ZNU Zentrum für Nachhaltige Unternehmensführung
Universität Witten/Herdecke

INDICATOR PROFILES

SDG-EVALUATION OF PRODUCTS – SEP

INDEX

1 INTRODUCTION

So far, hardly any methods exist for the integrated analysis and evaluation of the sustainability of products and services. A major reason for this is that until recently there was no globally uniform and accepted target system or evaluation standard. With the United Nations' Agenda 2030 adopted in September 2015 and the 17 Sustainable Development Goals and 169 targets contained therein, this is now available. Beyond life cycle assessments, product sustainability analyses and integrated sustainability assessments are often required in the political arena today.

The aim of the research project "SDG assessment - further development of a sustainability assessment method based on the Sustainable Development Goals of the United Nations (Agenda 2030)", which was funded by the BMBF, was therefore to (further) develop a method for integrated product sustainability analysis and product sustainability assessment.

The project was carried out jointly by ZNU – Center for Sustainable Leadership at the University Witten/Herdecke (project management) and the Öko-Institut e.V. (Institute for Applied Ecology).

The method is described in depth in the brochure *SEP* – SDG Evaluation of Products, available at www.sdg-evaluation.com. The document at hand gives the background information on the indicators developed for *SEP* – SDG Evaluation of Products.

2 INDICATOR PROFILES

SEP – SDG Evaluation of Products uses two different types of indicators:

- **Case 1 (C1) indicators:**
  Potential impacts on the SDGs directly caused by the product or the service along the life cycle (e.g. emissions or use of resources), and

- **Case 2 (C2) indicators:**
  Potential impacts on the SDGs caused by the companies along the product's or service's life cycle (e.g. wages or social security systems).

In the following sections the indicator profiles for C1- and C2-indicators are presented. The profiles follow always the same order, and give information on:
- the related Sustainable Development Goals (SDGs) of the United Nation's Agenda 2030
- core or comprehensive indicator and the used "filter" (Planetary Boundaries[1] or Declaration on Human Rights[2])
- the logic behind the indicator setting (description)
- the equation and input parameters (C2-indicators).

2.1 C1 INDICATORS

In the following the profiles of the C1 indicators of *SEP* are described. C1 indicators can be divided in two indicator subtypes: inventory indicators and impact indicators. For impact indicators also, the impact assessment method to be used is given. In contrast to C2 indicators, for C1 indicators only a normalisation step is foreseen, but no evaluation. Normalisation factors are given in section 2.1.3.

[1] Steffen, W; Richardson, K; Rockstrom, J et al. (2015):
Planetary boundaries: guiding human development on a changing planet. Science2015; 347(6223)

[2] UN (1949): Universal Declaration of Human Rights,
https://www.un.org/en/universal-declaration-human-rights/index.html, (Status: 13.02.2020)

2.1.1 C1 IMPACT INDICATORS

#C1.1 Soil quality index / Bodenqualitätsindex

Related SDG(s)	 2.4. "By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality"
Description	To assess impacts on soil quality, as mentioned in the SDG, the impact indicator soil quality index is used. This indicator was developed in the European Product Environmental Footprint (PEF) process. It is dimensionless and describes impacts within the impact category land use. It is obtained by aggregating the indicators Biotic production (kg biotic production), Erosion resistance (kg soil), Mechanical filtration (m3 water), and Groundwater replenishment (m3 groundwater) from the LANCA model (Beck et al., 2010; Bos et al., 2016).
Type	Comprehensive indicator
References	EC-JRC (2017): Environmental footprint characterisation factors. Available at http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml (checked last 15.04.2020) Fazio, S. Biganzioli, F. De Laurentiis, V., Zampori, L., Sala, S. Diaconu, E. (2018): Supporting information to the characterisation factors of recommended EF Life Cycle Impact Assessment methods, version 2, from ILCD to EF 3.0, EUR 29600 EN, European Commission, Ispra, ISBN 978-92-79-98584-3, doi:10.2760/002447, PUBSY No. JRC114822 Beck, T., Bos, U., Wittstock, B., Baitz, M., Fischer, M., Sedlbauer, K. (2010). 'LANCA Land Use Indicator Value Calculation in Life Cycle Assessment – Method Report', Fraunhofer Institute for Building Physics. Bos U., Horn R., Beck T., Lindner J.P., Fischer M. (2016). LANCA® - Characterisation Factors for Life Cycle Impact Assessment, Version 2.0, 978-3-8396-0953-8, Fraunhofer Verlag, Stuttgart.

#C1.2 Terrestrial biodiversity / Terrestrische Biodiversität

Related SDG(s)	 2.4. "By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality" 15.9 "By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts"
Description	SDGs 2.4 and 15.9 require to assess impacts on biodiversity, to maintain ecosystems and to implement such values in management systems. To assess impacts on biodiversity in LCA, several approaches have been developed. In SEP the approach developed by Lindner et al. (2019) is used. This decision was taken because biodiversity impact is not assessed within PEF, however, it is necessary to do so in order to determine potential contributions to the SDGs. The indicator is dimensionless. PEF does not mention an indicator for terrestrial biodiversity (PEF, 2018).
Type	**Core indicator (Planetary Boundaries)**
References	Lindner, J P, Fehrenbach, H, Winter, L, Bloemer, J, Knuepffer, E (2019): Valuing Biodiversity in Life Cycle Impact Assessment, Sustainability 2019, 11(20), 5628, doi: 10.3390/su11205628 PEF (2018): Product Environmental Footprint Category Rules Guidance. Version 6.3

#C1.3 Accumulated Exceedance (terrestrial eutrophication / terrestrische Eutrophierung)

Related SDG(s)	 2.4. "By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality"
Description	The SDG aims to maintain ecosystems and implement resilient agricultural practices. This can be assessed on product / service level by assessing impacts due to eutrophication. The indicator chosen to assess impacts with respect to terrestrial eutrophication is accumulated exceedance based on the models of Seppälä et al. (2006) and Posch et al. (2008). The indicator's unit is mol N eq. The indicators are proposed by PEF (EC-JRC, 2017, Fazio et al., 2018).
Type	**Core indicator (Planetary boundaries)**
References	EC-JRC (2017): Environmental footprint characterisation factors. Available at http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml Fazio, S. Biganzioli, F. De Laurentiis, V., Zampori, L., Sala, S. Diaconu, E. (2018): Supporting information to the characterisation factors of recommended EF Life Cycle Impact Assessment methods, version 2, from ILCD to EF 3.0, EUR 29600 EN, European Commission, Ispra, ISBN 978-92-79-98584-3, doi:10.2760/002447, PUBSY No. JRC114822 Posch, M., Seppälä, J., Hettelingh, J.P., Johansson, M., Margni M., Jolliet, O. (2008). The role of atmospheric dispersion models and ecosystem sensitivity in the determination of characterisation factors for acidifying and eutrophying emissions in LCIA. International Journal of Life Cycle Assessment (13) pp.477–486 Seppälä, J., Posch, M., Johansson, M., Hettelingh, J.P. (2006). Country-dependent Characterisation Factors for Acidification and Terrestrial Eutrophication Based on Accumulated Exceedance as an Impact Category Indicator. International Journal of Life Cycle Assessment 11(6): 403-416

#C1.4 Comparative Toxic Unit for Human Health (Human toxicity / Humantoxizität)

Related SDG(s)	 3.9. "By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination"
Description	The SDG aims to reduce deaths and illnesses caused by hazardous chemicals. This can be assessed on product / service level by using the two indicators on comparative toxic unit for humans on cancerogenic and non-cancerogenic impacts. The indicator's unit is CTUh. This indicator was developed by Rosenbaum et al. (2008) within the USEtox model and is also proposed by PEF (EC-JRC, 2017, Fazio et al., 2018).
Type	Comprehensive indicator
References	EC-JRC (2017): Environmental footprint characterisation factors. Available at http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml Fazio, S. Biganzioli, F. De Laurentiis, V., Zampori, L., Sala, S. Diaconu, E. (2018): Supporting information to the characterisation factors of recommended EF Life Cycle Impact Assessment methods, version 2, from ILCD to EF 3.0, EUR 29600 EN, European Commission, Ispra, ISBN 978-92-79-98584-3, doi:10.2760/002447, PUBSY No. JRC114822 Rosenbaum, R.K., Bachmann, T.M., Gold, L.S., Huijbregts, M.A.J., Jolliet, O., Juraske, R., Köhler, A., Larsen, H.F., MacLeod, M., Margni, M., McKone, T.E., Payet, J., Schuhmacher, M., van de Meent, D., Hauschild, M.Z. (2008): USEtox - The UNEPSETAC toxicity model: recommended characterisation factors for human toxicity and freshwater ecotoxicity in Life Cycle Impact Assessment. International Journal of Life Cycle Assessment, 13(7): 532-546, 2008

#C1.5 Photochemical ozone creation potential / Photochemisches Ozonbildungspotential

Related SDG(s)	 3.9. "By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination"
Description	The SDG aims to reduce deaths and illnesses caused by air pollution. This can be assessed on product / service level by using the methods developed by van Zelm et al. (2008) and implemented in ReCiPe 2008 to calculate impacts of photochemical ozone formation on human health. The indicator's unit is kg NMVOC eq. The indicator is proposed by PEF (EC-JRC, 2017, Fazio et al., 2018).
Type	Comprehensive indicator
References	EC-JRC (2017): Environmental footprint characterisation factors. Available at http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml Fazio, S. Biganzioli, F. De Laurentiis, V., Zampori, L., Sala, S. Diaconu, E. (2018): Supporting information to the characterisation factors of recommended EF Life Cycle Impact Assessment methods, version 2, from ILCD to EF 3.0, EUR 29600 EN, European Commission, Ispra, ISBN 978-92-79-98584-3, doi:10.2760/002447, PUBSY No. JRC114822 Van Zelm, R., Huijbregts, M.A.J., Den Hollander, H.A., Van Jaarsveld, H.A., Sauter, F.J., Struijs, J., Van Wijnen, H.J., Van de Meent, D. (2008). European characterizationfactors for human health damage of PM10 and ozone in life cycle impact assessment. Atmospheric Environment 42, 441-453 Struijs, J., Beusen, A., van Jaarsveld, H. and Huijbregts, M.A.J. (2009). Aquatic Eutrophication. Chapter 6 in: Goedoop, M., Heijungs, R., Huijbregts, M.A.J., De Schryver, A., Struijs, J., Van Zelm, R. (2009). ReCiPe 2008 A life cycle impact assessment method which comprises harmonised category indicators at the midpoint and the endpoint level. Report I: Characterisation factors, first edition.

