 3) tax expenditure, other revenue foregone, and under-pricing of goods and services. The definitions of the IEA Statistical Manual (IEA, 2005) and the Agreement on Subsidies and Countervailing Measures (ASCM) under the World Trade Organization (WTO) (WTO, 1994) are used to define fossil fuel subsidies. Standardised descriptions from the United Nations Statistical Office’s Central Product Classification should be used to classify individual energy products. It is proposed to drop the wording “as a proportion of total national expenditure on fossil fuels” and thus this indicator is effectively "Amount of fossil fuel subsidies per unit of GDP (production and consumption)".  
  
   
  
Rationale:  
  
The scale and impact of fossil fuel subsidies presents both challenges and opportunities for achieving the goals of the 2030 Agenda on Sustainable Development. For one, the use of fossil fuels, and their promotion through subsidy schemes, adversely affects the ability of governments to attain key goals, such as reducing poverty, improving health, reaching gender equality, providing access to energy, and addressing climate change. At the same time, there is a need to ensure that poor households that are particularly vulnerable to price increases obtain or retain access to energy. Energy-dependent sectors of the economy can be affected, particularly by abrupt changes in prices. Any successful reform therefore requires careful analysis and adapted mitigation measures. For another, reallocating fossil fuel subsidies to sectors that are relevant for development could give a boost to reaching the SDGs.   
  
  
  
Awareness and understanding of existing subsidies based on credible data is necessary to increase transparency and inform decision-making. Reporting against a global indicator measuring consumer and producer fossil fuel subsidies provides a global picture that encompasses both consumer and producer subsidies. It allows for tracking of national and global trends and serve as an important guide for policy-making.   
  
  
  
Concepts:  
  
The concepts and definitions used in the methodology have been based on existing international frameworks and glossaries.  
  
Use definition of fossil fuels from IEA Statistics Manual, “Fossil fuels are taken from natural resources which were formed from biomass in the geological past. By extension, the term fossil is also applied to any secondary fuel manufactured from a fossil fuel.”  
  
Use the terms set out in CPC Rev. 2.1 for the statistical classification of the individual products. No other commonly accepted definition identified  
  
Include electricity and heat generated from fossil fuels in the scope of fossil fuels.   
  
Include non-energy uses with monitoring optional for the measuring of this indicator.  
  
Additional details are provided in the methodological document entitled, Measuring Fossil Fuel Subsidies in the Context of the Sustainable Development Goals.  
  
  
  
Comments and limitations:  
  
The monitoring and reporting of SDG Indicator 12.c.1 requires capacity within national statistical systems to evaluate direct and indirect transfers of government funds. Data collection by the statistical agencies from the sectoral ministries and state-owned enterprises, including at the sub-national level, which depends on their capacity. There is a need for additional training materials and sharing of experiences on the indicator.  
  
  
  
The indicator methodology utilizes a phased monitoring to allow for countries with different capacities to engage in monitoring 12.c.1. The two phases include global monitoring based on price gap estimates plus national monitoring of direct and indirect transfers with optional monitoring of tax expenditure foregone.  
  
  
  
Methodology  
  
Computation Method:  
  
It is proposed that countries report on the subsidy categories listed below as sub-indicators.  
  
- Direct transfers;   
  
- Induced transfers (reporting on regulated prices and calculation of the total amount);  
  
- Tax expenditure, other government revenue foregone and under-pricing of goods and services, including risk (optional).   
  
  
  
The last category should be included as an optional sub-indicator. Each sub-indicator should be expressed in national currency or United States dollars in current prices. UN Environment will use market exchange rates to calculate between national currency and United States dollar.   
  
  
  
Care should be given if a country chooses to aggregate across the three sub-indicators in order to avoid double counting and all three sub-indicators should be publicly available to ensure transparency. Care needs to be taken when aggregating estimates of induced transfers with data on direct transfers and some measures in under-pricing of goods and services.   
  
  
  
Estimates of subsidies to consumers observable through price-gaps (i.e., consumer price support) have been calculated by several international organizations (IADB, IEA, and IMF), covering different geographic regions and time-periods. The three organisations that produce these estimates use roughly the same approach, which can be summed up by the following equation:  
  
  
  
Consumer price support = (adjusted net-of-tax reference unit price – local net-of-tax unit price) x units subsidized  
  
  
  
Estimates are based on reference prices on import (or export) parity prices using the price of a product at the nearest international hub, adjusted for quality differences if necessary, plus (or minus) the cost of freight and insurance to the net importer (or back to the net exporter), plus the cost of internal distribution and marketing and any value-added tax (VAT). For tradable commodities (mainly coal, crude oil, and petroleum products), the reference prices are based on the spot price at the nearest international hub – e.g., the United States, Northwest Europe, or Singapore.  
  
  
  
Disaggregation:  
  
Because of the risk of double counting, the dataset should therefore provide disaggregated information on individual subsidy measures that will be reported as sub-indicators by category of subsidies.  
  
  
  
Treatment of missing values:  
  
  
  
At country level  
  
Missing values are not imputed.   
  
At regional and global levels  
  
A price gap method is used to create national, regional and global estimates.  
  
  
  
Regional aggregates:  
  
The methodology used for the calculation of the regional/global aggregates from the country values is available at http://pre-uneplive.unep.org/media/docs/graphs/aggregation\_methods.pdf.   
  
  
  
Sources of discrepancies:  
  
Country level data and price gap data are shown separately, thus this should not apply.   
  
  
  
Data Sources  
  
Description:  
  
Direct transfers are generally reported in government budgets, and well documented in sectoral and Finance Ministries, broken down by programme if not by fuel. Those that meet the SNA definition of “subsidies” – i.e., subsidies on products, and other subsidies on production – can also be found in a country’s System of National Accounts. Budget documents are publicly available for most countries. The degree to which information on individual programmes is itemized in those reports is highly variable, however. Support to corporations involved in energy production or transformation may sometimes be found in their annual reports, for example. In some cases, researchers may be able to obtain unpublished data from state-owned energy enterprises directly.  
  
  
  
Induced transfer are measured by calculating the price-gap between the producer or consumer price and a reference price, and multiplying that differential by the affected volume produced or consumed.   
  
  
  
Measuring the value of special features introduced into the tax code to favour certain industries or activities of those industries (such as investment in productive capital) can be a complex endeavour. Some countries do this exercise already, and report the annual value of those tax features in their periodic tax-expenditure reports. Where that is not the case, the analysist must construct a model and estimate the difference in the revenues that would be owed to the government under the baseline conditions and with the special tax feature.  
  
  
  
Fossil fuel subsidies should be monitored on an annual basis.  
  
   
  
Collection process:  
  
The data will be collected by UN Environment through electronic reporting being developed by UN Environment.   
  
  
  
Data Availability  
  
Description:  
  
An initial baseline data assessment of data availability demonstrates that 99 countries have existing data which can be used to estimate fossil fuels from direct transfer and many of these countries also have information on tax revenue foregone. Data on induced transfers using a price gap approach is available for all UN member states.  
  
  
  
Time series:  
  
The reporting on this indicator will follow an annual cycle with initial reporting on induced transfers starting in 2018. Data on direct transfers and tax revenue foregone will be in place by 2020.  
  
  
  
Calendar  
  
Data collection:  
  
Annual with reporting on induced transfers starting in 2018. Data on direct transfers and tax revenue foregone will be in place by 2020.  
  
  
  
   
  
Data release:  
  
Annual.  
  
  
  
Data providers  
  
National Focal Points from National Statistical Systems.  
  
OECD  
  
IMF and IEA  
  
  
  
Data compilers  
  
UN Environment (United Nations Environment Programme)   
  
  
  
References  
  
  
  
References:  
  
IEA. (2005). Energy Statistics–Manual. International Energy Agency, Paris, France. Paris. https://doi.org/10.1787/9789264033986-en  
  
OECD. (2015). OECD Companion to the Inventory of Support Measures for Fossil Fuels 2015. Paris.  
  
  
  
Related indicators as of February 2020

Last updated: 14 February 2018  
  
  
  
Goal 12: Ensure sustainable consumption and production patterns   
  
Target 12.1: Implement the 10-Year Framework of Programs on sustainable consumption and production (10YFP), all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries  
  
Indicator 12.1.1: Number of countries developing, adopting or implementing policy instruments aimed at supporting the shift to sustainable consumption and production  
  
  
  
Institutional information  
  
  
  
Organization(s):  
  
United Nations Environment Programme (UNEP)  
  
  
  
Concepts and definitions  
  
  
  
Definition:  
  
This indicator allows for the quantification (#) and monitoring of countries making progress along the policy cycle of binding and non-binding policy instruments aimed at supporting Sustainable Consumption and Production.   
  
