SDG indicator metadata

(Harmonized metadata template - format version 1.1)

0. Indicator information (SDG_INDICATOR_INFO)

0.a. Goal (SDG_GOAL)

Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

0.b. Target (SDG_TARGET)

Target 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

0.c. Indicator (SDG_INDICATOR)

Indicator 2.4.1: Proportion of agricultural area under productive and sustainable agriculture

0.d. Series (SDG_SERIES_DESCR)

AG_LND_SUST_PRXTS - [PROXY] Progress toward productive and sustainable agriculture, trend score [2.4.1]

AG_LND_SUST_PRXCSS - [PROXY] Progress toward productive and sustainable agriculture, current status score [2.4.1]

0.e. Metadata update (META_LAST_UPDATE)

2024-07-01

0.f. Related indicators (SDG_RELATED_INDICATORS)

It links to:

Indicator 2.3.1: Productivity of small-scale food producers

Indicator 2.3.2: Average income of small-scale food producers, by sex and indigenous status

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

Indicator 8.3.1: Informal employment in agriculture

0.g. International organisations(s) responsible for global monitoring (SDG_CUSTODIAN_AGENCIES)

Food and Agriculture Organization of the United Nations (FAO)

1. Data reporter (CONTACT)

1.a. Organisation (CONTACT_ORGANISATION)

Food and Agriculture Organization of the United Nations (FAO)

2. Definition, concepts, and classifications (IND_DEF_CON_CLASS)

2.a. Definition and concepts (STAT_CONC_DEF)

Over the past 30 years, the definition and measurement of sustainable agriculture has been much debated. According to the 2030 Agenda for Sustainable Development, the performance of all sectors, including agriculture, must be assessed against the three dimensions of sustainability: economic, social and environmental. Until recently, there has been no internationally agreed method to measure sustainable agriculture. The SDG process created the opportunity to develop a commonly accepted measurement method. SDG target 2.4 requires that by 2030, countries "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". During a meeting in December 2022, the Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs), which governs the overall SDG monitoring process, endorsed the new methodology relating to SDG indicator 2.4.1, which operationalizes an internationally agreed definition of sustainable agriculture.

2.b. Unit of measure (UNIT_MEASURE)

For each country, scores are assigned to each sub-indicator based on the applicable method described in Annexes 1 and 2, and the average score determines the classification of the country into one of five bands with respect to the trend towards productive and sustainable agriculture as well as status with respect to productive and sustainable agriculture, as follows:

Score	Trend towards productive and sustainable agriculture
1 –< 1.5	Band 1: Deterioration away from productive and sustainable agriculture
1.5 –< 2.5	Band 2: Slight deterioration from productive and sustainable agriculture
2.5 –< 3.5	Band 3: No improvement towards productive and sustainable agriculture
3.5 –< 4.5	Band 4: Slight improvement towards productive and sustainable agriculture
4.5 – 5	Band 5: Improvement towards productive and sustainable agriculture

Score	Current status with respect to productive and sustainable agriculture
1 –< 1.5	Band 1: Very far from achieving productive and sustainable agriculture
1.5 –< 2.5	Band 2: Far from achieving productive and sustainable agriculture
2.5 –< 3.5	Band 3: At a moderate distance to achieving productive and sustainable agriculture
3.5 –< 4.5	Band 4: Close to achieving productive and sustainable agriculture
4.5 – 5	Band 5: Productive and sustainable agriculture already achieved

2.c. Classifications (CLASS_SYSTEM)

The land area classification is the FAO Land Use Classification, as implemented in the FAO Land Use, Irrigation and Agricultural Practices Questionnaire (http://www.fao.org/faostat/en/#data/RL/metadata). It is consistent with the classification of the Census of Agriculture and the System of Environmental and Economic Accounts (SEEA).

3. Data source type and data collection method (SRC_TYPE_COLL_METHOD)

3.a. Data sources (SOURCE_TYPE)

The SDG 2.4.1. sub-indicators allow for monitoring seven distinct themes, using national statistics available either directly in countries, or sourced as default from existing UN databases, mostly from FAOSTAT (Table 1). The annual *Questionnaire on Land Use, Irrigation and Agricultural Practices*, which collects national data on land use (primarily focusing on agriculture, forestry, aquaculture and fisheries), irrigation and agricultural practices, SDG indicator 6.4.2 (based on responses to the AQUASTAT Questionnaire) and SDG indicator 8.3.1 form the basis of data compilation for deriving this indicator. The choice of the seven sub-indicators proxies for SDG 2.4.1 is based on recent FAO work (Progress Towards Monitoring Sustainable Agriculture, Tubiello et al., 2021). Information may be complemented with statistics from national statistical yearbooks and other official publications and information from governmental data portals.