#C1.6 Disease incidences (Particulate matter / Feinstaub)

Related SDG(s)	 3.9. "By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination"
Description	The SDG aims to reduce deaths and illnesses caused by air pollution. This can be assessed on product / service level by using the method recommended by UNEP (2016) on assessing impacts due to particulate matter. The inidicator's unit is disease incidence. The indicator is also proposed by PEF (EC-JRC, 2017, Fazio et al., 2018).
Type	Comprehensive indicator
References	EC-JRC (2017): Environmental footprint characterisation factors. Available at http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml Fazio, S. Biganzioli, F. De Laurentiis, V., Zampori, L., Sala, S. Diaconu, E. (2018): Supporting information to the characterisation factors of recommended EF Life Cycle Impact Assessment methods, version 2, from ILCD to EF 3.0, EUR 29600 EN, European Commission, Ispra, ISBN 978-92-79-98584-3, doi:10.2760/002447, PUBSY No. JRC114822 UNEP (2016) Global guidance for life cycle impact assessment indicators. Volume 1. ISBN: 978-92-807-3630-4. Available at: http://www.lifecycleinitiative.org/life-cycle-impact-assessment-indicators-and-characterization-factors/

#C1.7 Comparative Toxic Unit for ecosystems (Ecotoxicity / Ökoxizität)

Related SDG(s)	 3.9. "By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination" 6.3 "By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally" 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"
Description	The SDGs aim to reduce toxic impacts on ecosystems and to avoid reverse effects on human health. This can be assessed on product / service level by using the comparative toxic unit for ecosystems indicator. The inidicator's unit is CTUe. The indicator was developed by Rosenbaum et al. (2008) within the USEtox model and is also proposed by PEF (EC-JRC, 2017, Fazio et al., 2018).
Type	**Core indicator (Planetary Boundaries)**
References	EC-JRC (2017): Environmental footprint characterisation factors. Available at http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml Fazio, S. Biganzioli, F. De Laurentiis, V., Zampori, L., Sala, S. Diaconu, E. (2018): Supporting information to the characterisation factors of recommended EF Life Cycle Impact Assessment methods, version 2, from ILCD to EF 3.0, EUR 29600 EN, European Commission, Ispra, ISBN 978-92-79-98584-3, doi:10.2760/002447, PUBSY No. JRC114822 Rosenbaum, R.K., Bachmann, T.M., Gold, L.S., Huijbregts, M.A.J., Jolliet, O., Juraske, R., Köhler, A., Larsen, H.F., MacLeod, M., Margni, M., McKone, T.E., Payet, J., Schuhmacher, M., van de Meent, D., Hauschild, M.Z. (2008): USEtox - The UNEPSETAC toxicity model: recommended characterisation factors for human toxicity and freshwater ecotoxicity in Life Cycle Impact Assessment. International Journal of Life Cycle Assessment, 13(7): 532-546, 2008

#C1.8 P-equivalents (Freshwater eutrophication / Süßwassereutrophierung)

Related SDG(s)	 6.3 "By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally"
Description	The SDG aims at improving water quality and measure bodies of water with good ambient water quality. On the level of products and services this can be done by calculation the impacts with respect to freshwater eutrophication. PEF (EC-JRC, 2017, Fazio et al., 2018) proposes for this purpose to use the EUTREND model (Struijs et al, 2009) as implemented in ReCiPe. The indicator is the fraction of nutrients reaching freshwater end compartments and its unit is kg P eq.
Type	**Core indicator (Planetary Boundaries)**
References	EC-JRC (2017): Environmental footprint characterisation factors. Available at http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml Fazio, S. Biganzioli, F. De Laurentiis, V., Zampori, L., Sala, S. Diaconu, E. (2018): Supporting information to the characterisation factors of recommended EF Life Cycle Impact Assessment methods, version 2, from ILCD to EF 3.0, EUR 29600 EN, European Commission, Ispra, ISBN 978-92-79-98584-3, doi:10.2760/002447, PUBSY No. JRC114822 Struijs, J., Beusen, A., van Jaarsveld, H. and Huijbregts, M.A.J. (2009). Aquatic Eutrophication. Chapter 6 in: Goedkoop, M., Heijungs, R., Huijbregts, M.A.J., De Schryver, A., Struijs, J., Van Zelm, R. (2009). ReCiPe 2008 A life cycle impact assessment method which comprises harmonised category indicators at the midpoint and the endpoint level. Report I: Characterisation factors, first edition.

#C1.9 Scarcity-adjusted water use / Knappheitsangepasste Wassernutzung

Related SDG(s)	 6.4 "By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity"
Description	The SDG aims at increasing water use efficiency and reducing water scarcity. This can be assessed at product/service level by using the indicator user deprivation potential (deprivation-weighted water consumption) which was developed in the impact assessment model Available WAter REmaining (AWARE). The indicator's unit is m3. The indicator is recommended by UNEP (2016) and PEF (EC-JRC, 2017, Fazio et al., 2018).
Type	Comprehensive indicator
References	EC-JRC (2017): Environmental footprint characterisation factors. Available at http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml Fazio, S. Biganzioli, F. De Laurentiis, V., Zampori, L., Sala, S. Diaconu, E. (2018): Supporting information to the characterisation factors of recommended EF Life Cycle Impact Assessment methods, version 2, from ILCD to EF 3.0, EUR 29600 EN, European Commission, Ispra, ISBN 978-92-79-98584-3, doi:10.2760/002447, PUBSY No. JRC114822 UNEP (2016) Global guidance for life cycle impact assessment indicators. Volume 1. ISBN: 978-92-807-3630-4. Available at: http://www.lifecycleinitiative.org/life-cycle-impact-assessment-indicators-and-characterization-factors/

#C1.10 Abiotic resource depletion / Abiotischer Ressourcenverbrauch

Related SDG(s)	 8.4 "Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead" 9.4 "By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities" 12.2 "By 2030, achieve the sustainable management and efficient use of natural resources"
Description	The SDGs aim at improving resource efficiency. This can be assessed on the level of products or services by using the two indicators for the assessment of abiotic resource depletion: ADP ultimate reserves to assess the impact category resource use of minerals and metals (in kg Sb eq) and ADP-fossil to assess the impact category resource use of fossils (in MJ). The impact assessment models have been developed by Guinée et al. (2002) and van Oers et al. (2002) and are implemented in the assessment model CML 2002. The indicators are proposed by PEF (EC-JRC, 2017, Fazio et al., 2018).
Type	**Core indicator (Planetary Boundaries)**
References	EC-JRC (2017): Environmental footprint characterisation factors. Available at http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml Fazio, S. Biganzioli, F. De Laurentiis, V., Zampori, L., Sala, S. Diaconu, E. (2018): Supporting information to the characterisation factors of recommended EF Life Cycle Impact Assessment methods, version 2, from ILCD to EF 3.0, EUR 29600 EN, European Commission, Ispra, ISBN 978-92-79-98584-3, doi:10.2760/002447, PUBSY No. JRC114822 Guinée, J.B. (Ed.), Gorrée, M., Heijungs, R., Huppes, G., Kleijn, R., de Koning, A., Van Oers, L., Wegener Sleeswijk, A., Suh, S.,. Udo de Haes, H.A, De Bruijn, J.A., Van Duin R., Huijbregts, M.A.J. (2002). Handbook on Life Cycle Assessment: Operational Guide to the ISO Standards. Series: Eco-efficiency in industry and science. Kluwer Academic Publishers. Dordrecht (Hardbound, ISBN 1-4020-0228-9; Paperback, ISBN 1-4020-0557-1) van Oers L, de Koning A, Guinee JB, Huppes G (2002). Abiotic Resource Depletion in LCA. Road and Hydraulic Engineering Institute, Ministry of Transport and Water, Amsterdam