Sustainable Consumption and Production: the working definition of Sustainable Consumption and Production (SCP) used in the context of this framework is: “The use of services and related products, which respond to basic needs and bring a better quality of life while minimising the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of future generation.”  
  
 Policy: although quite flexible and contexts specific, a policy is usually defined as a course of action that has been officially agreed by an entity or an organization (governmental or non-governmental) and is effectively implemented to achieve specific objectives.  
  
Policy instruments for sustainable consumption and production: policy instruments refer to the means – methodologies, measures or interventions – that are used to achieve those objectives. In the case of SCP, such instruments are designed and implemented to reduce the environmental impacts of consumption and production patterns, with a view of generating economic and/or social benefits.   
  
  
  
Making progress along the policy cycle refers to the development, adoption, implementation or evaluation of such policy instruments.   
  
  
  
Rationale:  
  
Mainstreaming sustainable consumption and production in decision-making at all levels is a core function of the 10-Year Framework, which is expected to “support the integration of sustainable consumption and production into sustainable development policies, programmes and strategies, as appropriate, including, where applicable, into poverty reduction strategies” (Rio+20 Outcome Document – A/CONF.216/5). The purpose of this indicator is to help assess the volume and geographical repartition of governments progressing on sustainable consumption and production. In addition, further information is being collected on the types, focus and orientation of the policy instruments that are being developed and used, to monitor their progression over time as well as their contribution to other Sustainable Development Goals. This should support evaluation of how much / how fast governments progress in the development and application of policies addressing sustainable consumption and production, whether at cross-cutting or sectoral level.  
  
  
  
The indicator is also considering both binding (laws and regulations) and non-binding policy instruments. The first category is essential to the shift, as binding instruments provide the legal ground for sustainable consumption and production, and can be used for enforcement or to provide incentives. The ability to develop, pass and implement legislation is an indication of jurisdictions’ engagement in the shift towards sustainable consumption and production. This indicator can also help monitor the evolution of the global legislative landscape. The second category is also essential to ensure institutional engagement, commitment and ownership. In some cases, non-binding policy instruments can lead to the creation of new legal ones. The development and implementation of non-binding instruments across sectors also provides information on engagement of partners and other stakeholders in sustainable consumption and production.  
  
  
  
Concepts:  
  
As mentioned above, policy instruments are distinguished in legally binding policies and non-legally binding ones.  
  
Legally binding: a legally binding policy instrument refers to a system of rules, procedures and/or principles which are prescribed and enforced by a governing authority with the aim of requiring or preventing specific actions or providing incentives that lead to change in actions or preferences. It includes: laws, regulations, standards, by-laws, codes, etc. They can relate to different types of jurisdictions such as a ministry, state, municipality, or group of states.   
  
Non-binding: a non-binding policy instrument refers to a coherent set of decisions associated to a common vision, objective and/or direction, and to a proposed course of action to achieve these. It includes, for instance: action plans, policies, strategies, programmes, and projects. They can have different scopes of application (international, national, local, etc.).  
  
At another level, different categories of policy instruments can be distinguished:   
  
Macro policies (e.g. national strategies/action plans, new institutions/entities)  
  
Regulatory and legal instruments (e.g. laws, standards, enforcement measures)  
  
Economic and fiscal instruments (taxes and tax incentives, grants, preferential loans, etc.)   
  
Voluntary and self-regulation schemes (e.g. sectoral partnerships, codes of conduct, CSR initiatives)  
  
  
  
It is important to note that, except for regulatory / legal instruments and voluntary / self-regulation schemes, the options above are not mutually exclusive: for instance, an economic instrument can be legally binding.   
  
  
  
“Policy cycle”: this political science concept is widely used to analyse and inform public policy-making processes, but can be transposed to any recurrent pattern leading to the implementation of a policy or policy instrument. The following approach with regards to the various stages of the policy cycle is adopted:   
  
Policy development, including Agenda setting (e.g. the problem identified is high enough on the public agenda that action becomes likely) and Policy design (e.g. setting objectives, identifying costs-benefits of potential policy instruments and selecting);   
  
Policy adopted or officially launched (e.g. adopting or authorizing the preferred policy options through the legislative process and refined through the bureaucratic process);   
  
Policy under implementation through specific actions (e.g. translating policy into concrete action and policy instruments); results and impacts are being monitored;  
  
Policy and related action plan has reached its end date and has been evaluated.  
  
  
  
Comments and limitations:  
  
Whereas the indicator quantifies and monitors countries’ progress along the policy cycle of binding and non-binding policy instruments aimed at supporting Sustainable Consumption and Production; it does not provide any qualitative information and whether policies were well-designed or if a proper background analysis had been conducted, the quality of implementation, level of enforcement, and its effects. These aspects will have to be looked at through narrative reports / qualitative analysis.   
  
  
  
The indicator encompasses policy instruments supporting the shift to SCP, including: policies which identify SCP as a key priority, policies focused on SCP and sectoral policies with SCP objectives. It is acknowledged that sectoral policies are also being reported under other SDG indicators and in particular 12.7.1 (# of countries implementing sustainable public procurement policies and action plans) and 12.b.1 (# of sustainable tourism strategies or policies and implemented action plans with agreed monitoring and evaluation tools).  
  
  
  
Establishing baselines and targets can be time and resource intensive and depends on the willingness of 10YFP National Focal Points to communicate necessary information.   
  
  
  
Main aspects regarding precision, reliability, attribution and double counting are addressed above. If you come across additional issues, please inform the 10YFP Secretariat.  
  
  
  
Methodology  
  
  
  
Computation Method:  
  
To be reported under this indicator, a government should have moved through one or more new stage(s) of the “Policy cycle” on one or more policy instrument(s) during the reporting period.  
  
This indicator is calculated at relevant aggregation levels based on the information collected from the National Focal Points and other government officials; users of the data should be mindful of double counting one same policy, when aggregating data across reporting years.  
  
  
  
Disaggregation:  
  
Country (using the official SDG country list provided by UNDESA).  
  
Ministry: Ministry of Environment / Sustainable Development / Natural Resources / Energy; Ministry of the Economy / Finance / Treasury; Ministry of Industry / Trade / Commerce / Labour; Ministry of Planning / Development / Infrastructures; Ministry of Foreign Affairs / Regional / International Cooperation; Ministry of Energy / Mineral Development / Power; Ministry of Science / Research / Technology / Innovation; Ministry of Agriculture / Livestock / Fisheries / Forestry / Food Security / Rural Affairs; Ministry of Tourism / Culture / Sports; Ministry of Transports / Roads / Works / Construction / Building; Ministry of Urban Development / Land Management / Housing; Ministry of Education / Higher Education / Youth; Ministry of Poverty Alleviation / Social Welfare / Families / Women.  
  
Policy: macro-policy; policy instrument.  
  
Type of macro-policy: macro-policy specifically focused on SCP; macro-policy with SCP as a key priority/objective; sectoral macro-policy with SCP objectives.  
  
Focus of “macro-policy with SCP as a key priority/objective”: sustainable development; green economy/green growth; circular economy; development/poverty eradication; other (specified).  
  
Type of instrument: regulatory/legal; economic/financial; voluntary/self-regulatory  
  
Policy cycle stage: Under development (initial stage); just adopted; under implementation through specific actions; has reached its end date and has been evaluated.   
  
Year of adoption: 2002 to 2022.  
  
Legal status: binding/non-binding.  
  
Sectors: Agriculture and fishery; Buildings and construction; Consumer goods; Culture and recreation; Financial sector; Education; Energy, Food & Beverage; Forestry; Environmental protection; Environmental services; Government and Civil Society; Housing; Industrial sector (Including SMEs); Scientific Research, Development and Innovation; Tourism; Transport; Waste (including Chemicals); Water.  
  
Actors involved: national ministries or other specialized national agencies; local authorities; civil society organizations; scientific and technical organizations; United Nations/inter-governmental organizations; business sector.   
  