3.b. Data collection method (COLL_METHOD)

Data for the 7 sub-indicators measures are collected and analysed directly at national level. FAO Questionnaires on Land Use, Irrigation and Agricultural Practices and AQUASTAT, are disseminated annually to relevant national entities. The measure based on SDG 8.3.1 is prepared by International Labour Organization (ILO) in close consultation with national governments.
The list of the relevant FAO Questionnaires and their purpose are as follows:

Land Use, Irrigation and Agricultural Practices: Data on land use (primarily focusing on agriculture, forestry, aquaculture and fisheries), irrigation and agricultural practices.

Crop and Livestock Production and Utilization: Data on primary crop production data, primary crop utilization data, area harvested, live animals number data, primary livestock production and loss data, oils utilization data, selected derived agricultural commodities production data.

Fertilizers: Data on production, agricultural use and other uses of fertilizers (both chemical and organic)

AQUASTAT: Data on water withdrawals by sectors and by sources, wastewater and irrigated areas.

Prices Received by Farmers: Primary Crop and Livestock Products: Data on agricultural producer prices for primary crops and livestock.

3.c. Data collection calendar (FREQ_COLL)

FAO Questionnaires Dispatch Dates:

Land Use, Irrigation and Agricultural Practices: October
Crop and Livestock Production and Utilization: May
Fertilizers: October
AQUASTAT: May
Prices Received by Farmers: Primary Crop and Livestock Products: May

3.d. Data release calendar (REL_CAL_POLICY)

Annual data dissemination schedules are as follows:
Land Use, Irrigation and Agricultural Practices: June 30
Crop and Livestock Production and Utilization: December 23
Fertilizers: June 30
AQUASTAT: January
Prices Received by Farmers: Primary Crop and Livestock Products: December
Data for SDG 8.3.1 are released annually by the ILO

3.e. Data providers (DATA_SOURCE)

Data are provided by various governmental sources serving as official focal points. The institutions responsible for data collection at national level vary according to countries, including Ministry of Agriculture, Ministry of Water, Ministry of Environment, other relevant line Ministries and the National Statistics Office (NSO).

3.f. Data compilers (COMPILING_ORG)

Food and Agriculture Organization of the United Nations

3.g. Institutional mandate (INST_MANDATE)

Article I of the FAO constitution requires that the Organization collect, analyses, interpret and disseminate information relating to nutrition, food and agriculture http://www.fao.org/3/K8024E/K8024E.pdf.

4. Other methodological considerations (OTHER_METHOD)

4.a. Rationale (RATIONALE)

The SDG 2.4.1 Proxy offers a simplified methodology for monitoring progress on SDG 2.4.1 ''Proportion of agricultural area under productive and sustainable agriculture'' based on national level statistic (Tubiello et al., 2021). The SDG 2.4.1 Proxy consists of seven sub-indicators computable from existing national statistics, with a default option to source data from FAOSTAT. A set of simple rules to assess status and trend of each sub-indicator and determine aggregate scores is also provided, based on the UN Global SDG Progress Chart and the FAO SDG Progress Report. The 7 sub-indicators cover relevant socio-economic and environmental dimensions of sustainability and are based on readily available statistics already collected by FAO from member countries, thus easing the SDG data collection burden on national entities.

4.b. Comment and limitations (REC_USE_LIM)

The scoring system for the indicator scores allows for a current status and trend overview for each of the measures which comprise the indicator, and the overall status and trend towards productive and sustainable agriculture. Therefore, in the absence of sufficient data to produce the indicator, status and trend assessment of available sub-indicators is possible.