#C1.11 Global Warming Potential / Treibhauspotenzial

Related SDG(s)	 9.4 "By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities" 13.2 "Integrate climate change measures into national policies, strategies and planning"
Description	The SDGs aim to measure climate change and adopt more clean and environmentally sound technologies in industries. The indicator to assess this on the level of products and services is radiative forcing measured as Global Warming Potential (GWP100). The indicator's unit is kg CO2eq.The indicator is explicitly proposed by the SDGs and also an indicator proposed by PEF. The impact assessment is based on the baseline model of 100 years of the IPCC, using characterizations factors of IPCC (2013).
Type	**Core indicator (Planetary Boundaries)**
References	EC-JRC (2017): Environmental footprint characterisation factors. Available at http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml Fazio, S. Biganzioli, F. De Laurentiis, V., Zampori, L., Sala, S. Diaconu, E. (2018): Supporting information to the characterisation factors of recommended EF Life Cycle Impact Assessment methods, version 2, from ILCD to EF 3.0, EUR 29600 EN, European Commission, Ispra, ISBN 978-92-79-98584-3, doi:10.2760/002447, PUBSY No. JRC114822 IPCC (2013): IPCC Climate Change Fifth Assessment Report: Climate Change 2013. http://www.ipcc.ch/ipccreports/assessments-reports.htm

#C1.12 Ionising radiation potential / Ionisierendes Strahlungspotenzial

Related SDG(s)	 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"
Description	The SDG aims to reduce negative impacts on human health due to chemicals and wastes. For ionising radiation this can be assessed by the indicator human exposure efficiency relative to U235. The indicator's unit is kBq U235 eq. It is proposed by PEF (EC-JRC, 2017, Fazio et al., 2018) and is based on the human health effect model (Frischknecht et al, 2000).
Type	Comprehensive indicator
References	EC-JRC (2017): Environmental footprint characterisation factors. Available at http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml Fazio, S. Biganzioli, F. De Laurentiis, V., Zampori, L., Sala, S. Diaconu, E. (2018): Supporting information to the characterisation factors of recommended EF Life Cycle Impact Assessment methods, version 2, from ILCD to EF 3.0, EUR 29600 EN, European Commission, Ispra, ISBN 978-92-79-98584-3, doi:10.2760/002447, PUBSY No. JRC114822 Frischknecht, R., Braunschweig, A., Hofstetter P., Suter P. (2000), Modelling human health effects of radioactive releases in Life Cycle Impact Assessment. Environmental Impact Assessment Review, 20 (2) pp. 159-189.

#C1.13 N-equivalents (Marine eutrophication / Marine Eutrophierung)

Related SDG(s)	 14.1 "By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution"
Description	The SDG aims at reducing marine pollution from nutrients. On the level of products and services this can be done by calculation the impacts with respect to marine eutrophication. PEF (EC-JRC, 2017, Fazio et al., 2018) proposes for this purpose to use the EUTREND model (Struijs et al, 2009) as implemented in ReCiPe. The indicator is the fraction of nutrients reaching marine end compartments and its unit is kg N eq.
Type	**Core indicator (Planetary Boundaries)**
References	EC-JRC (2017): Environmental footprint characterisation factors. Available at http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml Fazio, S. Biganzioli, F. De Laurentiis, V., Zampori, L., Sala, S. Diaconu, E. (2018): Supporting information to the characterisation factors of recommended EF Life Cycle Impact Assessment methods, version 2, from ILCD to EF 3.0, EUR 29600 EN, European Commission, Ispra, ISBN 978-92-79-98584-3, doi:10.2760/002447, PUBSY No. JRC114822 Struijs, J., Beusen, A., van Jaarsveld, H. and Huijbregts, M.A.J. (2009). Aquatic Eutrophication. Chapter 6 in: Goedkoop, M., Heijungs, R., Huijbregts, M.A.J., De Schryver, A., Struijs, J., Van Zelm, R. (2009). ReCiPe 2008 A life cycle impact assessment method which comprises harmonised category indicators at the midpoint and the endpoint level. Report I: Characterisation factors, first edition.

#C1.14 Marine biodiversity / Marine Biodiversität

Related SDG(s)	 14.2 "By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans"
Description	The SDG aims at protecting marine ecosystems and reduce negative impacts. To assess impacts on marine biodiversity, in LCA up to now the development of impact assessment methods is just starting (e.g. Woods et al., 2016). Thus, this indicator cannot be assessed at the moment but has to be included when an approach is available. PEF does not mention an indicator for marine biodiversity (PEF, 2018).
Type	**Core indicator (Planetary Boundaries)**
References	PEF (2018): Product Environmental Footprint Category Rules Guidance. Version 6.3 Woods, J.S.; Veltman, K.; Huijbregts, M.; Verones, F.; Hertwich, E.G. (2016): Towards a meaningful assessment of marine ecological impacts in life cycle assessment (LCA); Environment International 89-90 (2016), pp. 48-61

#C1.15 Marine acidification potential / Marines Versauerungspotenziel

Related SDG(s)	 14.3 "Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels"
Description	The SDG aims at addressing impacts of ocean acidification. This can be assessed on product / service level by using the indicator marine acidification potential developed by Bach et al. (2016). The unit is kg CO2eq. PEF does not mention an indicator for marine acidification (PEF, 2018).
Type	Comprehensive indicator
References	Bach, V.; Möller, F.; Finogenova, N.; Emara, Y.; Finkbeiner, M. (2016): Characterization model to assess ocean acidification within life cycle assessment; Int J Life Cycle Assess, DOI 10.1007/s11367-016-1121-x PEF (2018): Product Environmental Footprint Category Rules Guidance. Version 6.3

2.1.2 C1 INVENTORY INDICATORS

#C1.16 Income per hectare / Einkommen pro Hektar *Small Scale Producers / Kleinerzeuger*innen*

Related SDG(s)	 2.3. "By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment"
Description	The SDG aims at doubling the income of small-scale producers. This can be measured with the inventory indicator income per hectare. However, to measure an increase in income is only possible by comparing two different years.
Type	Comprehensive indicator

#C1.17 Yield per hectare / Ernte pro Hektar *Small Scale Producers / Kleinerzeuger*innen*

Related SDG(s)	 2.3. "By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment"
Description	The SDG aims at doubling the productivity of small-scale producers. This can be measured with the inventory indicator yield per hectare. However, to measure an increase in yield is only possible by comparing two different years.
Type	Comprehensive indicator

#C1.18 Road traffic deaths / Verkehrstote

Related SDG(s)	 3.6 "By 2020, halve the number of global deaths and injuries from road traffic accidents"
Description	The SDG aims at halving deaths and injuries from road traffic. This can be measured by using the inventory indicator death rate of road traffic accidents. However, to measure a decrease in accidents is only possible by comparing two different years.
Type	Comprehensive indicator

#C1.19 Water use / Wassernutzung

Related SDG(s)	 6.4 "By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity"
Description	The SDG aims at increasing the water use efficiency. This can be measured by the inventory indicator water use. However, to measure an increase in efficiency is only possible by comparing two different years.
Type	Comprehensive indicator

#C1.20 Energy use (renewable & total) / Energienutzung (erneuerbar & gesamt)

Related SDG(s)	 7.2 "By 2030, increase substantially the share of renewable energy in the global energy mix" 7.3 "By 2030, double the global rate of improvement in energy efficiency"
Description	The SDGs aim at increasing share of renewable energies in the energy mix and also the energy efficiency. This can be measured with the two inventory indicators energy use (renewables) and energy use (total). However, to measure an increase in efficiency is only possible by comparing two different years.
Type	Comprehensive indicator

#C1.21 Food losses / Lebensmittelverluste

Related SDG(s)	 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"
Description	The SDG aims at decreasing food losses along the food value chain. This can be measured by the inventory indicator food losses. How to measure specific food losses is described by FAO (w/o year) and also rules set by PEF should be considered (PEF, 2018). However, to measure a decrease in food losses is only possible by comparing two different years.
Type	Comprehensive indicator
References	FAO (w/o year): http://www.fao.org/platform-food-loss-waste/food-loss/food-loss-measurement/en/ PEF (2018): Product Environmental Footprint Category Rules Guidance. Version 6.3

#C1.22 Waste generation / Abfallanfall

Related SDG(s)	 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"
Description	The SDG aims at decreasing the amount of waste along the product's / service's life cycle. This can be measured by the inventory indicator waste generation per waste fraction and the foreseen end-of-life treatment. However, to measure a decrease in waste generation is only possible by comparing two different years.
Type	Comprehensive indicator

#C1.23 Use of recycled material / Nutzung von Recyclingmaterialien

Related SDG(s)	 12.5 "By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse"
Description	The SDG aims at increasing the use of recycled materials. This can be measured by the inventory indicator use of recycled materials. However, to measure an increase in the use of recycled material is only possible by comparing two different years.
Type	Comprehensive indicator

#C1.24 Marine debris / Marine Abfälle

Related SDG(s)	 14.3 "Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels"
Description	The SDG aims at addressing impacts of ocean acidification. This can be assessed on product / service level by using the indicator marine acidification potential developed by Bach et al. (2016). The unit is kg CO2eq. PEF does not mention an indicator for marine acidification (PEF, 2018).
Type	Comprehensive indicator

#C1.25 Share of by-catch / Beifanganteil

Related SDG(s)	 14.4 "By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics"
Description	The SDG aims at decreasing the share of by catches in fishing. This can be measured by the inventory indicator share of by catches. However, to measure a reduction in by catches is only possible by comparing two different years.
Type	**Core indicator (Planetary Boundaries)**

2.1.3 NORMALISATION FACTORS

Normalisation factors (NF) are only available for impact indicators. The following table gives therefore the NF for the impact indicators in SEP. These are taken from PEF (2018)[3]. However, for impact categories/indicators not included in PEF no NF is available.