Support received from non – national partner: United Nations/inter-governmental organizations; multilateral financial institutions; bilateral organizations; international non-governmental organizations.  
  
Support received from 10YFP: encouraged the development/implementation; technical support; financial support; capacity-building activities; experience and knowledge-sharing tools; no connection to 10YFP.  
  
Support received from 10YFP programmes: sustainable public procurement; sustainable tourism; consumer information for SCP; sustainable food systems; sustainable lifestyles and education; sustainable buildings and construction; none of the above.  
  
Link to other SDGs: SDG 1;2;3;4;5;6;7;8;9;10;11;13;14;15;16;17  
  
Impact measured: Resource efficiency; environmental impact; human well-being. More detailed impact indicators in the 10YFP Indicators of Success.  
  
Relevant links and attachments including electronic copies of the policies, or their drafts, relevant official reports, summary of consultations and any other relevant associated documents and web links should be attached to the reporting.  
  
  
  
Treatment of missing values:  
  
  
  
At country level  
  
A zero is imputed when no positive real value was officially recorded, in the base data sets used, for any of the underlying components which make up this aggregated total. Thus “0.0” can represent either NA, or a genuine 0.0, or (crucially) a combination of both, which is a common situation. This allows for values to be easily aggregated into further aggregations; however, it should be thus noted that due to imputing missing values as ‘0.0’, the aggregations may represent a lower value than actual situation.   
  
  
  
At regional and global levels  
  
Similarly, missing values are imputed as zero in the regional and global aggregations.   
  
  
  
Note: the disaggregation categories above are indicative and some can be left empty when reporting on measures for which such data elements are not available.  
  
Data Sources  
  
  
  
Description:  
  
Data is collected through an online survey based on this metadata sheet.  
  
The survey may include additional questions, such as those on inter-ministerial and/or multi-stakeholder coordination mechanism for SCP.  
  
The questions included in the survey can be revised as needed, in particular as data becomes available through the survey and alignment may be required with related ongoing work under the SDGs.  
  
The 10YFP Global Survey on National SCP Policies and Initiatives, administered by the 10YFP Secretariat in 2015, and reported on by 10YFP National Focal Points, as well as the subsequent report, may complement information and data collected.   
  
  
  
Collection process:  
  
Data is provided by 10YFP National Focal Points.  
  
The survey is administered by the 10YFP Secretariat.  
  
A pilot data collection and reporting was undertaken to test the methodology and reporting tools in 2017. On the basis of this pilot the methodology may be further revised.  
  
The 10YFP or 10YFP secretariat is not responsible for the quality of the data provided.  
  
  
  
Data Availability  
  
  
  
Description:  
  
To date, 71 countries plus the European Union have participated in the pilot reporting on SDG 12.1.1. In addition, the data collected through the 2015 prototype survey and subsequent report bring to 82 the number of countries where policy instruments supporting the shift to sustainable consumption and production have been developed / reported.   
  
  
  
Time series:  
  
The data set covers each nation individually since 2002.   
  
  
  
Calendar  
  
  
  
Data collection:  
  
 Reporting on this indicator should be done in accordance with the methodology presented here.  
  
 10YFP National Focal Points are responsible for relevance, accuracy and methodological rigour of any information reported.  
  
 The pilot reporting and data collection scheduled for Q4 of 2017; related data release is scheduled for Q2 2018.  
  
 It is envisaged that the data is collected every 2 years.  
  
   
  
Data release:  
  
First release of data at the High Level Political Forum on Sustainable Development in 2018.   
  
  
  
Data providers  
  
National data provider: 10YFP National Focal Points – the full list of National Focal Points is available here. In countries there is no nominated 10YFP national focal point, the survey will be sent to the UN Environment Focal Point.   
  
  
  
Data compilers  
  
Organisations responsible for data collection and compilation on this indicator at the global level: UN Environment, the 10YFP Secretariat administers the data collection through a dedicated online tool. UN Environment, the 10YFP or the 10YFP Secretariat are not responsible for the quality of the data provided.  
  
  
  
References  
  
  
  
URL:  
  
10YFP Indicators of Success: principles, process and methodology, January 2017  
  
UNEP Live (Natural Resources: DMC, Energy, GHG, Water Footprint) http://uneplive.unep.org   
  
Capacity-building and policy needs assessment for SCP developed by SWITCH Asia http://www.switch-asia.eu/policy-support-components/rpsc/policy-assessment   
  
  
  
References:  
  
Sustainable Consumption and Production: A handbook for policy-makers. UNEP, 2015.  
  
ABC for SCP: clarifying concepts on Sustainable Consumption and Production, UNEP, 2010  
  
10YFP Secretariat’s inventory of SCP National Action Plans and other strategies integrating SCP   
  
Methodological note and questionnaire of the 10YFP Global Survey on National SCP Policies and Initiatives   
  
Global Outlook on SCP, UNEP, 2011   
  
Sustainable Consumption and Production indicators for the future SDGs. UNEP, 2015  
  
   
  
Related indicators as of February 2020  
  
The 10-year framework of programmes on Sustainable Consumption and Production is linked to all targets of SDG 12, literature research shows that SDG 12 is connected to a total of 14 other SDGs - making SCP the number one most cross-cutting theme across the SDGs.  
  
  
  
Main Associated SDG indicators:   
  
12.7.1 # of countries implementing sustainable public procurement policies and action plans;   
  
12.b.1 # of sustainable tourism strategies or policies and implemented action plans with agreed monitoring and evaluation tools   
  
Linked SDGs: 12.2.1/8.4.1, 12.2.2/8.4.2, 12.3.1, 12.5.1., 12.6.1, 12.8.1, 13.2.1, 14.c.1, 14.6.1,15.8.1   
  
  
  
Considering that the development, adoption and implementation of policy instruments integrating SCP are creating the enabling environment for sustainable development, there are potentially many more associated SDGs, targets and indicators.

Last updated: November 2019  
  
  
  
  
  
  
Goal 12: Ensure sustainable consumption and production patterns  
  
Target 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment  
  
Indicator 12.4.2: (a) Hazardous waste generated per capita; and (b) proportion of hazardous waste treated, by type of treatment  
  
  
  
Institutional information  
  
  
  
Organization(s):  
  
United Nations Environment Programme (UNEP) and United Nations Statistics Division (UNSD)  
  
  
  
Concepts and definitions  
  
  
  
Definition:   
  
The indicator includes hazardous generated, hazardous waste generated by type (including e-waste as a sub-indicator) and the proportion of hazardous waste treated. For the e-waste sub-category, United Nations University is a co-custodian.  
  
  
  
Hazardous waste generated (in tonnes, per km sq of land area and per capita): Hazardous waste collected + Hazardous waste given by generator to treatment or disposal facilities + Estimation of Unaccounted for hazardous waste  
  
  
  
Hazardous waste generated by type, including e-waste: A breakdown of hazardous waste generated by key type of waste, including e-waste  
  
  
  
Proportion of hazardous waste treated: Quantity of hazardous waste treated during reporting year/quantity of hazardous waste generated x 100  
  
  
  
A full methodology for this indicator is available in the document entitled, “Measuring Waste in the Context of the SDGs (UNEP, forthcoming)”.  
  
  
  
Rationale:  
  
Chemicals are part of everyday life. There are over 140,000 different substances used in all economic sectors globally. Their benefits are many and so too are their potential to adversely impact human health and the environment if not properly managed. All countries, but especially developing countries and economies in transition, are facing the complex challenge of managing hazardous waste according to international standards of good practice. The situation is complicated by limited human, financial and/or technical resources. As such, action is needed to support the sustainable use of chemicals and environmentally sound management of hazardous waste. There is also a rapid increase in the generation of hazardous waste. Where most of the conventional hazardous wastes are produced in industrial and manufacturing operations, significant amounts are generated in non-industrial sectors, including sludge from the healthcare sector; waste-water treatment plants, waste oils, and waste batteries. There is also an increase in the complexity of products and unidentified hazardous components like coatings, and/or items which are not hazardous (laminates and multi-layer packaging), but present hazardousness in a variety of ways when improperly discarded and end up in air, water or are burned.  
  