4.c. Method of computation (DATA_COMP)

The 7 measures are assessed both in terms of the direction and consistency of their trend and in terms of their current status according to the system-wide methodology adopted for the global SDG Progress Chart, and also by FAO itself for its SDG Progress Report. Of the 7 indicators, only one has a clearly defined numerical target, whereas a further 3 have a conventionally or scientifically established upper bound, which, however, cannot serve as a normative target for the purpose of this progress assessment, given that countries that lie below this upper bound should not necessary strive to reach the upper bound.
Therefore, the four main progress assessment methods, considering the trend and the current status for indicators with and without a numerical target, are as follows:

Trend assessment for indicators with a numerical target: Ratio actual vs. required (CR)	Trend assessment for indicators without a numerical target: actual growth (CAGR) compared to baseline
Status assessment for indicator with a numerical target: distance to the target	Status assessment for indicators without a numerical target: quintile distribution

The compound annual growth rate (CAGR) for is calculated as:

$$CAGR_a = \left(\frac{x_t}{x_{t_0}}\right)^{\frac{1}{t-t_0}} - 1$$

where t_0 (2015) is the beginning of the assessment period. The ratio of actual vs. target growth rate (CR) is calculated as:

$$CR = \frac{CAGR_a}{CAGR_r} = \frac{\left(\frac{x_t}{x_{t_0}}\right)^{\frac{1}{t-t_0}} - 1}{\left(\frac{x^*}{x_{t_0}}\right)^{\frac{1}{2030-t_0}} - 1}$$

A full methodological note for each of the 7 measures and the two different assessment approaches can be found in the Annex 2.

Translation of progress assessment into a country score:

1. Example of country results

Country results are disseminated through a set of complementary modalities, including an aggregate score, a dashboard based on traffic-light colours, and a full dataset of absolute values for each of the 7 sub-indicators. The global SDG database will only disseminate aggregate country scores for current status

and trend toward productive and sustainable agriculture. More granular scores at the level of the 7-sub-indicators, along with complementary dashboards and visualizations can be accessed through FAO's dedicated shinyapp here: https://foodandagricultureorganization.shinyapps.io/SDG_241_PROXY/

a) **Aggregate single-country score**

For each country, scores assigned to each sub-indicator based on the applicable method described in Annexes 2 and 3 are averaged, and the average score determines the classification of the country into one of five bands with respect to the trend towards productive and sustainable agriculture as well as status with respect to productive and sustainable agriculture, as follows:

Score	Trend towards productive and sustainable agriculture
1 –< 1.5	Band 1: Deterioration away from productive and sustainable agriculture
1.5 –< 2.5	Band 2: Slight deterioration from productive and sustainable agriculture
2.5 –< 3.5	Band 3: No improvement towards productive and sustainable agriculture
3.5 –< 4.5	Band 4: Slight improvement towards productive and sustainable agriculture
4.5 – 5	Band 5: Improvement towards productive and sustainable agriculture

Score	Current status with respect to productive and sustainable agriculture
1 –< 1.5	Band 1: Very far from achieving productive and sustainable agriculture
1.5 –< 2.5	Band 2: Far from achieving productive and sustainable agriculture
2.5 –< 3.5	Band 3: At a moderate distance to achieving productive and sustainable agriculture
3.5 –< 4.5	Band 4: Close to achieving productive and sustainable agriculture
4.5 – 5	Band 5: Productive and sustainable agriculture already achieved

The two conditions for proceeding to the calculation (if not met, no score is calculated) are:

1) A minimum of 4 out of 7 sub-indicator are available for the country
2) A minimum of 1 sub-indicator for social & economic dimension and 2 sub-indicators for the environmental dimension

b) **Single country dashboard**

For additional insight into the situation of a particular country, it is possible to display a dashboard of results for its trend and current status with respect to productive and sustainable agriculture. In the example below, we can see that the country is making slight or good progress towards a number of sub-indicators, yet it is still far or very far from the target for most indicators.

By applying the scoring system, the country will be categorized into Band 4 with respect to trend and into Band 2 with respect to Current Status. Therefore, the country is making "slight improvement towards productive and sustainable agriculture", even though it is still "far from achieving productive and sustainable agriculture".