#	INDICATOR NAME	UNIT	Global NF	Person NF
C1.1	Soil quality index	pt	9.20E+15	1.33E+06
C1.2	Terrestrial biodiversity	/	n.a.	n.a.
C1.3	Accumulated Exceedance	mol N eq	1.22E+12	1.77E+02
C1.4	Comparative Toxic Unit for Human health (cancer, non-cancer)	CTUh	2.66E+05	3.85E-05
		CTUh	3.27E+06	4.75E-04
C1.5	Photochemical ozone creation potential	kg NMVOCeq	2.80E+11	4.06E+01
C1.6	Disease incidences (Particulate matter)	Disease incidence	4.39E+06	6.37E-04
C1.7	Comparative Toxic Unit for ecosystems	CTUe	8.15E+13	1.18E+04
C1.8	P-equivalents (Freshwater eutrophication)	kg Peq	1.76E+10	2.55E+00
C1.9	Scarcity-adjusted water use	m^3 worldeq	7.91E+13	1.15E+04
C1.10	Abiotic resource depletion (fossils)	MJ	4.50E+14	6.53E+04
	Abiotic resource depletion (minerals &metals)	kg Sbeq	3.99E+08	5.79E-02
C1.11	Global Warming Potential	kg CO2 eq	5.35E+13	7.76E+03
C1.12	Ionising radiation Potential	kBq U235eq	2.91E+13	4.22E+03
C1.13	N-equivalents (Marine eutrophication)	kg Neq	1.95E+11	2.83E+01
C1.14	Marine biodiversity	x	n.a.	n.a.
C1.15	Marine acidification Potential	kg CO2 eq	n.a.	n.a.

Figure 1: Normalisation factors (NF) for SEP

[3] PEF (2018): Product Environmental Footprint Category Rules Guidance. Version 6.3

2.2 C2 INDICATORS

In the following the profiles of the C2 indicators of *SEP* are presented. It follows the following logic:

- In the vertical Y-axis the contribution to the sub targets of the SDG is displayed. The scale ranges from y = -1 (lowest negative contribution) to y = +1 (highest positive contribution)

- The respective input parameters of the indicator are displayed on the x-axis. For this purpose, country and/or sector-specific values must be used in some cases, e.g. for #C2.1 or #C2.2. If no data are available, data from comparable countries or even estimates must be used. It is important to indicate the assumptions and sources.

As the SDGs do not always specify a quantifiable target, which is however necessary for the evaluation, a systematic approach was developed for this purpose: In cases where no target value is specified by the SDG sub-target (1st step of the cascade), the second or subsequent step is used. The different steps for target value definition are:
First priority is always given to the SDG itself: If the target value to be achieved is clearly defined here, then this was taken as the basis. This is the case with SDG C2.1, for example.
In the second priority, the guiding principle of the SDGs "Leave no one behind" was used: This states that all countries, peoples, individuals, etc. must be included in sustainable development and no one should be left behind.
For the target value this means, for example, that all employees along the value chain are considered. The basis for the consideration of this principle was the Sustainable Development Report (2019) of the Sustainable Development Solutions Network and the Bertelsmann Foundation, which proposes a comparable approach.[5]
In the third priority, the average of the three best companies in the respective industry or the three best OECD countries was then selected to define the target value.
The forth priority chosen was expert judgement, and as a last option, if it was not possible to define a target value in the manner described, the topic in question was included in indicator #C2.3 "Sustainability risk management". Here the question is asked how the company takes up the topic in management, whether goals, measures and responsibilities have been defined. This approach was taken from the "Management Approach" of the Global Reporting Initiative.[6]

It should also be noted that the finest possible examination level should always be used. For example, in the analysis of income inequality between women and men in indicator #C2.9, ideally only those employees are considered who are directly involved in the production, distribution, transport, etc. of the product. If data is only available for all employees at the respective location or even only for the entire company, it should be used. If the data is not available or cannot be collected, a more general level of analysis should be used.

4 United Nations (2018), Leave no-one behind:https://www.undp.org/content/undp/en/home/librarypage/poverty-reduction/what-does-it-mean-to-leave-no-onebehind-.html (status: 20/02/2020)

5 SDSN & Bertelsmann Stiftung (2019) Sustainable Development Report 2019 des Sustainable Development Solutions Network und der Bertelsmannstiftung, https://www.sdgindex.org/reports/sustainable-development-report-2019/ (status: 13/02/2020)

6 Global Reporting Initiative (2016): https://www.globalreporting.org/standards/media/1038/gri-103-management-approach-2016.pdf (status: 20/02/2020)

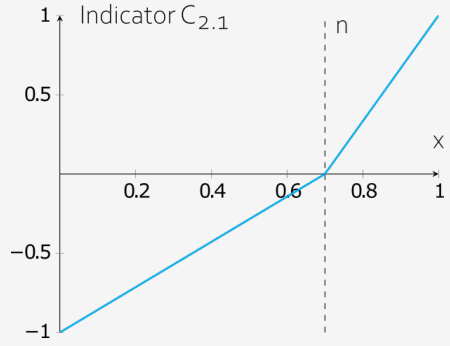
#C2.1
Workers earning below UN poverty line /
Beschäftigte, die unter der UN-Armutsgrenze verdienen

Related SDG(s)

1.1 "By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day"

Description

The SDG aims to eradicate extreme poverty for all people everywhere. Therefore, this indicator measures the share of employees in all steps of the value chain that earn less than the current UN poverty line[7]. In 2020 the UN poverty line was 1,90$ per day. The SDG is met when there are no workers earning below the current UN poverty line (C2.1=1). A neutral score of the SDG is obtained when the number of employees that earn below the current UN poverty line matches the national country average of people below the current UN poverty line (C2.1=0).
The function is expressed as linear as each employee less that earns below the current UN poverty line is considered a positive contribution to the SDG. The target value is based on the explicit SGD sub target to eradicate all extreme poverty.



- $C_{2.1}$ = +1:
No workers earn below the UN poverty line

- $C_{2.1}$ = 0:
National country average of workers below UN poverty line

Type

Core indicator (Human Rights)

Equation

$$C_{2.1} = \begin{cases} 1, & for\ n = 1 \\ x * \frac{1}{n} - 1, & for\ x < n \\ x * \frac{1}{(1-n)} - \frac{n}{(1-n)}, & for\ x \geq n \end{cases}$$

Input parameters

x = Share of workers/employees above poverty line
n = National country average of workers above poverty line of the specific step in the supply chain

7 United Nations, Ending Poverty: https://www.un.org/en/sections/issues-depth/poverty/index.html (checked last at 28/02/2020)

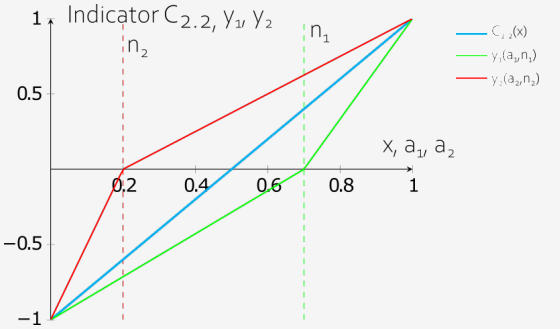
#C2.2
Coverage of social security support /
Abdeckung der sozialen Sicherungssysteme

Related SDG(s)

1.3 "Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable"

Description

The SDG stipulates that "substantial" coverage is to be achieved among the poor and those in need of protection. Applied to companies, this means that the objective is that all employees along the product life cycle can benefit from social security systems (C2.2 = 1). A neutral, i.e. no positive but also no negative contribution to the SDG (y = 0), is assumed if the coverage of the company's employees reaches the average coverage of employees with social security in the country concerned, a negative contribution is made if the coverage in the company is below the national average.
The evaluation was based on a straight line, since each employee who benefits from social security is more positive. The target value of the indicator follows the principle of "Leave no-one behind".



- C2.2 = +1:
All workers profit from social security support

- C2.2 = 0:
National country average of workers that profit from social security support

In order to define a social security system, the International Labour Organisation (ILO) definition was used[8], which includes the following types of social security: a) child and family benefits (e.g. benefits in form of periodic cash or of housing, holidays, help, etc.), b) maternity protection (e.g. paid leave or leave with adequate social security benefits), c) unemployment support, d) employment injury benefits, e) sickness benefits, f) health protection, g) old-age benefits, h) disability benefits, i) survivors' benefits (e.g. earnings-related periodic cash benefits and funeral grants to survivors of deceased workers).