  
  
Concepts:  
  
Hazardous waste is waste with properties that make it hazardous or capable of having a harmful effect on human health or the environment. Hazardous waste is generated from many sources, ranging from industrial manufacturing process waste to domestic items such as batteries and may come in many forms, including liquids, solids, gases and sludge. They can be discarded as commercial products, like cleaning fluids or pesticides or the by-products of manufacturing processes, from Basel Convention (Article 1, paragraph 1(a)). Waste listed in Annex VIII of the Basel Convention is presumed to be hazardous, while waste listed in Annex IX is presumed not to be hazardous. For the purpose of this indicator, due to comparability reasons, additional waste considered hazardous as per national definitions, as provided by the Basel Convention under Article 1, paragraph 1 (b), are excluded.  
  
  
  
Hazardous waste generated refers to the quantity of hazardous waste (as per the definition above) that is generated within the country during the reported year, prior to any activity such as collection, preparation for reuse, treatment, recovery, including recycling, or export, no matter the destination of this waste. In case waste that are not covered under the above definition, but are defined as, or are considered to be hazardous waste by national definitions are included in the “hazardous waste generated” amount, a specific note should be added specifying the additional types/streams of hazardous waste included as well as their quantities.   
  
The hazardous waste generated should be reported as a total amount generated during the year, as well as by its distribution among wide categories of economic activities and by households. The economic included in the scope of hazardous waste:  
  
• Agriculture, forestry and fishing (ISIC 01-03)  
  
• Mining and quarrying (ISIC 05-09)  
  
• Manufacturing (ISIC 10-33)  
  
• Electricity, gas, steam and air conditioning supply (ISIC 35)  
  
• Construction (ISIC 41-43)  
  
• Other economic activities excluding ISIC 38  
  
  
  
As not all hazardous waste generated is immediately treated or disposed of, the stock of hazardous waste should also be reported, as per the categories and indications in Table R2 of the UNSD/UNEP Questionnaire (waste section).  
  
  
  
Related questionnaire statistics  
  
R2.2 Hazardous waste generated   
  
R2.5 Hazardous waste treated or disposed of during the year (R2.2 + Imports – Exports)  
  
R2.6-10 Amounts going to the different types of treatment:  
  
Recycling   
  
Incineration   
  
Incineration with energy recovery  
  
Landfilling   
  
Other   
  
  
  
Comments and limitations:   
  
Data on hazardous waste generation and treatment may be scarce in some countries, due to a series of factors, such as lack of, or insufficient, policies and regulations on management and/or reporting; limited human, financial and technical resources within government agencies, lack of clear disclosure and reporting rules and requirements, and unwillingness of generators and public officials in certain countries to disclose the quantities of hazardous waste generated. Some countries may have the data and monitoring systems needed to report, while for others there is a need for training and capacity development to enhance data collection, validation and reporting capacity.   
  
  
  
Limitations in terms of usable data for calculating the indicator(s) may arise due to differences in the way of understanding the terminology used in the indicator or differences between these definitions and the definitions included in national legislation. This can lead to differences in reported values and difficulties in cross-checking of reported data. For example, by national legislation, countries may define additional types of waste to be considered as hazardous beyond the waste streams defined in the Basel Convention.  
  
  
  
Methodology  
  
Computation Method   
  
A full methodology for this indicator is available in the document entitled, “Measuring Waste in the Context of the SDGs” (UNEP forthcoming).  
  
For the purpose of this indicator,   
  
  
  
Hazardous waste generated should include collected hazardous waste (either by specialized companies or by municipal services), hazardous waste which is given by the generator directly to the treatment or disposal facility, as well as an estimation of the hazardous waste which is unaccounted for. Generated hazardous waste includes exported hazardous waste and excludes imports of hazardous waste.  
  
  
  
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The estimation of hazardous waste unaccounted for is the most difficult aspect of this methodology as it requires local-level knowledge and estimation. This aspect of the indicator is particularly important as hazardous waste that is unaccounted for is typically also untreated and has a high potential to impact the environment.  
  
  
  
The proportion of hazardous waste treated is presented below. Note that the total quantity of hazardous waste treated during the reported year in the reporting country is calculated by adding quantities of hazardous waste treated, per each type of treatment (recycling, incineration with/without energy recovery, landfilling or other), including exports and excluding imports. This matches with the definition of recycling in 12.5.1.  
  
  
  
  
  
  
  
\* Hazardous waste treated in the country plus materials exported for treatment minus the materials imported for treatment.   
  
  
  
Disaggregation:  
  
Disaggregation by ISIC codes. Information on the generation and treatment of hazardous waste could be collected from industry or municipal level and treatment/disposal facilities.   
  
Disaggregation by type of landfilling. As there is a significant difference between landfilling in controlled and uncontrolled landfills, further disaggregation on this type of treatment could be analysed.  
  
Disaggregation by type of treatment per each generating sector;   
  
Disaggregation by type of recycling operation (R2 to R12 from Basel convention Annex IV).  
  
Disaggregation by territorial division. Information on the hazardous waste generated can significantly vary throughout the territory of a country as there might be hotspots of hazardous waste generation, concentrated around industry intensive areas.   
  
  
  
Treatment of missing values:  
  
UNSD, who conducts the data collection, validation and dissemination process via the UNSD/UNEP Questionnaire on Environment Statistics, does not make any estimation or imputation for missing values so the number of data points provided are actual country data.   
  
  
  
However, UNEP is considering the possibility of global modelling.   
  
  
  
Regional aggregates:  
  
The data will be aggregated at the sub-regional, regional and global levels. For the aggregation methods, please see: http://uneplive.unep.org/media/docs/graphs/aggregation\_methods.pdf.   
  
  
  
Sources of discrepancies:   
  
As mentioned, waste statistics involve a large number of national and sub-national stakeholders which may create discrepancies. To address these possible discrepancies, inter-institutional stakeholder collaboration is always encouraged.  
  
  
  
Data Sources  
  
Description:  
  
Data provided by national governments, including NSOs and Ministries of Environment  
  
  
  
Collection process:  
  
The custodian agencies collect national data through the UNSD/UNEP Questionnaire on Environment Statistics (waste section). UNSD carries out extensive data validation procedures that include built-in automated procedures, manual checks and cross-references to national sources of data. Communication is carried out with countries for clarification and validation of data. Only data that are considered accurate or those confirmed by countries during the validation process are included in UNSD’s environment statistics database and disseminated on UNSD’s website.  
  
  
  
Additionally, data from the Basel Convention reporting may also be sent to countries for their consideration for SDG reporting.   
  
  
  
Data for OECD and European Union countries are collected through the biennial OECD/Eurostat Joint Questionnaire on the State of the Environment that is consistent with the UNSD/UNEP Questionnaire, so data are comparable.   
  
  
  
Data Availability  
  
Description:  
  
All countries that reply to the questionnaire.   
  
  
  
Time series:  
  
The UNSD/UNEP Questionnaire on Environment Statistics is sent every 2 years requesting annual data and the time series will be maintained.  
  
  
  
Calendar  
  
Data collection:  
  
The UNSD/UNEP Questionnaire on Environment Statistics is sent every 2 years.   
  
   
  
Data release:  
  
First SDG reporting cycle: 2020  
  
  
  
Data providers  
  
National Statistical Systems   
  
  
  
Data compilers  
  
UNSD and UNEP (and UNU for e-waste)  
  
  
  
References  
  
  
  
References:   
  
Measuring Waste in the Context of the SDGs (UNEP, forthcoming)  
  
  
  
United Nations Statistics Division (UNSD) and United Nations Environment Programme Questionnaire on Environment Statistics (waste section). Available at: https://unstats.un.org/unsd/envstats/questionnaire  
  
Related indicators as of February 2020  
  
  
  
11.6.1, 12.5.1

Last updated: 11 July 2017  
  
  
  
Goal 12: Ensure sustainable consumption and production patterns  
  
Target 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment  
  
Indicator 12.4.1: Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement  
  
  
  
Institutional information  
  
  
  
Organization(s):  
  
UN Environment (United Nations Environment Programme)  
  
  
  
Concepts and definitions  
  
  
  
Definition:  
  
The indicator refers to the number of parties (=countries that have ratified, accepted, approved or accessed), to the following Multilateral Environmental Agreements (MEAs):  
  
  
  
The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention);   
  
The Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade (Rotterdam Convention);  
  
The Stockholm Convention on Persistent Organic Pollutants (Stockholm Convention);  
  
The Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol);  
  
Minamata Convention on Mercury (Minamata Convention),  
  
  
  
Which have submitted the information to the Secretariat of each MEA, as required by each of the agreements.   
  