Table 2. Country level dashboard example

Proposed Proxy measure	Trend	Current status
Gross production value per hectare	5	2
Gross output diversification	5	2
Nitrogen use efficiency	4	3
Agriculture component of water stress	1	1
GHG emissions intensity in agriculture	3	2
Agricultural value added per worker	4	4
Informal employment in agriculture	1	1
Average score	3.3	2.4

4.d. Validation (DATA_VALIDATION)

Of the 7 sub-indicators, two are components of SDG indicators (8.3.1 and 6.4.2) and are considered official data. The other six sub-indicators are based on either official data provided by the country to FAO or estimated by FAO as part of its mandate on food and agriculture statistics. The entire set of country values pertaining to the six metrics based on FAO estimates are shared with National Statistical Offices by the FAO Chief Statistician, and considered validated unless the country objects to their publication.

4.e. Adjustments (ADJUSTMENT)

Not applicable

4.f. Treatment of missing values (i) at country level and (ii) at regional level (IMPUTATION)

Imputation methods of the sub-indicators are domain-specific and are applied at country level. Estimates by FAO are produced by a variety of methods, such as imputation, interpolation, modelling, etc. For reporting of the sub-indicators within SDG 2.4.1, carry-forward, linear interpolation, and carry-backwards routines are applied to the underlying input data.

(i) At the country level, in order to compute scores the following conditions need to both apply:

1) At least 4 sub-indicators are available for the country, of which:
2) At least 1 covers the socio-economic dimension and at least 2 cover the environmental dimension.

Country aggregate scores are calculated as a simple average across the indicators.

(ii) There is no additional treatment of missing values at the regional level.

4.g. Regional aggregations (REG_AGG)

At the regional level, scores are calculated using a weighted average of the country scores, with agricultural land as the weighting variable. Missing countries or those that do not meet the criteria above are not included in the aggregates, and the implicit assumption is that these countries perform the same as the neighbouring countries in the region.

4.h. Methods and guidance available to countries for the compilation of the data at the national level (DOC_METHOD)

Countries compile the data through annual submissions to the following FAO Questionnaires:

Land Use, Irrigation and Agricultural Practices, Crop and Livestock Production and Utilization, Fertilizers, AQUASTAT, and Prices Received by Farmers: Primary Crop and Livestock Products, as well as undertaking the well-established processes to report on SDG indicators 6.4.2 and 8.3.1. Underlying sources of data from countries include agricultural censuses and surveys.

4.i. Quality management (QUALITY_MGMNT)

The underlying data collected from FAO undergo rigorous quality assurance quality control (QAQC) procedures. These include the checking of totals, visual inspection of updated data and revisions vs previously disseminated data, and comparisons with alternative data sources.

4.j Quality assurance (QUALITY_ASSURE)

FAO is responsible for the quality of the internal statistical processes used to compile the published datasets. The FAO Statistics Quality Assurance Framework (SQAF), available at: http://www.fao.org/docrep/019/i3664e/i3664e.pdf, provides the necessary principles, guidelines and tools to carry out quality assessments. FAO performs an internal bi-annual survey (FAO Quality Assessment and Planning Survey) designed to gather information on all of FAO's statistical activities, notably to assess the extent to which quality standards are being implemented with a view to increasing compliance with the quality dimensions of SQAF, documenting best practices and prepare quality improvement plans, where necessary. Domain-specific quality assurance activities are carried out systematically (e.g. quality reviews, self-assessments, compliance monitoring).

4.k Quality assessment (QUALITY_ASSMNT)

The responsible officer conducts a self-assessment of the calculation process and its outputs on the basis of the FAO Statistics Quality Assurance Framework (SQAF). The SQAF considers the following principles: relevance, accuracy and reliability, timelessness and punctuality, coherence and comparability, and accessibility and clarity.

5. Data availability and disaggregation (COVERAGE)

Data availability: The measures are established and widely available ("Tier I"-type) indicators that FAO has disseminated for many years through FAOSTAT and AQUASTAT (seven indicators have a country coverage that is higher than 80%, while the informal employment in agriculture indicator for rural areas currently has a country coverage slightly over 50%).
Time series: 2015 to T – 2, where T is the current calendar year.
Disaggregation: Data for the 7 measures are collected and analysed directly at national level.

6. Comparability / deviation from international standards (COMPARABILITY)

Not applicable since FAO shall compile indicators for all countries.