Type

Core indicator (Human Rights)

Equation

$$C_{2.2} = \frac{1}{9} \cdot \sum_{i=1}^{9} y_i \quad where \quad y_i = \begin{cases} 0, & for\ n_i = 1 \\ a_i * \frac{1}{n_i} - 1, & for\ a_i < n_i \\ a_i * \frac{1}{(1-n_i)} - \frac{n_i}{(1-n_i)}, & for\ a_i \geq n_i \end{cases}$$

Input parameters

Share of employees benefiting from
a1 = child and family benefits
a2 = maternity protection
a3 = unemployment support
a4 = employment injury benefits
a5 = sickness benefits
a6 = health protection
a7 = old-age benefits
a8 = disability benefits
a9 = survivors' benefits
n1-n9 = National country average of related cover-age a1-a9

8 International Labour Organization, World Social Protection Report, p. 168, https://www.social-protection.org/gimi/gess/RessourcePDF.action?ressource.ressourceId=54887 (checked last at 17/02/2020)

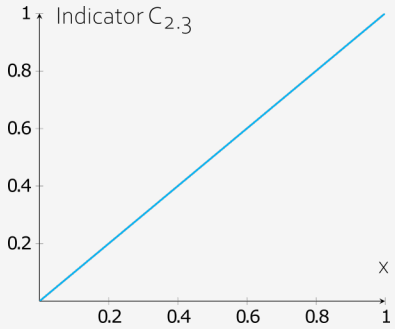
#C2.3
Coverage of product-related sustainability (risk) management / Abdeckung des produktbezogenen Nachhaltigkeits-(Risiko-)Managements

Related SDG(s)

2.4, 3.6, 5.1, 6.5, 6.6, 7.3, 8.7, 8.8, 9.3, 12.2, 12.3, 12.4, 13.2, 14.2, 15.1-15.6, 15.8, 15.9, 15.a, 15.b, 16.5, 16.a, 17.7, 17.11, 17.16, 17.17
(see Annex)

Description

The indicator covers all sustainability issues mentioned in the SDGs relevant for a comprehensive management in the company's sustainability (risk) management. The indicator addresses the coverage of sustainability issues (C2.3a – C2.3t) and the form of implementation of the issues in the management (input parameters a – c).
However, the sustainability issues are split up in core issues (c, i, j, k, n, p & s) and comprehensive issues. According to the Global Reporting Initiative (GRI) management approach there are three aspects of comprehensive management of sustainability issues: a) policies, goals and targets, b) responsibilities and resources, c) specific actions, such as processes, projects, programs and initiatives and measures[9].
The evaluation is done per sustainability issue covered. Thus, the highest possible contribution (y = 1) is achieved when all management measures (policies / goals and targets; responsibilities / resources; specific actions / measures) are covered. The lowest contribution is assumed when no management measures are covered (y = 0).



- C2.3 = +1:
All management aspects are covered comprehensively in the sustainability (risk) management

- C2.3 = 0:
No management aspect is addressed

C2.3a: sustainable agriculture (SDG 2.4), C2.3b: driver/passenger safety/reduction of accidents (SDG 3.6), C2.3c: equal opportunities (SDG 5.1), C2.3d: water use&scarcity (SDG 6.5, 6.6), C2.3e: natural resources (SDG 12.2), C2.3f: food losses (SDG 12.3), C2.3g: chemicals (SDG 12.4), C2.3h: waste (SDG 12.4, 12.5), C2.3i: climate change (SDG 13.2), C2.3j: marine biodiversity (SDG 14.2), C2.3k: terrestrial&freshwater biodiversity (SDG 15.1-15.5, 15.8), C2.3l: patents on natural resources (SDG 15.6), C2.3m: corruption prevention (SDG 16.5), C2.3n: human rights (SDG 8.7, 8.8, 16.a), C2.3o: promotion of environmental sound technologies in developing countries (SDG 17.7), C2.3p: energy efficiency (SDG 7.3), C2.3q: small scale suppliers/industry borrowers in supply chain (particular from least developed countries) (SDG 9.3), C2.3r: share of products/materials from developing countries (SDG 17.11), C2.3s: Investments in conservation and sustainable use of biodiversity/ecosystems (SDG 15.a, 15.b), C2.3t: Engagement in multi-stakeholder partnerships for sustainable development (SDG 17.16, 17.17).

Equation

$$C_{2.3} = x = \frac{1}{60} \cdot \sum_{i=a}^{t} \sum_{j=1}^{3} C2.3_{i,j}$$

Input parameters

Boolean operator (value either 1 or 0) for management measures covered
C2.3i,1 = policies / goals and targets
C2.3i,2 = responsibilities / resources
C2.3i,3 = specific actions / measures

[9] The detailed description of each can be found in the GRI Management Approach document from p. 8 on: https://www.globalreporting.org/standards/media/1038/gri-103-management-approach-2016.pdf (checked last at 17/02/2020)

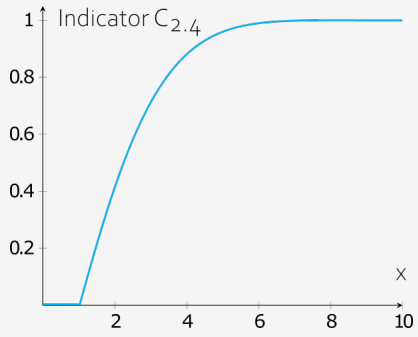
#C2.4
Use of different breeds&varieties /
Nutzung verschiedener Rassen&Sorten

Related SDG(s)

2.5 "By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed"

Description

The SDG aims to enhance genetic diversity of seeds, plants and animals. The indicator describes agrobiodiversity and measures the number of breeds / varieties cultivated. Fallow is counted as a crop type in this context.
The use of different breeds helps to maintain genetic diversity as do the cultivation of different varieties. One single crop/breed constitutes a monoculture. Thus, the use of just one single crop/breed does not have a positive effect ($C_{2.4} = 0$). However, every additional crop/breed increases agrobiodiversity until a certain level of diversity in crops/breeds is achieved. Then, the marginal biodiversity value decreases and levels out, approaching $C_{2.4} = 1$. Recording crop number per hectare and year means that both crop rotation systems are appropriated (diversity in time) as well as parallel cultivation of different crops (diversity in space). The target value is based on expert judgement.



Type

Core indicator (Planetary Boundaries)

Equation

$$C_{2.4} = \begin{cases} 0, & x < 1 \\ 2 \cdot e^{-\frac{(x-1)^6}{0.7543}} - 1, & x \geq 1 \\ 1, & x > 10 \end{cases} \quad where \quad x = \frac{n}{A \cdot t}$$

Input parameters

n = Number of breeds or varieties cultivated
A = Agricultural area hectare [ha]
t = number of years [a]

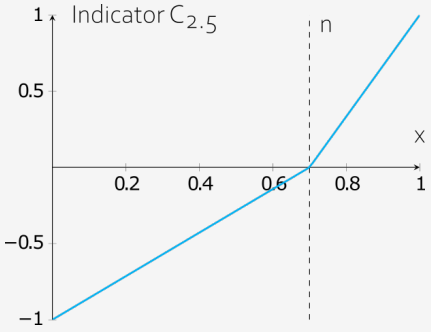
#C2.5
Health insurance /
Krankenversicherung

Related SDG(s)

3.8 "Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all"

Description

The SDG aims to achieve universal health coverage for all. The indicator therefore measures the share of workers that are covered by health insurance. The SDG is met when all employees among the value chain profit from health insurance (C2.5=1). A neutral score is obtained when the share of employees matches the share of the national country average of workers that profit from health insurance (C2.5 =0)
The function is expressed as linear as each employee that is additionally covered by health insurance is a positive contribution to the SDG. The target value is based on the UN principle "Leave no-one behind".



- C2.5 = +1:
All employees profit from health insurance

- C2.5 = 0:
National country average of workers that profit from health insurance

Type

Core indicator (Human Rights)

Equation

$$C_{2.5} = \begin{cases} 0, & for\ n = 1 \\ x * \frac{1}{n} - 1, & for\ x < n \\ x * \frac{1}{(1-n)} - \frac{n}{(1-n)}, & for\ x \geq n \end{cases}$$

Input parameters

x = Share of workers/employees covered by health insurance
n = National country average of workers covered by health insurance

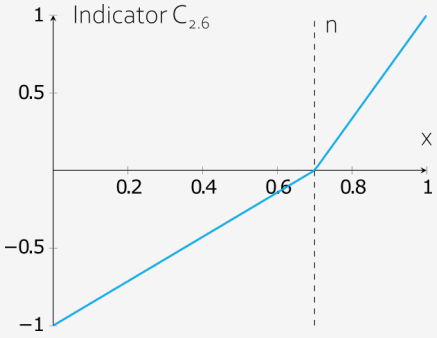
#C2.6
Occupational injuries /
Berufsunfälle und -krankheiten

Related SDG(s)

3.9 "By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination"
8.8 "Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment"

Description

The SDGs aim to reduce the number of work-related deaths and illnesses to promote safe and secure working environments. The indicator takes the number of working accidents as a proxy for occupational safety. The SDGs are met when there are no work accidents among workers (C2.6=1). The contribution is neutral when the national country average of workers that have work accidents is met within the organisation (C2.6=0).
The function is expressed as linear as each work accident less is considered a positive contribution to the SDG. The target value is based on the UN principle "Leave no-one behind".



- C2.6 = +1:
There are no work accidents among workers

- C2.6 = 0:
National country average of workers that have work accidents

Type

Comprehensive indicator

Equation

$$C_{2.6} = \begin{cases} 0, & for\ n = 1 \\ x * \frac{1}{n} - 1, & for\ x < n \\ x * \frac{1}{(1-n)} - \frac{n}{(1-n)}, & for\ x \geq n \end{cases}$$

Input parameters

x = Share of workers / employees not experiencing fatal and non-fatal occupational injuries
n = National country average of workers/employees not experiencing fatal and non-fatal occupational injuries

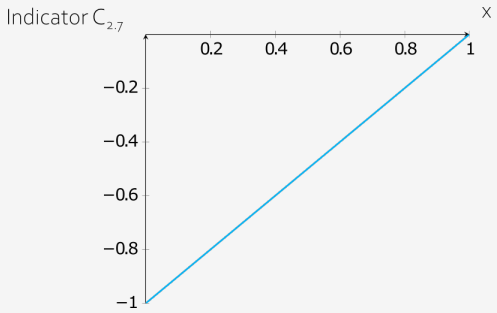
#C2.7
Access to protective clothing /
Zugang zu Schutzkleidung

Related SDG(s)

3.9 "By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination"
8.8 "Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment"

Description

The SDGs aim to reduce the number of work-related deaths and illnesses to promote safe and secure working environments. The indicator thus measures the access of workers to protective clothing for working situations where protection is needed, e.g. extreme heat, high risk of mechanical injuries, exposure to chemicals etc. There is a neutral contribution to the SDG when all employees have access to protective clothing (C2.7=0). The contribution is negative (C2.7=-1) when none of the workers in working situations where protection is needed have access to protective clothing.
The function is expressed as linear as each additional employee that has access to protective clothing is considered a positive contribution to the SDG. The target value is based on the UN principle "Leave no-one behind".