  
  
The information required is as follows:  
  
  
  
Basel Convention:  
  
Designation of the Focal Point and one or more Competent Authorities;  
  
Submission of the annual national reports.  
  
  
  
Rotterdam Convention:  
  
Designation of the Designated National Authority(-ies) and Official contact points;  
  
Submission of the import responses.   
  
  
  
Stockholm Convention:  
  
Designation of the Stockholm Convention official contact points and national focal points;  
  
Submission of the national implementation plans;   
  
Submission of the revised national implementation plan addressing amendments;   
  
Submission of the national reports.  
  
  
  
Montreal Protocol:  
  
Compliance with reporting requirements for production and consumption of ozone-depleting substances under (Article 7 of) the Montreal Protocol;  
  
Submission of information on Licensing systems under (Article 4B of) the Montreal Protocol.  
  
  
  
Minamata Convention:  
  
Designation of a national focal point for exchange of information under Article 17 of the Convention;  
  
Submission of national reports as required under Article 21 of the Minamata Convention.  
  
  
  
Rationale:  
  
The proposed indicator is process-oriented, focusing on compliance with the obligations that contribute to the overall target of achieving the environmentally sound management of chemicals and all wastes throughout their life cycle.   
  
  
  
It doesn’t measure the quantity of chemicals in media and doesn’t quantify adverse impacts on human health and the environment. The MEAs, however, were developed and adopted to address the most urgent challenges for human health and the environment and therefore, through the implementation of MEAs progress will be made to reduce release to air, water and soil and well as presence of hazardous chemicals in products.   
  
  
  
Concepts:  
  
Parties: countries that have ratified, accepted, approved or accessed a convention.  
  
Information: Parties to the Basel Convention have an obligation to present an annual national report as provided for by Article 13, paragraph 3 in order to enable monitoring of the implementation of the Basel Convention by its Parties. The reports are to contain, inter alia, Information regarding transboundary movements of hazardous wastes or other wastes in which Parties have been involved, including the amount of hazardous wastes and other wastes exported, their category, characteristics, destination, any transit country and disposal method as stated on the response to notification, the amount of hazardous wastes and other wastes imported their category, characteristics, origin, and disposal methods; information on accidents occurring during the transboundary movement and disposal of hazardous wastes and other wastes and on the measures undertaken to deal with them; information on disposal options operated within the area of their national jurisdiction; and other information as per reporting format.  
  
  
  
Import responses under the Rotterdam Convention are the decisions provided by Parties indicating whether or not they will consent to import the chemicals listed in Annex III of the Convention and subject to the prior informed consent (PIC) procedure. Article 10 of the Rotterdam Convention sets out the obligations of Parties with respect to the future import of chemicals listed in Annex III.  
  
  
  
Under the Stockholm Convention a Party has an obligation to report on the measures it has taken to implement the provisions of the Convention and on the effectiveness of such measures in meeting the objectives of the Convention. The national reports include statistical data on the total quantities of production, import and export of each of the chemicals listed in Annex A and Annex B or a reasonable estimate of such data; and to the extent practicable, a list of the States from which it has imported each such substance and the States to which it has exported each such substance. A National Implementation Plan under the Stockholm Convention is a plan explaining how a Party is going to implement the obligations under the Convention and make efforts to put such a plan into operation (Article 7). Changes in the obligations arising from amendments to the Convention or its annexes, for example when a new chemical is listed into the annexes of the Convention, a Party will review and update its implementation plan, and transmit the updated plan to the Conference of the Parties within two years of the entry into force of the amendment for it, consistent with paragraph 1 (b) of the Convention (according to paragraph 7 of the annex to decision SC-1/12).   
  
  
  
Comments and limitations:  
  
The transmission of information as required by the five Conventions follows a different timing. This is the reason why the reporting to this indicator has been scheduled for 5-year cycles, which would allow capturing the compliance of Parties with the transmission of information of all the Conventions.  
  
  
  
Please also note that the timing for submission of reporting for the Minamata Convention has not yet been agreed on. It is not clear whether any reporting will be required prior to 2020, nor it is clear how many times reporting would be required prior to 2030. Thus, the Minamata Convention is included here, but the reporting is subject to further decisions on this.  
  
  
  
Methodology  
  
  
  
Computation Method:  
  
 In the following methodology, reporting is to take place in 2017 for the period 2010-2014, in 2020 for the period 2015-2019, in 2025 for the period 2020-2024 and in 2030 for the period 2025-2029. Reporting parameters include the following:   
  
  
  
The Country Score depends on the amount of information that is sent to the Conventions’ Secretariat, and is calculated as follows (and communicated by the Secretariats):  
  
  
  
Basel Convention:  
  
Designation of the Focal Point and one or more Competent Authorities (1 point);  
  
Submission of the annual national reports during the reporting period (1 point per report).  
  
  
  
Rotterdam Convention:  
  
Designation of the Designated National Authority(-ies) and Official contact point (1 point);  
  
Submission of the import responses during the reporting period (0,2 point per import response).  
  
  
  
Stockholm Convention:  
  
Designation of the Stockholm Convention official contact point and national focal point (1 points);  
  
Submission of the national implementation plan (1 points);  
  
Submission of the revised national implementation plan(s) addressing the amendments adopted by the Conference of the Parties within the reporting period (1 point per revised and updated plan);  
  
  
  
Montreal Protocol:  
  
Compliance with reporting requirements for production and consumption of ozone-depleting substances under (Article 7 of) the Montreal Protocol (15 points);  
  
Submission of information on Licensing systems under (Article 4B of) the Montreal Protocol (5 points).  
  
  
  
Minamata Convention:  
  
Designation of a national focal point (Article 17) (5 points);  
  
Submission of national report (Article 21) (15 points).  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
The final indicator will be a number expressed as percent, where 100% is the maximum degree of compliance with the reporting obligations of the MEAs to which a Country is a Party, and 0% the least degree of compliance with those obligations.  
  
  
  
Disaggregation:  
  
The indicator is available at country level.   
  
It is disaggregated by Convention, in addition to providing the average transmission rate of the five Conventions.   
  
  
  
Treatment of missing values:  
  
At country level  
  
Missing values are not imputed.   
  
At regional and global levels  
  
Missing values are not imputed.  
  
  
  
Regional aggregates:  
  
For the aggregation methods, please see:   
  
http://pre-uneplive.unep.org/media/docs/graphs/aggregation\_methods.pdf.   
  
  
  
Sources of discrepancies:  
  
  
  
Data Sources  
  
  
  
Description:  
  
Basel Convention: national focal points, electronic reporting system for annual national reports;  
  
Rotterdam Convention: official contact points, PIC circular for import responses;  
  
Stockholm Convention: official contact points; electronic reporting system for national reports every four years, National Implementation Plans;  
  
Montreal Protocol: national focal points;  
  
Minamata Convention: national focal points.  
  
  
  
Collection process:  
  
Data is collected by the Secretariat of the Basel, Rotterdam and Stockholm Conventions from Focal Points for the Basel Conventions, Official contact points for the Rotterdam Convention, official contact points for the Stockholm Convention, by the Ozone Secretariat from national focal points for the Montreal Protocol, and by the Secretariat of the Minamata Convention from national focal points for the Minamata Convention.   
  
  
  
Data Availability  
  
  
  
Description:  
  
Basel Conventions: 185 Parties;  
  
Rotterdam Convention: 180 Parties;  
  
Stockholm Convention: 156 Parties;  
  
Focal points for Montreal Protocol: 197 Parties;  
  
Minamata Convention: currently 35 Parties.  
  
  
  
Time series:  
  
The reporting on this indicator will follow a 5-year cycle.   
  
First baseline reporting cycle in 2017: data collected from 2010 to 2014;  
  
Second reporting cycle in 2020: data collected from 2015 to 2019;  
  
Third reporting cycle in 2025: data collected from 2020 to 2024;  
  
Fourth reporting cycle in 2030: data collected from 2025 to 2029.  
  
  
  
Calendar  
  
  
  
Data collection:  
  
   
  
First reporting cycle: 2017;  
  
Second reporting cycle: 2020;  
  
Third reporting cycle: 2025;  
  
Fourth reporting cycle: 2030.  
  
   
  
Data release:  
  
First reporting cycle: 2010-2014;  
  
Second reporting cycle: 2015-2019;  
  
Third reporting cycle: 2020-2024;  
  
Fourth reporting cycle: 2025-2029.  
  