7. References and Documentation (OTHER_DOC)

Tubiello, F.N., Wanner, N., Asprooth, L., Mueller, M, Ignaciuk, A., Khan, A. A. & Rosero Moncayo, J., 2021. Measuring progress towards sustainable agriculture. FAO Statistics Working Paper 21-24. Rome, FAO.

https://doi.org/10.4060/cb4549en FAO. 1988. Report of the FAO Council, 94th Session, 1988. FAO, Rome, Italy

Annex 1: Description of the sub-indicators

1. Gross production value per hectare
Formula:

Gross production value per hectare = $\frac{Gross\ Production\ Value\ Agriculture}{Agricultural\ Land}$

Numerator (Gross Production Value Agriculture): Value of gross production has been compiled by multiplying gross production in physical terms by output prices at farm gate. Thus, value of production measures production in monetary terms at the farm gate level. Since intermediate uses within the agricultural sector (seed and feed) have not been subtracted from production data, this value of production aggregate refers to the notion of "gross production".

Denominator (Agriculture Land): Land used for cultivation of crops and animal husbandry. The total of area under ''Cropland'' and ''Permanent meadows and pastures.''

Unit of measure: $\frac{\text{Constant 2014–2016 I \$}}{\text{1000 hectares}}$

Data sources:
Numerator: FAOSTAT Value of Agricultural Production Domain
https://www.fao.org/faostat/en/#data/QV
Denominator: FAOSTAT Land Use Domain
https://www.fao.org/faostat/en/#data/RL

2. Gross output diversification

Formula:

Gross output diversification = $1 - \sum(\frac{Gross\ Production\ Value_{cit}}{Gross\ Production\ Value_{it}})^2$

C= crop
I = country
t = year

Unit of measure: unitless

Data source:

FAOSTAT Value of Agricultural Production Domain

https://www.fao.org/faostat/en/#data/QV

3. Cropland nitrogen use efficiency

Formula: The nutrient budget (NB) is calculated as the sum of inputs: synthetic fertilizers (SF) multiplied by the fraction of fertilizer applied to cropland (CF), manure applied to soils (MAS), nitrogen deposition (ND), and biological fixation (BF), and seed (SD) minus outputs: crop removal (CR).

Thus: the Nutrient Budget (NB) for country *i* for nutrient *j* for year *y* is calculated as:

$NB_{i,j,y} = sum(SF_{i,j,y} \times CF_{i,j,y}, MAS_{i,j,y}, ND_{i,j,y}, BF_{i,j,y}, SD_{i,j,y}) - CR_{i,j,y}$

The Nutrient Use Efficiency (NUE) for country I for nutrient j for year y is calculated as:

$NUE_{i,j,y} = Cri_{,j,y}/sum(SF_{i,j,y} \times CF_{i,j,y}, MAS_{i,j,y}, ND_{i,j,y}, BF_{i,j,y}, SD_{i,j,y})$

Unit of measure: %
"A global reference database in FAOSTAT of cropland nutrient budgets and nutrient use efficiency: nitrogen, phosphorus and potassium, 1961–2020"
Ludemann, C. (Creator), Wanner, N. (Creator), Chivenge, P. (Creator), Dobermann, A. (Creator), Einarsson, R. (Creator), Grassini, P. (Creator), Gruere, A. (Creator), Jackson, K. (Creator), Lassaletta, L. (Creator), Maggi, F. (Creator), Obli-Laryea, G. (Creator), van Ittersum, M. (Creator), Vishwakarma, S. (Creator), Zhang, X. (Creator) & Tubiello, F. N. (Creator), 2 Jun 2023

DOI: 10.5061/dryad.hx3ffbgkh

Data sources:

Synthetic fertilizers:

Data: "Fertilizers by Nutrient" domain in FAOSTAT

http://fenix.fao.org/faostat/internal/en/#data/RFN

Coefficients: The cropland fraction estimates were derived from 4 exisiting datasets

Zou, T., et. al. Global trends of cropland phosphorus use and sustainability challenges. Nature (2022).

Manure applied to soils

Data: "Manure applied to Soils" domain in FAOSTAT

http://fenix.fao.org/faostat/internal/en/#data/GU

Coefficients: OECD Secretariat 1997, USA (Midwest Plan Service 1985) and Europe (Levington Agriculture 1997) and from Sheldrick et al (2003). Statistics Netherlands (2012).

Atmospheric Deposition:

Data: Vishwakarma, Srishti et al. (2022), Quantifying nitrogen deposition inputs to cropland: A national scale dataset from 1961 to 2020, Dryad, Dataset.