- C2.7 = 0:
All workers have access to protective clothing

- C2.7 = -1:
None of the workers have access to protective clothing

Type

Comprehensive indicator

Equation

$$C_{2.7} = x - 1$$

Input parameters

x = Share of workers exposed to situations where protection is needed with access to protective clothing

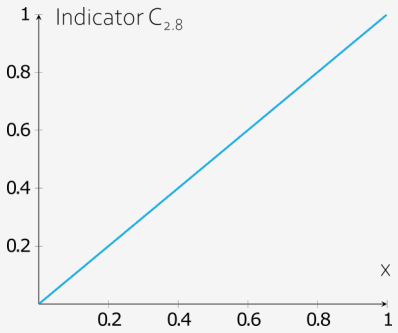
#C2.8
Training in sustainability issues /
Training zu Nachhaltigkeitsthemen

Related SDG(s)

4.4 "By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship"
4.7 "By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development"
13.3 "Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning"
16.5 "Substantially reduce corruption and bribery in all their forms"

Description

The indicator covers all sustainability issues mentioned in the SDGs relevant for training of employees. Thus, the indicator addresses the sustainability issues (C2.8a – C2.8d) and the share of employees being trained in each sustainability issue (input parameter C2.8i). Each SDG is met when all employees are trained in the respective sustainability issue (C2.8=1). There is a neutral contribution to the SDG when none of the employee is trained in the respective sustainability issue (C2.8=0)
The function is expressed as linear as each additional employee that is trained in the respective sustainability issue is considered a positive contribution. The target value is based on the UN principle "Leave no-one behind".



- C2.8 = +1:
All employees are trained in the respective sustainability issue

- C2.8 = 0:
No employee is trained in the respective sustainability issue

C2.8a: ICT skills (e.g. technical and vocational) (SDG 4.4), C2.8b: sustainability in general (SDG 4.7), C2.8c: climate change (SDG 13.3), C2.8d: prevention of corruption and bribery (SDG 16.5)

Type

Comprehensive indicator

Equation

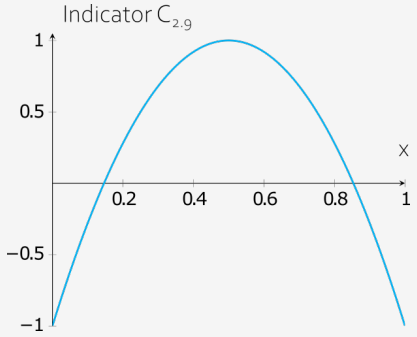
$$C_{2.8} = x = \frac{1}{4} \cdot \sum_{i=a}^{d} C2.8_i$$

Input parameters

C2.8i = share or workers/employees trained in the respective sustainability issue

#C2.9
Equal share of training for men and women /
Gleicher Anteil an Fort-/Weiterbildung für Frauen und Männer

Related SDG(s)	4.5 "By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations"
Description	The target value of the indicator, based on the SDG, is the equal treatment of female and male employees in trainings within the company. This indicator defines the negative contribution (C2.9 = -1) in case of absolute unequal treatment, i.e. either only women or only men receive further training. The maximum contribution to the SDG (C2.9 = 1) is reached when both genders are equally enabled to participate in further training measures. However, as it is difficult to establish absolute equality, smaller inequalities are allowed, for example, when women account for 52% of hours of continuing training and men for only 48% or vice versa. The evaluation was therefore based on a quadratic function. This clearly penalises discrimination in both directions, but allows for smaller inequalities. The indicator is based on the UN principle "Leave no-one behind".
Type	Comprehensive indicator
Equation	$C_{2.9} = -8 * (x - 0.5)^2 + 1$
Input parameters	x = Share of average hours of training of one gender in total training hours



- C2.9 = +1:
  Women and men are trained equally
- C2.9 = -1:
  Woman and men are trained completely unequal

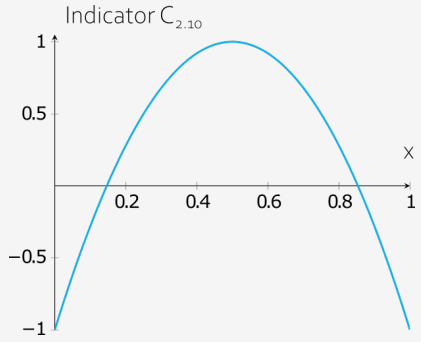
#C2.10
Equal wages for men and women /
Gleiche Bezahlung für Männer und Frauen

Related SDG(s)

5.1 "End all forms of discrimination against all women and girls everywhere"
8.5 "By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value"

Description

The target value of the indicator, based on the SDGs, is the equal wage of female and male employees. Therefore, this indicator defines the negative contribution (C2.10 = -1) in case of absolute unequal treatment, i.e. either women or men are not paid at all. The maximum contribution to the SDG (C2.10 = 1) is reached when both genders are equally paid. However, as it is difficult to establish absolute equality, smaller inequalities are allowed, for example, when women are paid a bit better than men or vice versa. The evaluation was therefore based on a quadratic function. This clearly penalises discrimination in both directions, but allows for smaller inequalities. The target value is based on the UN principle "Leave no-one behind".



- C2.10 = +1:
  Women and men earn equally
- C2.10 = -1:
  Woman and men earn completely unequal

Type

Core indicator (Human Rights)

Equation

$$C_{2.10} = -8 * (x - 0.5)^2 + 1$$

Input parameters

x = Share of average hourly wage of one gender in total wages

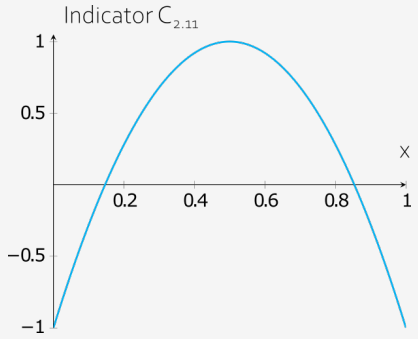
#C2.11
Equal managerial positions for men and women /
Gleiche Führungspositionen für Männer und Frauen

Related SDG(s)

5.5 "Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life"

Description

The target value of the indicator, based on the SDG, is the equal treatment of female and male employees regarding managerial positions at all hierarchy levels.
Therefore, this indicator defines the negative contribution ($C_{2.11} = -1$) in case of absolute unequal treatment, i.e. only women or only men are in managerial positions. The maximum contribution to the SDG ($C_{2.11} = 1$) is reached when both genders are equally considered. However, as it is difficult to establish absolute equality, smaller inequalities are allowed, for example, when more women are in managerial positions than men or vice versa. The evaluation was therefore based on a quadratic function. This clearly penalises discrimination in both directions, but allows for smaller inequalities. The indicator is based on the UN principle "Leave no-one behind".



- $C_{2.11} = +1$:
Women and men have an equal share of managerial positions

- $C_{2.11} = -1$:
Woman and men have a completely unequal share of managerial positions

Type

Core indicator (Human Rights)

Equation

$$C_{2.11} = -8 * (x - 0.5)^2 + 1$$

Input parameters

x = Share of one gender in managerial positions in total managerial positions

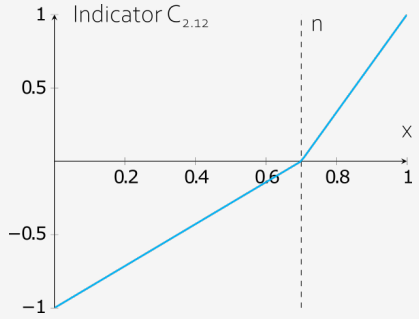
#C2.12
Drinking water at work /
Trinkwasser bei der Arbeit

Related SDG(s)

6.1 "By 2030, achieve universal and equitable access to safe and affordable drinking water for all"

Description

The SDG aims to achieve universal access to safe drinking water for all. Transferred for products, the indicator captures the share of employees that have access to safely managed drinking water at work. The SDG is reached (C2.12=1) when all employees have access to safe drinking water at work. There is a negative contribution when none of the workers have access to safe water (C2.12=-1). The function is expressed as linear as each additional employee that has access to safe drinking water at work is considered a positive contribution. The target value is based on the explicit SDG sub target.



- C2.12 = +1:
  All employees have access to drinking water at work
- C2.12 = -1:
  No employees have access to drinking water at work

Type

Core indicator (Human Rights)

Equation

$$C_{2.12} = \begin{cases} 1, & for\ n = 1 \\ x * \frac{1}{n} - 1, & for\ x < n \\ x * \frac{1}{(1-n)} - \frac{n}{(1-n)}, & for\ x \geq n \end{cases}$$

Input parameters

x = Share of workers/employees that have access to safely managed drinking water at work
n = National country average of workers/employees that have access to safely managed drinking water at work

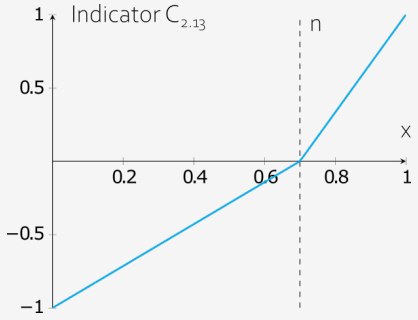
#C2.13
Adequate sanitation at work /
Angemessene sanitäre Einrichtungen am Arbeitsplatz

Related SDG(s)

6.2 "By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations"

Description

The SDG aims to achieve access to adequate sanitation for all. Transferred to products, this indicator measures the share of employees that have access to lockable sanitation at work, including a hand-washing facility with soap and water. The SDG is reached completely when all employees have access to adequate sanitation at work (C2.13=1). There is a negative contribution when none of the employees has access to adequate sanitation at work (C2.13=-1). The function is expressed as linear as each additional employee that has access to adequate sanitation at work is considered a positive contribution. The target value is based on the explicit SGD sub target.