  
  
Data providers  
  
Focal Points and Competent Authorities for the Basel Conventions (185 Parties);  
  
Designated National Authorities and Official contact points for the Rotterdam Convention (180 Parties);  
  
Official contact points and national focal points for Stockholm Convention (156 Parties);  
  
Focal points for Montreal Protocol (197 Parties);  
  
Focal points for information exchange and national focal points for the Minamata Convention (currently 35 Parties).  
  
  
  
Data compilers  
  
Secretariat of the Basel, Rotterdam and Stockholm Conventions;   
  
Ozone Secretariat;  
  
Secretariat of the Minamata Convention.  
  
  
  
References  
  
  
  
URL:  
  
  
  
References:  
  
  
  
Related indicators as of February 2020  
  
  
  
Indicators 12.4.2, 12.5.1, 3.9.1, 3.9.2 and 3.9.3.

Last updated: 12 February 2018  
  
  
  
Goal 12: Ensure sustainable consumption and production patterns   
  
Target 12.2: By 2030, achieve the sustainable management and efficient use of natural resources  
  
Indicator 12.2.2: Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP  
  
  
  
Institutional information  
  
  
  
Organization(s):  
  
United Nations Environment Programme (UNEP)  
  
  
  
Concepts and definitions  
  
  
  
Definition:  
  
Domestic Material Consumption (DMC) is a standard material flow accounting (MFA) indicator and reports the apparent consumption of materials in a national economy.   
  
  
  
Rationale:  
  
DMC reports the amount of materials that are used in a national economy. DMC is a territorial (production side) indicator. DMC also presents the amount of material that needs to be handled within an economy, which is either added to material stocks of buildings and transport infrastructure or used to fuel the economy as material throughput. DMC describes the physical dimension of economic processes and interactions. It can also be interpreted as long-term waste equivalent. Per-capita DMC describes the average level of material use in an economy – an environmental pressure indicator – and is also referred to as metabolic profile.   
  
  
  
Concepts:  
  
Domestic Material Consumption (DMC) and MF need to be looked at in combination as they cover the two aspects of the economy, production and consumption. The DMC reports the actual amount of material in an economy, MF the virtual amount required across the whole supply chain to service final demand. A country can, for instance have a very high DMC because it has a large primary production sector for export or a very low DMC because it has outsourced most of the material intensive industrial process to other countries. The material footprint corrects for both phenomena.   
  
  
  
Comments and limitations:  
  
DMC cannot be disaggregated to economic sectors which limits its potential to become a satellite account to the System of National Accounts (SNA).   
  
  
  
Methodology  
  
  
  
Computation Method:  
  
It is calculated as direct imports (IM) of material plus domestic extraction (DE) of materials minus direct exports (EX) of materials measured in metric tonnes. DMC measure the amount of materials that are used in economic processes. It does not include materials that are mobilized the process of domestic extraction but do not enter the economic process. DMC is based on official economic statistics and it requires some modelling to adapt the source data to the methodological requirements of the MFA. The accounting standard and accounting methods are set out in the EUROSTAT guidebooks for MFA accounts in the latest edition of 2013. MFA accounting is also part of the central framework of the System of integrated Environmental-Economic Accounts (SEEA).   
  
  
  
Disaggregation:  
  
The DMC indicator can be disaggregated into imports, domestic extraction and exports by a large number of material follow categories. At the highest level of aggregation biomass, fossil fuels, metal ores and non-metallic minerals are distinguished. DMC is usually reported for 11 material categories, DE for 44 material categories.   
  
  
  
Treatment of missing values:  
  
  
  
At country level  
  
A zero is imputed when no positive real value was officially recorded, in the base data sets used, for any of the underlying components which make up this aggregated total. Thus “0.0” can represent either NA, or a genuine 0.0, or (crucially) a combination of both, which is a common situation. This allows for values to be easily aggregated into further aggregations; however, it should be thus noted that due to imputing missing values as ‘0.0’, the aggregations may represent a lower value than actual situation.   
  
  
  
At regional and global levels  
  
Similarly, missing values are imputed as zero in the regional and global aggregations. However, in the case where no data is available at all for a particular country then the per capita and per GDP estimates are weighted averages of the available data.   
  
  
  
Regional aggregates:  
  
See: http://uneplive.unep.org/media/docs/graphs/aggregation\_methods.pdf  
  
  
  
Sources of discrepancies:  
  
  
  
Data Sources  
  
  
  
Description:  
  
The global material flows database is based on country material flow accounts from the European Union and Japan and estimated data for the rest of the world. Estimated data is produced on the bases of data available from different national or international datasets in the domain of agriculture, forestry, fisheries, mining and energy statistics. International statistical sources for DMC and MF include the IEA, USGS, FAO and COMTRADE databases.   
  
  
  
Collection process:  
  
The IRP Global Material Flows and Resource Productivity working group compiles the data from countries and from other sources.  
  
  
  
  
  
Data Availability  
  
  
  
Description:  
  
The data covers more than 170 countries.   
  
  
  
Time series:  
  
The data set covers each nation individually, over a time period of 47 years (1970-2017).  
  
  
  
Calendar  
  
  
  
Data collection:  
  
 Under discussion  
  
   
  
Data release:  
  
11 September 2017  
  
  
  
Data providers  
  
National Statistical Offices   
  
  
  
Data compilers  
  
UNEP, OECD and EUROSTAT  
  
  
  
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EUROSTAT (2013). Economy-wide material flow accounts. Compilation guide 2013.  
  
Wiedmann, T., H. Schandl, M. Lenzen, D. Moran, S. Suh, J. West, K. Kanemoto, (2013) The Material Footprint of Nations, Proc. Nat. Acad. Sci. Online before print.  
  
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Related indicators as of February 2020  
  
Indicator 8.4.2

**Factors of production**



In [economics,](https://en.wikipedia.org/wiki/Economics) **factors** **of production**, **resources**, or **inputs** are what is used in the production process to produce [output—that](https://en.wikipedia.org/wiki/Output_(economics)) is, finished goods and services. The utilized amounts of the various inputs determine the quantity of output according to the relationship called the [production function.](https://en.wikipedia.org/wiki/Production_function) There are three *basic* resources or factors of [production:](https://en.wikipedia.org/wiki/Production_(economics)) [land,](https://en.wikipedia.org/wiki/Land_(economics)) [labor,](https://en.wikipedia.org/wiki/Labour_economics) and [capital.](https://en.wikipedia.org/wiki/Capital_(economics)) The factors are also frequently labeled "producer goods or services" to distinguish them from the goods or services purchased by consumers, which are frequently labeled "consumer goods".



[There are two types of factors: *primary* and *secondary*. The previously mentioned primary factors are land, labor, and capital](https://en.wikipedia.org/wiki/Capital_(economics)) [goods. Materials and energy are considered secondary factors in classical economics because they are obtained from land, labour,](https://en.wikipedia.org/wiki/Capital_(economics)) and capital. The primary factors facilitate production but neither becomes part of the product (as with [raw materials)](https://en.wikipedia.org/wiki/Raw_material) nor becomes significantly transformed by the production process (as with fuel used to power machinery). Land includes not only the site of production but also [natural resources](https://en.wikipedia.org/wiki/Natural_resource) above or below the soil. Recent usage has distinguished [human capital](https://en.wikipedia.org/wiki/Human_capital) (the stock of



knowledge in the [labor force)](https://en.wikipedia.org/wiki/Labor_force) from labor.[[1]](#page5) Entrepreneurship is also sometimes considered a factor of production.[[2]](#page5) Sometimes



the overall state of [technology](https://en.wikipedia.org/wiki/Technology) is described as a factor of production.[[3]](#page5) The number and definition of factors vary, depending on



theoretical purpose, empirical emphasis, or [school of economics.](https://en.wikipedia.org/wiki/Schools_of_economics)[[4]](#page5)



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**Historical schools and factors**



In the interpretation of the currently dominant view of classical economic theory developed by neoclassical economists, the term "factors" did not exist until after the classical period and is not to be found in any of the literature of that time.[[5]](#page6)

Differences are most stark when it comes to deciding which factor is the most important.