Crop Removal:

Data: Primary Crops under the domain "Crops and livestock products"

https://www.fao.org/faostat/en/#data/QCL

Coefficients: Ludemann et al (2022) Global data on crop nutrient concentration and harvest indices

https://doi.org/10.5061/dryad.n2z34tn0x

Biological Fixation :

Data : Primary Crops under the domain "Crops and livestock products"

https://www.fao.org/faostat/en/#data/QCL

Methods: Peoples et al. (2021) and Herridge et al. (2022).

4. Agriculture component of water stress

Formula:

Agriculture component of water stress = $\frac{\text{TFWW}}{(\text{TRWR} - \text{EFR})} * 100\%$

TFWW: the total freshwater withdrawn (km3 /year (109 m3 /year))
TRWR: the difference between the total renewable freshwater resources km3 /year (109 m3 /year))
EFR: the environmental flow requirements (km3 /year (109 m3 /year))
While for the overall SDG indicator 6.4.2., values below 25% are considered safe (no stress), whereas values over 25% are classified into four different levels of severity, for the agriculture component of the indicator, adjusted thresholds have been determined at 70 percent of these conventional thresholds at aggregate national level, considering that globally, agriculture is responsible for 70 percent of all water withdrawals. Therefore, a water stress level for the agriculture component of below 17.5% is considered safe, a level of between 17.5% and 35% is considered to be low stress, and so on.

Unit of measure: Percentage

Data source: https://www.fao.org/sustainable-development-goals/indicators/642/en/
https://unstats.un.org/sdgs/dataportal

5. GHG emissions intensity in agriculture

Formula:

Green House Gas Emissions Intensity = $\frac{Emissions\ (Farm\ gate)}{Value\ of\ Agricultural\ Production} * 100\%$

Numerator (Farm gate emissions): Emissions from drained organic soils, cultivation of histosols, inorganic N fertilizers, crop residues, manure deposited on pasture, range and paddock, manure applied to soils, manure management, enteric fermentation, prescribed burning of savanna, burning crop residues, rice cultivation, and on-farm energy use.

Denominator (Value of Agricultural Production): Value of gross production has been compiled by multiplying gross production in physical terms by output prices at farm gate.

Unit of measure: kg CO_2 equivalent per constant 2014-2016 USD

Data source:

FAOSTAT Climate Change: Agrifood system emissions Emissions totals domain

https://www.fao.org/faostat/en/#data/GT

FAOSTAT Value of Agricultural Production Domain

https://www.fao.org/faostat/en/#data/QV

6. Agricultural value added per worker

Formula:

$$\text{Agricultural value added per worker} = \frac{\text{Value added in agriculture,forestry and fisheries}}{\text{Number of people employed in agriculture}}$$

This indicator provides information on the output of the agricultural sector by worker engaged. It is a measure of agricultural productivity. The data on the value added in agriculture, forestry and fisheries is extracted from FAOSTAT and then divided by the number of people employed in agriculture (in broad sense) extracted from ILOSTAT for a given year in a given country.

Unit of measure: US$ (2015 prices) per worker

Data source:

FAOSTAT Employment Indicators: Agriculture Domain
http://www.fao.org/faostat/en/#data/OE

7. Informal employment in agriculture

SDG Indicator 8.3.1 Proportion of informal employment in total employment, disaggregated by the agricultural sector

Informal employment comprises persons who in their main or secondary jobs were in one of the following categories: - Own-account workers, employers and members of producers' cooperatives employed in their own informal sector enterprises (the characteristics of the enterprise determine the informal nature of their jobs) - Own-account workers engaged in the production of goods exclusively for own final use by their household (e.g. subsistence farming) - Contributing family workers, regardless of whether they work in formal or informal sector enterprises (they usually do not have explicit, written contracts of employment, and are not subject to labour legislation, social security regulations, collective agreements, etc., which determines the informal nature of their jobs) - Employees holding informal jobs, whether employed by formal sector enterprises, informal sector enterprises, or as paid domestic workers by households (employees are considered to have informal jobs if their employment relationship is, in law or in practice, not subject to national labour legislation, income taxation, social protection or entitlement to certain employment benefits) For the purpose of classifying persons into formal or informal employment for this indicator, only the characteristics of the main job are considered.