- C2.13 = +1:
  All employees have access to sanitation at work
- C2.13 = -1:
  No employees have access to sanitation at work

Type

Core indicator (Human Rights)

Equation

$$C_{2.13} = \begin{cases} 1, & for\ n = 1 \\ x * \frac{1}{n} - 1, & for\ x < n \\ x * \frac{1}{(1-n)} - \frac{n}{(1-n)}, & for\ x \geq n \end{cases}$$

Input parameters

x = Share of workers/employees with access to sanitation at work
n = National country average of workers/employees with access to sanitation at work

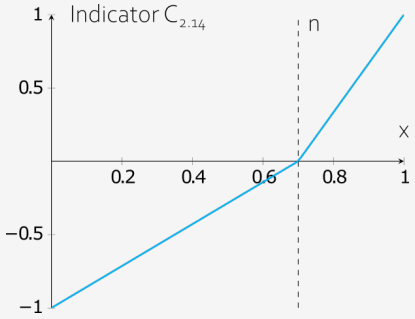
#C2.14
Wastewater treatment /
Abwasserbehandlung

Related SDG(s)

6.3 "By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally"

Description

The SDG aims to improve water quality by reducing the proportion of untreated wastewater. Transferred to products, the indicator measures the percentage of safely treated wastewater flows taking the UN definitions into account[10]. The SDG is met when all wastewater flows are safely treated (C2.14=+1). There is a neutral contribution when the share of treated wastewater is equal to the national country average (C2.14=0). The function is expressed as linear as each unit of wastewater that is treated safely is considered a positive contribution to the SDG. The target value is based on based on expert judgement.



- C2.14 = +1:
  All wastewater is safely treated
- C2.14 = 0:
  National country average of safely treated wastewater

Type

Comprehensive indicator

Equation

$$C_{2.14} = \begin{cases} 1, & for\ n = 1 \\ x * \frac{1}{n} - 1, & for\ x < n \\ x * \frac{1}{(1-n)} - \frac{n}{(1-n)}, & for\ x \geq n \end{cases}$$

Input parameters

x = Share of safely treated wastewater flows
n = National country average of safely treated wastewater flows

[10] United Nations, Progress on Wastewater Treatment; https://www.unwater.org/publications/progress-on-wastewater-treatment-631/ (checked last at 17/02/2020)

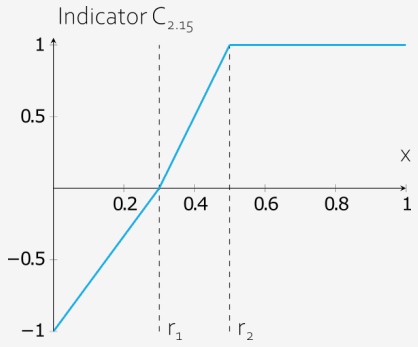
#C2.15
Employees under 24 years /
Beschäftigte unter 24 Jahren

Related SDG(s)

8.6 "By 2020, substantially reduce the proportion of youth not in employment, education or training"

Description

The SDG aims to reduce the proportion of youth not in employment, education, or training. The contribution of companies is to increase the share of employees (incl. apprenticeships) between 15-24 years. The SDG is reached when the share of employees in the company between 15-24 years is the same as proportion of youths/adults in the region between 15-24 years (C2.15=1). There is a neutral contribution (C2.15=0) when the share of employees in the company between 15-24 years is the same as the regional youth employment rate. The function is expressed as linear as each additional young person is considered a positive contribution to the SDG. The target value is based on the UN principle "Leave no-one behind".



- C2.15 = +1:
  Share of employees in the company between 15-24 years is the same as proportion of youths/ adults in region 15-24 years
- C2.15 = 0:
  Share of employees in the company between 15-24 years is the same as the Regional youth employment rate

Type

Comprehensive indicator

Equation

$$C_{2.15} = \begin{cases} 1, & for\ x > r_2 \\ x * \frac{1}{r_1} - 1, & for\ x < r_1 \\ x * \frac{1}{(1 - r_1 - r_2)} - \frac{r_1}{(1 - r_1 - r_2)}, & for\ r_1 \leq x \leq r_2 \end{cases}$$

Input parameters

x = share of employees (incl. apprenticeships and trainings) between 15 and 24 years
r1 = regional youth employment rate (between 15 and 24 years)
r2 = regional proportion of youths/adults in region between 15 and 24 years

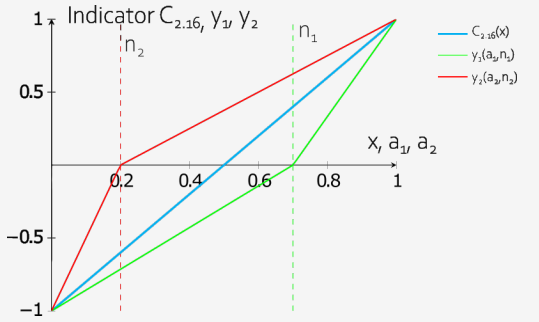
#C2.16
Fulfilment of ILO conventions /
Einhaltung der ILO-Konventionen

Related SDG(s)

8.7 "Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms"
8.8 "Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment"

Description

The respective SDGs aim to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition of child labour in all its forms. The GIF-SDG therefore proposes to take the level of compliance with basic labour rights based on the International Labour Organisation (ILO). The indicator measures the share of employees that benefit from the fulfilment of the conventions of the ILO (C2.16a1-a6). The SDGs are reached when all employees profit from basic labour rights (C2.16=+1). There is a neutral contribution, when the share of employees that profit from basic labour rights is the same as the national country average of fulfilment of ILO conventions (C2.16=0). The function is expressed as linear as each additional employee that profits from basic labour rights is considered a positive contribution to the SDG. The target value is based on the UN principle "Leave no-one behind".



- C2.16 = +1:
ILO conventions are fulfilled for all employees

- C2.16 = 0:
National country average of fulfilment of ILO conventions

ILO-conventions[8]: C2.16a1: child work / minimum age, C2.16 a2: forced labour; C2.16 a3: freedom of association, C2.16 a4: discrimination, C2.16 a5: collective bargaining for all employees, C2.16 a6: equal remuneration of workers

Type

Core indicator (Human Rights)

Equation

$$C_{2.16} = \frac{1}{6} \cdot \sum_{i=1}^{6} y_i \quad where \quad y_i = \begin{cases} 0, & for\ n_i = 1 \\ a_i * \frac{1}{n_i} - 1, & for\ a_i < n_i \\ a_i * \frac{1}{(1-n_i)} - \frac{n_i}{(1-n_i)}, & for\ a_i \geq n_i \end{cases}$$

Input parameters

Share of employees benefiting from the fulfilment of the conventions of the ILO regarding:

a1 = child work / minimum age
a2 = forced labour
a3 = freedom of association
a4 = discrimination
a5: collective bargaining for all employees
a6 = equal remuneration of workers
n1-n6 = National country average of related fulfilments a1-a6

[11] Fundamental ILO Conventions: https://www.ilo.org/global/standards/introduction-to-international-labour-standards/conventions-and-recommendations/lang--en/index.htm (checked last 02/03/2020)

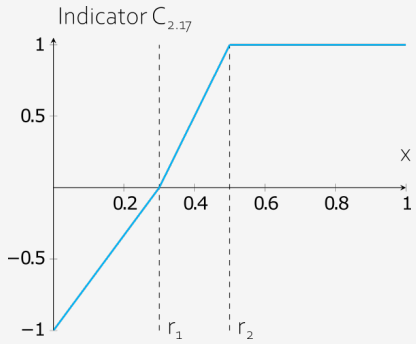
#C2.17
Investments in R&D /
Investitionen in F&E

Related SDG(s)

9.5 "Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending"

Description

The SDG aims to enhance research and development (R&D) and to encourage innovation. The contribution of companies is to raise the share of income spent on research & development. The SDG is reached, when the share of expenses based on income spent on R&D is equal to the average of 3 Industry leaders in the sector per income (C2.17=+1). There is a neutral contribution to the SDG when the expenses spent on R&D is equal to the national country-branch average. The function is expressed as linear as each additional resource spent on R&D is considered a positive contribution. The target value is based on the average of 3 Industry leaders in the sector per income.