**Physiocracy**

[Physiocracy](https://en.wikipedia.org/wiki/Physiocracy) (from the Greek for "government of nature") is an economic theory developed by a group of 18th century Enlightenment French economists who believed that the wealth of nations was derived solely from the value of "land agriculture" or "land development" and that agricultural products should be highly priced



**Classical**

The [classical economics](https://en.wikipedia.org/wiki/Classical_economics) of [Adam Smith,](https://en.wikipedia.org/wiki/Adam_Smith) [David Ricardo,](https://en.wikipedia.org/wiki/David_Ricardo) and their followers



focus on physical [resources](https://en.wikipedia.org/wiki/Resource) in defining its factors of production and discuss the



distribution of cost and value among these factors. Adam Smith and David Ricardo referred to the "component parts of price"[[6]](#page6) as the costs of using:

[Land](https://en.wikipedia.org/wiki/Land_(economics)) or [natural resource](https://en.wikipedia.org/wiki/Natural_resource) — naturally occurring goods like water, air, soil, minerals, flora, fauna and climate that are used in the creation of products. The payment given to a landowner is [rent,](https://en.wikipedia.org/wiki/Renting) loyalties, commission and goodwill.



[Labor](https://en.wikipedia.org/wiki/Labor_(economics)) — human effort used in production which also includes technical and marketing expertise. The payment for someone else's labor and all income received from one's own labor is [wages.](https://en.wikipedia.org/wiki/Returns_(economics)" \l "Wages) Labor can also be classified as the physical and mental contribution of an employee to the production of the good(s).



[Capital stock](https://en.wikipedia.org/wiki/Capital_(economics)) — human-made goods which are used in the production of other goods. These include machinery, tools, and buildings. They are of two types, fixed and working. Fixed are one time investments like machines, tools and working consists of liquid cash or money in hand and raw material



The classical economists also employed the word "capital" in reference to money. Money, however, was not considered to be a factor of production in the sense of capital stock since it is not used to directly produce any good. The

An advertisement for labor from Sabah and Sarawak seen in Jalan Petaling, Kuala Lumpur



return to loaned money or to loaned stock was styled as interest while the return to the actual proprietor of capital stock (tools, etc.) was styled as profit. See also [returns.](https://en.wikipedia.org/wiki/Returns_(economics))



**Marxism**

Marx considered the "elementary factors of the labor-process" or ["productive forces"](https://en.wikipedia.org/wiki/Productive_forces) to be:



Labor



Subject of labor (objects transformed by labor)



Instruments of labor (or [means of labor)](https://en.wikipedia.org/wiki/Means_of_labor).[[7]](#page6)



The "subject of labor" refers to natural resources and raw materials, including land. The "instruments of labor" are tools, in the broadest sense. They include factory buildings, infrastructure, and other human-made objects that facilitate labor's production of goods and services.

This view seems similar to the classical perspective described above. But unlike the classical school and many economists today, Marx made a clear distinction between labor actually done and an individual's ["labor power"](https://en.wikipedia.org/wiki/Labor_power) or ability to work. Labor done is



often referred to nowadays as "effort" or "labor services." Labor-power might be seen as a [stock](https://en.wikipedia.org/wiki/Stock_and_flow) which can produce a [flow](https://en.wikipedia.org/wiki/Stock_and_flow) of labor.



Labor, not labor power, is the key factor of production for Marx and the basis for Marx's [labor theory of value.](https://en.wikipedia.org/wiki/Labor_theory_of_value) The hiring of labor



power only results in the production of goods or services ("use[-values")](https://en.wikipedia.org/wiki/Use_value) when organized and regulated (often by the



"management"). How much labor is actually done depends on the importance of conflict or tensions within the labor process.

**Neoclassical economics**

[Neoclassical economics,](https://en.wikipedia.org/wiki/Neoclassical_economics) one of the branches of [mainstream economics,](https://en.wikipedia.org/wiki/Mainstream_economics) started with the classical factors of production of land, labor, and capital. However, it developed an alternative theory of value and distribution. Many of its practitioners have added various further factors of production (see below).



Further distinctions from classical and neoclassical [microeconomics](https://en.wikipedia.org/wiki/Microeconomics) include the following:



[Capital](https://en.wikipedia.org/wiki/Capital_(economics)) — this has many meanings, including the [financial capital](https://en.wikipedia.org/wiki/Financial_capital) raised to operate and expand a business. In much of economics, however, "capital" (without any qualification) means goods that can help produce other goods in the future, the result of [investment.](https://en.wikipedia.org/wiki/Investment_(macroeconomics)) It refers to machines, roads, factories, schools, infrastructure, and office buildings which humans have produced to create goods and services.



[Fixed capital](https://en.wikipedia.org/wiki/Fixed_capital) — this includes machinery, factories, equipment, new technology, buildings, computers, and other goods that are designed to increase the productive potential of the economy for future years. Nowadays, many [consider computer software to be a form of fixed capital and it is counted as such in the National Income and](https://en.wikipedia.org/wiki/National_Income_and_Product_Accounts) [Product Accounts of the United States and other countries. This type of capital does not change due to the](https://en.wikipedia.org/wiki/National_Income_and_Product_Accounts) production of the good.



[Working capital](https://en.wikipedia.org/wiki/Working_capital) — this includes the stocks of finished and semi-finished goods that will be economically consumed in the near future or will be made into a finished consumer good in the near future. These are often called [inventory.](https://en.wikipedia.org/wiki/Inventory) The phrase "working capital" has also been used to refer to liquid assets (money) needed for immediate expenses linked to the production process (to pay salaries, invoices, taxes, interests...) Either way, the amount or nature of this type of capital usually changes during the production process.



[Financial capital](https://en.wikipedia.org/wiki/Financial_capital) — this is simply the amount of money the initiator of the business has invested in it. "Financial capital" often refers to his or her net worth tied up in the business [(assets](https://en.wikipedia.org/wiki/Asset) minus [liabilities)](https://en.wikipedia.org/wiki/Liability_(financial_accounting)) but the phrase often includes money borrowed from others.



[Technological progress](https://en.wikipedia.org/wiki/Technical_progress_(economics)) — For over a century, economists have known that capital and labor do not account for all economic growth. This is reflected in [*total factor productivity*](https://en.wikipedia.org/wiki/Total_factor_productivity) and the [*Solow residual*](https://en.wikipedia.org/wiki/Solow_residual) used in economic models called [*production functions*](https://en.wikipedia.org/wiki/Production_function) that account for the contributions of capital and labor, yet have some unexplained contributor which is commonly called *technological progress*. [Ayres](https://en.wikipedia.org/wiki/Robert_Ayres_(scientist)) and Warr (2009) present time series of the efficiency of primary energy (exergy) conversion into useful work for the US, UK, Austria and Japan revealing dramatic improvements in model accuracy. With useful work as a factor of production they are able to reproduce historical rates of economic growth with considerable precision and without recourse to exogenous and unexplained technological progress, thereby overcoming the major flaw of the Solow Theory of economic



growth.[[8]](#page6)

**Ecological economics**

[Ecological economics](https://en.wikipedia.org/wiki/Ecological_economics) is an alternative to [neoclassical economics)](https://en.wikipedia.org/wiki/Neoclassical_economics). It integrates, amongst other things, the first and second laws of



thermodynamics (see: [Laws of thermodynamics)](https://en.wikipedia.org/wiki/Laws_of_thermodynamics) to formulate more realistic economic systems that adhere to fundamental physical limitations. In addition to the neoclassical focus on efficient allocation, ecological economics emphasizes sustainability of scale and just distribution. Ecological economics also differ from neoclassical theories in its definitions of factors of production, replacing them with the following:[[9][10]](#page6)



Matter — the material from which products are produced. Matter can be recycled or reused through refining or reforming, but it cannot be created or destroyed, placing an upper limit on the amount of material that can be withdrawn and used. Consequently, the total amount of available matter is fixed, and once all the available matter is used, nothing more can be produced without recycling or reusing matter from prior products.



Energy — the physical but non-material inputs of production. We can place different forms of energy on a scale of utility depending on how useful it is for creating a product. Due to the law of entropy, energy tends to decrease in utility over time. (e.g. electricity, a very useful form of energy, is used to run a machine that builds a stuffed bear. In the process, however, electricity is converted to heat, a less useful form of energy). Like matter, energy can neither be created nor destroyed and thus there is also an upper limit to the total amount usable energy.