Unit of measure: Percentage

Data sources: ILO Stat

https://ilostat.ilo.org/topics/informality/

Annex 2: Methods for assessing the current status

Dimension	2.4.1 sub-indicator theme	Proposed Proxy measure	Numerical target
Economic	Land productivity	Gross production value per hectare	No
Economic	Resilience	Gross output diversification	No
Environment	Soil quality	Nitrogen use efficiency	Yes
Environment	Water availability	Agriculture component of water stress (6.4.2 disaggregation)	Yes
Environment	[No equivalent theme]	GHG emissions intensity	No
Social	Food Security	Agricultural value added per worker (link to 2.3.2)	No
Social	Decent employment	Proportion of informal employment in agriculture	No

1.1 Indicators with a numerical target

The current distance to the target is calculated only when a numerical target exists, as follows:

$$d_{it} = \begin{cases} x^* - x_{it}, & \text{when the desired direction is an increase over time} \\ x_{it} - x^*, & \text{when the desired direction is a decrease over time} \end{cases}$$

Here x_{it} denotes the numerical value of the generic indicator for country *i* in year *t*; while x^* is the target value of the generic indicator (to be reached by 2030). This distance measure is 0 for indicators having already reached the target at the time of the assessment.

a) SDG indicator 6.4.2, agriculture component

For this indicator, thresholds have been determined that are set at 70 percent, the conventional thresholds for the severity levels of water stress at aggregate national level (as per metadata of SDG indicator 6.4.2), considering that globally, agriculture is responsible for 70 percent of all water withdrawals. The current distance to the target for the agriculture component of SDG indicator 6.4.2 is therefore calculated as follows: *Where* x is the level of water stress attributable to agriculture

Bounds	Color	Meaning	Score
$x \leq$ **17.5 percent**	Dark green	Target already met	5
$17.5 < x \leq 35\ percent$	Light green	Close to the target	4
$35\ percent < x \leq 52.5\ percent$	Yellow	Moderate distance to the target	3
$52.5\ percent < x \leq 70\ percent$	Orange	Far from the target	2
$x > 70\ percent$	Red	Very far from the target	1
None	Grey	Missing data	1

b) Nitrogen Use Efficiency

For the cropland nitrogen use efficiency (NUE), the desired range is between 50% to 90%, based on a scientifically determined optimal target between 65% and 80%[1]. The assessment of the current status (last available data) will be conducted by calculating the distance to the target as shown below. The cropland NUE value *x* for country *i* in year *t* will be assessed as follows:

Bounds	Color	Meaning	Score
$50\% \leq x_{i,t} \leq 90\%$	Dark green	Target already met	5
$45\% \leq x_{i,t} < 50\%$ $90\% < x_{i,t} \leq 95\%$	Light green	Close to the target	4
$40\% \leq x_{i,t} < 45\%$ $95\% < x_{i,t} \leq 100\%$	Yellow	Moderate distance to the target	3
$35\% \leq x_{i,t} < 40\%$ $100\% < x_{i,t} \leq 105\%$	Orange	Far from target	2
$x_{i,t} < 35\%$ $x_{i,t} > 105\%$	Red	Very far from target	1
None	Grey	Missing data	1

1.2 Indicators without a numerical target

All the other six proxy measures will be treated as indicators without a numerical target, for which the distance to the target cannot be calculated. For analytical purposes, it is useful however to provide a summary picture that describes the current worldwide distribution of the indicator. For this reason, each country will be associated to the corresponding quintile. The quintiles divide the entire distribution of countries into five equal groups, according to their indicator value: the first quintile contains the bottom fifth of the countries on the indicators scale (i.e. the 20 % of the countries with the lowest value), the second quintile represents the second fifth (from 20 % to 40 %) and so on; finally the fifth quintile represents the top 20 % countries, i.e. those with the highest values for the indicator. A country's quintile categorization will earn it a corresponding score for the purposes of calculating its overall progress towards productive and sustainable agriculture, depending on the normative direction:

With an increasing normative direction

Quintile	Color	Meaning	Score
$q_{80\%} < x_{it} \leq q_{100\%}$	Dark green	Best performers	5
$q_{60\%} < x_{it} \leq q_{80\%}$	Light green	Above median performers	4
$q_{40\%} < x_{it} \leq q_{60\%}$	Yellow	Median performers	3
$q_{20\%} < x_{it} \leq q_{40\%}$	Orange	Below median performers	2
$q_{0\%} \leq x_{it} \leq q_{20\%}$	Red	Worst performers	1
None	Grey	Missing data	1