- C2.17 = +1:
Average share of expenses spent on R&D of the three industry leaders measured by income

- C2.17 = 0:
National country-branch average of expenses spent on R&D

Type

Comprehensive indicator

Equation

$$C_{2.17} = \begin{cases} 1, & for\ x > r_2 \\ x * \frac{1}{r_1} - 1, & for\ x < r_1 \\ x * \frac{1}{(1 - r_1 - r_2)} - \frac{r_1}{(1 - r_1 - r_2)}, & for\ r_1 \leq x \leq r_2 \end{cases}$$

Input parameters

x = share of investments in R&D based on income
r1 = national country-branch average
r2 = average share of 3 industry leaders in the sector

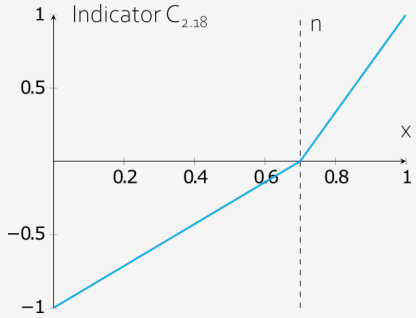
#C2.18
Relative poverty rate /
Relative Armutsquote

Related SDG(s)

10.2 "By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status"

Description

The SDG aims to empower and promote the social, economic and political inclusion of all people. The GIF-SDG proposes to measure the proportion of people living below 50% of median income to ensure economic inclusion. This indicator thus measures the percentage of workers that earn less than 50% of median disposable income in the specific country in the value chain. The SDG is reached when none of the workers earn below the relative poverty rate (C2.18=+1). There is a neutral contribution to the SDG when the proportion of workers earning below the relative poverty rate matches the proportion of population below the relative poverty line in the respective country (C2.18=0). The function is expressed as linear as each additional employee that earns above the relative poverty rate is considered a positive contribution to the SDG. The target value is based on the UN principle "Leave no-one behind".



- C2.18 = +1:
No workers earn below the relative poverty rate

- C2.18 = 0:
The proportion of workers earning below the relative poverty rate matches the proportion of population below the relative poverty line in the respective country

Type

Core indicator (Human Rights)

Equation

$$C_{2.18} = \begin{cases} 1, & for\ n = 1 \\ x * \frac{1}{n} - 1, & for\ x < n \\ x * \frac{1}{(1-n)} - \frac{n}{(1-n)}, & for\ x \geq n \end{cases}$$

Input parameters

x = share of workers/employees that earn **above** relative poverty line
n = proportion of workers/employees that earn above relative poverty line in the respective country

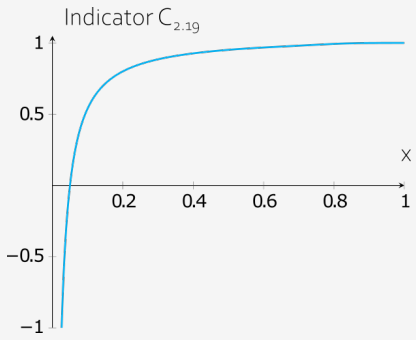
#C2.19
Income Spread /
Einkommensspreizung

Related SDG(s)

10.1 "By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average"
10.3 "Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard"

Description

The SDGs' focus is on reducing inequalities within societies. An indicator to measure this is the so-called Palma ratio, that measures the spread of income in a country. It compares the sum of the income received by the 10% inhabitants with the highest disposable income to the sum of the income received by the 40% inhabitants with the lowest disposable income. Applied to organisations, this means to put a focus on having a just spread of incomes within an organisation and thus it requires to build the ratio of the highest income to the lowest income in the organisation. According to the Economy for the Common Good[12], the spread between the highest and lowest income within a company should be in the worst case 1:20, a spread of 1:5 is considered good, but still leaves room for improvement. Thus, based on expert judgement, a neutral contribution (C2.19 = 0) to the SDGs was set at x = 0.05 (1:20), an 80% contribution (C2.19 = 0.8) was set at x = 0.2 (1:5). The target value is based on expert judgement (model of the Economy for the Common Good).



Type

Comprehensive indicator

Equation

$$C_{2.19} = \frac{1.0457 * x^{1.0449} - 0.0457}{x^{1.0449}}$$

Input parameters

x = proportion of lowest to highest income

[12] Blachfellner M, Drosg-Plöckinger A, Fieber S, Hofielen G, Knakrügge L, Kofranek M, Koloo S, Loy C, Rüther C, Sennes D, Sörgel R, Teriete M (2017): Arbeitsbuch zur Gemeinwohlbilanz 5.0 – Vollbilanz.
Download: https://www.ecogood.org/de/ (checked last at 06/03/2020)

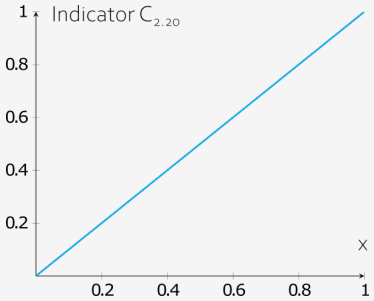
#C2.20
Product-related sustainability information /
Produktbezogene Nachhaltigkeitsinformationen

Related SDG(s)

12.6 "Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle"
12.8 "By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature"
14.4 "By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics"

Description

The SDGs refer to offering publicly available information on sustainability about the product or service. Information should be given regarding the sustainability performance of the companies that produce the product resp. offer the service (organisational level, e.g. within a sustainability report, SDG 12.6), and regarding the product or service itself, including its value chain(s) (SDG 12.8). The information regarding the product or service includes, if applicable, information on fishing practices (SDG 14.4). The SDG is reached when sustainability information is disclosed comprehensively based on GRI 417-1 (C2.20=+1). There is a neutral contribution when no sustainability information is disclosed (C2.20=0) because it is not assumed to have negative impacts from lacking information. The function is expressed as linear as each additional sustainability information that is disclosed contributes positively to the SDG. The target value is based on the complete disclosure of sustainability information based on GRI 417-1.



- C2.20 = +1:
The Product has all types of sustainability information available requested by GRI 417-1

- C2.20 = 0:
No product sustainability information is available

GRI 417-1[13] differentiates five different types of product or service-related information (incl. labelling) on: a1) the sourcing of components of the product or service (origin), a2) content, particularly with regard to substances that might produce an environmental or social impact, a3) safe use of the product or service, a4) disposal of the product and environmental or social impacts (including packaging), a5) other product-related sustainability information (to be explained). With respect to the SDGs (see above) the category a6) sustainability report of the company was added.

Type

Comprehensive indicator

Equation

$$C_{2.20} = x = \frac{1}{6} \cdot \sum_{i=1}^{6} a_i$$

Input parameters

Boolean operator (value either 1 or 0) for available information on
a1 = sourcing of components of the product or service (origin)
a2 = content, particularly with regard to substances that might produce an environmental or social impact
a3 = safe use of the product or service
a4 = disposal of the product and environmental or social impacts (including packaging)
a5 = other product-related sustainability information (to be explained)
a6 = sustainability report of the company

[13] Global Reporting Initiative, Marketing and Labeling:
https://www.globalreporting.org/standards/media/1032/gri-417-marketing-and-labeling-2016.pdf (checked last at 17/02/2020)

3 ZNU
— *CENTER FOR SUSTAINABLE LEADERSHIP*

ZNU is an applied research institute founded by Dr. Christian Geßner and Dr. Axel Kölle in the Faculty of Economics at the University of Witten/Herdecke. The focus of ZNU is on the practical measurement of sustainability at company and product level. In addition, ZNU works to inspire people for sustainable successful business and to enable them to shape sustainable change in their companies from within.

In particular, the ZNU Standard of sustainable management was developed for this purpose, which supports companies to manage their operations more sustainably and to make an active, measurable contribution to sustainable change in economy and society. The ZNU Standard demands improvement, activates potentials at the locations, promotes the development of more sustainable processes and products and enables a systematic differentiation in competition.

The ZNU management standard is now supplemented by the *SEP - SDG Evaluation of Products* method. It allows to analyze and evaluate the contribution of products to sustainability along the respective value chains and to identify optimization potentials.

If you have any questions regarding the use of *SEP*, please contact us at znu@uni-wh.de. We are happy to support you on your way to a sustainable future.

Contact at the ZNU for the method SDG-evaluation of products (*SEP*):
Dr. Ulrike Eberle, Head of Research

Email: *znu@uni-wh.de*

Further information:
www.sdg-evaluation.com

4 ANNEX
— *SDGS RELATED TO INDICATOR #C2.3*

SDG 2.4	"By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality"
SDG 3.6	"By 2020, halve the number of global deaths and injuries from road traffic accidents"
SDG 5.1	"End all forms of discrimination against all women and girls everywhere"
SDG 6.5	"By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate"
SDG 6.6	"By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes"
SDG 7.3	"By 2030, double the global rate of improvement in energy efficiency"
SDG 8.7	"Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms"
SDG 8.8	"Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment"
SDG 9.3	"Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets"
SDG 12.2	"By 2030, achieve the sustainable management and efficient use of natural resources"
SDG 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"
SDG 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"
SDG 13.2	"Integrate climate change measures into national policies, strategies and planning"
SDG 14.2	"By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans"

SDG 15.1	"By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements"
SDG 15.2	"By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally"
SDG 15.3	"By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world"
SDG 15.4	"By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development"
SDG 15.5	"Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species"
SDG 15.6	"Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed"
SDG 15.8	"By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species"
SDG 15.9	"By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts"
SDG 15.a	"Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems"
SDG 15.b	"Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation"
SDG 16.5	"Substantially reduce corruption and bribery in all their forms"
SDG 16.a	"Strengthen relevant national institutions, including through international cooperation, for building capacity at all levels, in particular in developing countries, to prevent violence and combat terrorism and crime"
SDG 17.11	"Significantly increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports by 2020"
SDG 17.16	"Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries"
SDG 17.17	"Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships Data, monitoring and accountability"

IMPRESSUM

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