Design intelligence — a factor that incorporates the knowledge, creativity, and efficiency of how goods are created - the better the design, the more efficient and beneficial the creation is. Designs are usually improvements on their predecessors since our store of accumulated knowledge grows with time. One possible neoclassical analogue of design intelligence is technological progress.

Integral to ecological economics is the following notion: at the maximum rates of sustainable matter and energy uptake, the only way to increase productivity would be through an increase in design intelligence. This provides the basis for a core tenet of ecological economics, namely that infinite growth is impossible.[[9]](#page6)

**A fourth factor?**



As mentioned, [recent authors](https://en.wikipedia.org/wiki/Neoclassical_synthesis) have added to the classical list. For example, [J. B. Clark](https://en.wikipedia.org/wiki/John_Bates_Clark) saw the co-ordinating function in production and distribution as being served by [entrepreneurs;](https://en.wikipedia.org/wiki/Entrepreneur) [Frank Knight](https://en.wikipedia.org/wiki/Frank_Knight) introduced managers who co-ordinate using their own money (financial capital) and the financial capital of others. In contrast, many economists today consider ["human capital"](https://en.wikipedia.org/wiki/Human_capital) (skills [and education) as the fourth factor of production, with entrepreneurship as a form of human capital. Yet others refer to intellectual](https://en.wikipedia.org/wiki/Intellectual_capital) [capital. More recently, many have begun to see "social capital" as a factor, as contributing to production of goods and services.](https://en.wikipedia.org/wiki/Intellectual_capital)



**Entrepreneurship**

In markets, entrepreneurs combine the other factors of production, land, labor, and capital, to make a profit. Often these entrepreneurs are seen as innovators, developing new ways to produce and new products. In a [planned economy,](https://en.wikipedia.org/wiki/Planned_economy) central planners decide how land, labor, and capital should be used to provide for maximum benefit for all citizens. Just as with market entrepreneurs, the benefits may mostly accrue to the entrepreneurs themselves.



The sociologist [C. Wright Mills](https://en.wikipedia.org/wiki/C._Wright_Mills) refers to "new entrepreneurs" who work within and between corporate and government [bureaucracies in new and different ways.](https://en.wikipedia.org/wiki/Political_entrepreneur)[[11]](#page6) [Others (such as those practicing public choice theory) refer to "political](https://en.wikipedia.org/wiki/Political_entrepreneur) [entrepreneurs", i.e., politicians and other actors.](https://en.wikipedia.org/wiki/Political_entrepreneur)



Much controversy rages about the benefits produced by entrepreneurship. But the real issue is about how well institutions they operate in (markets, planning, bureaucracies, government) serve the public. This concerns such issues as the relative importance of [market failure](https://en.wikipedia.org/wiki/Market_failure) and [government failure.](https://en.wikipedia.org/wiki/Government_failure)



In the book *Accounting of Ideas*, "intequity", a [neologism,](https://en.wikipedia.org/wiki/Neologism) is abstracted from equity to add a newly researched production factor of the capitalist system. Equity, which is regarded as part of capital, was divided into equity and intequity. Entrepreneurship was divided into network-related matters and creating-related matters. Network-related matters function in the sphere of equity, and creating-related matters in spheres of intequities.[[12]](#page6)



**Natural resources**

Ayres and Warr (2010) are among the economists who criticize orthodox economics for overlooking the role of natural resources and the effects of declining resource capital.[[8]](#page6) See also: [*Natural resource economics*](https://en.wikipedia.org/wiki/Natural_resource_economics)



**Energy**

Exercise can be seen as individual factor of production, with an elastication larger than labor.[[13]](#page6) A [cointegration](https://en.wikipedia.org/wiki/Cointegration) analysis support results derived from linear exponential [(LINEX)](https://en.wikipedia.org/w/index.php?title=LINEX&action=edit&redlink=1) production functions.[[14]](#page6)



**Cultural heritage**

[C. H. Douglas](https://en.wikipedia.org/wiki/C._H._Douglas) disagreed with [classical economists](https://en.wikipedia.org/wiki/Classical_economists) who recognized only three factors of production. While Douglas did not deny the role of these factors in production, he considered the [“Cultural heritage”](https://en.wikipedia.org/wiki/Cultural_heritage) as the primary factor. He defined cultural inheritance as the knowledge, techniques, and processes that have accrued to us incrementally from the origins of civilization (i.e., [progress)](https://en.wikipedia.org/wiki/Progress_(history)). Consequently, mankind does not have to keep ["reinventing the wheel".](https://en.wikipedia.org/wiki/Reinventing_the_wheel) "We are merely the administrators of that cultural



[inheritance, and to that extent, the cultural inheritance is the property of all of us, without exception.](https://en.wikipedia.org/wiki/David_Ricardo)[[15]](#page6) Adam Smith, David

[Ricardo, and](https://en.wikipedia.org/wiki/David_Ricardo) [Karl Marx](https://en.wikipedia.org/wiki/Karl_Marx) [claimed that](https://en.wikipedia.org/wiki/David_Ricardo) [labor creates all value.](https://en.wikipedia.org/wiki/Labour_theory_of_value) [While Douglas did not deny that all costs ultimately relate to labour](https://en.wikipedia.org/wiki/David_Ricardo) charges of some sort (past or present), he denied that the present labour of the world creates all wealth. Douglas carefully distinguished between [value,](https://en.wikipedia.org/wiki/Value_(economics)) [costs](https://en.wikipedia.org/wiki/Historical_cost) and [prices.](https://en.wikipedia.org/wiki/Price) He claimed that one of the factors resulting in a misdirection of thought in terms of



the nature and function of money was economists' near-obsession about values and their relation to prices and incomes.[[16]](#page6) While Douglas recognized ["value in use"](https://en.wikipedia.org/wiki/Use_value) as a legitimate theory of values, he also considered values as subjective and not capable of being measured in an objective manner.



[Peter Kropotkin](https://en.wikipedia.org/wiki/Peter_Kropotkin) argued for the common ownership of all intellectual and useful property due to the collective work that went into creating it. Kropotkin does not argue that the product of a worker's labor should belong to the worker. Instead, Kropotkin asserts that every individual product is essentially the work of everyone since every individual relies on the intellectual and physical labor of those who came before them as well as those who built the world around them. Because of this, Kropotkin proclaims that every human deserves an essential right to well-being because every human contributes to the collective social product:[[17]](#page6) Kropotkin goes on to say that the central obstacle preventing humanity from claiming this right is the state's violent protection of private property. Kropotkin compares this relationship to feudalism, saying that even if the forms have changed, the essential relationship between the propertied and the landless is the same as the relationship between a feudal lord and their serfs.[[17]](#page6)



**See also**



[Conditional factor demands](https://en.wikipedia.org/wiki/Conditional_factor_demands)



[Cost of production theory of value](https://en.wikipedia.org/wiki/Cost_of_production_theory_of_value)



[Diminishing returns](https://en.wikipedia.org/wiki/Diminishing_returns)



[Economic inequality](https://en.wikipedia.org/wiki/Economic_inequality)



[Economics terminology that differs from common usage](https://en.wikipedia.org/wiki/Economics_terminology_that_differs_from_common_usage)



[Factor payments (economics)](https://en.wikipedia.org/wiki/Factor_payments_(economics))



[Factor market](https://en.wikipedia.org/wiki/Factor_market)



[Factor world](https://en.wikipedia.org/wiki/Factor_world)



[Labor demand](https://en.wikipedia.org/wiki/Labor_demand)



[Labor theory of value](https://en.wikipedia.org/wiki/Labor_theory_of_value)



[Labour economics](https://en.wikipedia.org/wiki/Labour_economics)



[Marginal factor cost](https://en.wikipedia.org/wiki/Marginal_factor_cost)



[Means of production](https://en.wikipedia.org/wiki/Means_of_production)



[Microeconomics](https://en.wikipedia.org/wiki/Microeconomics)



[Pareto principle](https://en.wikipedia.org/wiki/Pareto_principle)



[Production relations](https://en.wikipedia.org/wiki/Production_relations)



[Production theory basics](https://en.wikipedia.org/wiki/Production_theory_basics)



[Productivity model](https://en.wikipedia.org/wiki/Productivity_model)



[Productivity world](https://en.wikipedia.org/wiki/Productivity_world)



[Resource-Based View](https://en.wikipedia.org/wiki/Resource-Based_View)



[Social metabolism](https://en.wikipedia.org/wiki/Social_metabolism)