[1]Ludemann *et al*., 2023, in press https://essd.copernicus.org/preprints/essd-2023-206/essd-2023-206.pdf

With a decreasing normative direction

Quintile	Color	Meaning	Score
$q_{0\%} \leq x_{it} \leq q_{20\%}$	Dark green	Best performers	5
$q_{20\%} < x_{it} \leq q_{40\%}$	Light green	Above median performers	4
$q_{40\%} < x_{it} \leq q_{60\%}$	Yellow	Median performers	3
$q_{60\%} < x_{it} \leq q_{80\%}$	Orange	Below median performers	2
$q_{80\%} < x_{it} \leq q_{100\%}$	Red	Worst performers	1
None	Grey	Missing data	1

Annex 3: Method for assessing trend

The method to assess the trend distinguishes between indicators underpinning targets with and without a numerical yardstick.

2.1 Indicators with a numerical target

For indicators with a fixed numerical target, the trend is assessed by comparing the actual growth since the baseline year, with the growth required to achieve the target. Assuming a geometrical growth over time, the trend is assessed with the following mathematical expression[2]

$$CR = \frac{CAGR_a}{CAGR_r} = \frac{\left(\frac{x_t}{x_{t_0}}\right)^{\frac{1}{t-t_0}} - 1}{\left(\frac{x^*}{x_{t_0}}\right)^{\frac{1}{2030-t_0}} - 1}:$$

Against the following thresholds and categories as included in the technical annex of the global SDG Progress Chart:

Level or ratio CR	Color	Assessment category	Score
$x \leq x^*$	Dark green	Target already met	5
$CR \geq 0.95$	Light green	On-track to achieve the target	4
$0.5 < CR < 0.95$	Yellow	On-path, but too slow to achieve the target	3
$-0.10 \leq CR \leq 0.5$	Orange	No improvement (stagnation) since baseline	2
$CR < -0.10$	Red	Deterioration/movement away from the target (<<)	1
Missing data	Grey	None	1

2.2 Indicators without a numerical target (applies to all the other indicators)

For indicators without a set numerical target, which is the case for most of the suggested indicators in this proposal, it is only possible to assess the actual growth ($CAGR_a$ in the expression above) against two sets of thresholds and categories, which depend on the normative direction of the indicator

Therefore

[2] t_0 denotes the baseline year, while t indicates the current or considered year for the assessment

$$CAGR_a = \left(\frac{x_t}{x_{t_0}}\right)^{\frac{1}{t-t_0}} - 1$$

Different criteria can be used to assess the CAGR, depending on the sign of the normative direction and also on the fact that for some indicators a situation that remains unchanged over time (not increase or not decrease) can be judged positively.

Thresholds and categories when a positive outcome corresponds to an increase of the indicator

Levels of actual growth rate	Color	Assessment category	Score
$CAGR_a > 0.01$	Dark green	Improvement since baseline-year (>>)	5
$0.005 < CAGR_a \leq 0.01$	Light green	Slight improvement since baseline-year (>)	4
$-0.005 \leq CAGR_a \leq 0.005$	Yellow	No improvement since baseline-year (=)	3
$-0.01 \leq CAGR_a < -0.005$	Orange	Slight deterioration since baseline-year (<)	2
$CAGR_a < -0.01$	Red	Deterioration since baseline-year (<<)	1
Missing data	Grey	None	1

Thresholds and categories when a positive outcome corresponds to a decrease of the indicator

Levels of actual growth rate	Color	Assessment category	Score
$CAGR_a < -0.01$	Dark green	Improvement since baseline-year (>>)	5
$-0.01 \leq CAGR_a < -0.005$	Light green	Slight improvement since baseline-year (>)	4
$-0.005 \leq CAGR_a \leq 0.005$	Yellow	No improvement since baseline-year (=)	3
$0.005 < CAGR_a \leq 0.01$	Orange	Slight deterioration since baseline-year (<)	2
$CAGR_a > 0.01$	Red	Deterioration since baseline-year (<<)	1
Missing data	Grey	None	1