Context and Impact indicators

	Impact Indicator code	Context Indicator Code		Indicator name
		PMEF	CMEF (current)	
Population		C.01	**C.01**	Population numbers
		C.02	**C.04**	Population density
		C.03	**C.02**	Age structure of the population
Total area		C.04	**C.03**	Total area
		C.05	**C.31**	Land cover
Labour market	I.24	C.06	**C.05**	Employment rate in rural areas
		C.07	**C.07**	Unemployment rate in rural areas
		C.08		Employment
			C.11	By sector By type of region
			C.13	By economic activity
Economy	I.25	C.09	**C.08**	Gross Domestic Product per capita
	I.27	C.10	**C.09**	Poverty rate
		C.11		Gross value added
			C.10	By sector
			C.10	By type of region
				In agriculture
	I.8		**R.03_PI**	For primary producers
Farms and farmers		C.12	**C.17**	Agricultural holdings (farms)
		C.13	**C.22**	Farm labour force
		C.14	**C.23**	Age structure of farm managers
		C.15	**C.24**	Agricultural training of farm managers
	I.23	C.16		New farm managers and new young farm managers
Agricultural land		C.17	**C.18**	Utilised agricultural area
		C.18	**C.20**	Irrigable land
		C.19	**C.34**	Farming in Natura 2000 areas
		C.20	**C.32**	Areas facing natural and other specific constraints (ANCs)
	I.21	C.21		Agricultural land covered with landscape features
	I.22	C.22	**R.11**	Crop diversity
Livestock		C.23	**C.21**	Livestock units
		C.24		Livestock density

Agricultural and farm income	**I.3**	**C.25**	**C.25**	Agricultural factor income
	I.2	**C.26**	**C.26**	Comparison of agricultural income with non-agricultural labour costs
		C.27		Farm income
	I.4			by type of farming
				by region
				by farm size
	I.5			in Areas facing natural and other specific constraints
		C.28	**C.28**	Gross fixed capital formation in agriculture
Agricultural productivity	**I.6**	**C.29**	**C.27**	Total factor productivity in agriculture
		C.30		Labour productivity
			C.14	in agriculture
			C.15	in forestry
			C.16	in the food industry
Agricultural trade	**I.7**	**C.31**	**I.06**	Agricultural imports and exports
Other gainful activities		**C.32**	**C.30**	Tourism infrastructure
Farming practices		**C.33**	**C.19**	Agricultural area under organic farming
		C.34	**C.33**	Farming intensity
	I.29	**C.35**	**R.09_PI**	Value of production under EU quality schemes and organics
Biodiversity	**I.19**	**C.36**	**C.35**	Farmland Bird Index
	I.20	**C.37**		Percentage of species and habitats of Community interest related to agriculture with stable or increasing trends
Water	**I.17**	**C.38**		Water use in agriculture
		C.39		Water quality
	I.15		**C.40**	Gross nutrient balance – nitrogen
			C.40	Gross nutrient balance – phosphorus
	I.16			Nitrates in ground water
Soil	**I.11**	**C.40**	**C.41**	Soil organic carbon in agricultural land
	I.13	**C.41**	**C.42**	Soil erosion by water
Energy	**I.12**	**C.42**	**C.43**	Sustainable production of renewable energy from agriculture and forestry

		C.43	C.44	Energy use in agriculture, forestry and food industry
Climate	I.10	C.44	C.45	Greenhouse gas emissions from agriculture
	I.9	C.45		Agricultural sector resilience progress indicator
		C.46		Direct agricultural loss attributed to disasters
Air	I.14	C.47	C.45	Ammonia emissions from agriculture
Health	I.28	C.48		Sales/use of antimicrobials in food producing animals
	I.18	C.49		Risk, use and impacts of pesticides
Modernisation	I.1			Share of CAP budget for knowledge sharing and innovation
Fairness	I.26			Distribution of CAP support

Impact Indicators by objectives as modified by the Presidency

Specific Objective	Impact Indicator code	Context Indicator Code	Impact Indicator name
Modernising the sector by fostering knowledge, innovation and digitalisation in agriculture and rural areas and encouraging their uptake by farmers, through improved access to research, innovation, knowledge exchange and training	I.1		Sharing knowledge and innovation
Support viable farm income and resilience of the agricultural sector across the Union to enhance long-term food security and agricultural diversity as well as ensuring the economic sustainability of agricultural production in the Union	I.2	C.26	Reducing income disparities
	I.3	C.25	Reducing farm income variability
	I.4	C.27	Supporting viable farm income
	I.5	C.27	Contributing to territorial balance
Enhance market orientation and increase farm competitiveness both in the short and long term, including greater focus on research, technology and digitalisation	I.6	C.29	Increasing farm productivity
	I.7	C.31	Harnessing Agri-food trade
Improve the farmers' position in the value chain	I.8	C.11	Improving farmers' position in the food chain
Contribute to climate change mitigation and adaptation, including by reducing greenhouse gas emissions and enhancing carbon sequestration, as well as promote sustainable energy	I.9	C.45	Improving the resilience of agriculture to climate change
	I.10	C.44	Contributing to climate change mitigation
	I.11	C.40	Enhancing carbon sequestration
	I.12	C.42	Increasing sustainable energy in agriculture
Foster sustainable development and efficient management of natural resources such as water, soil and air, including by reducing chemical dependency	I.13	C.41	Reducing soil erosion
	I.14	C.47	Improving air quality
	I.15	C.39	Improving water quality
	I.16	C.39	Reducing nutrient leakage
	I.17	C.38	Reducing pressure on water resource
Contribute to halting and reversing biodiversity loss, enhance ecosystem services and preserve habitats and landscapes			
	I.18	C.49	Sustainable and reduced use of pesticides
	I.19	C.36	Increasing farmland bird populations
	I.20	C.37	Enhancing biodiversity protection
	I.21	C.21	Enhancing provision of ecosystem services
	I.22	C.22	Increasing agro-biodiversity in farming system
Attract and sustain young farmers and facilitate business development in rural areas Promote employment, growth, gender equality, social inclusion and local development in rural areas,	I.23	C.16	Attracting young farmers
	I.24	C.06	Contributing to jobs in rural areas
	I.25	C.09	Contributing to growth in rural areas
	I.26		A fairer CAP
	I.27	C.10	Promoting rural inclusion

including bio-economy and sustainable forestry			
Improve the response of Union agriculture to societal demands on food and health, including high quality, safe and nutritious food produced in a sustainable way, the reduction of food waste, as well as improving animal welfare and combatting antimicrobial resistances	**I.28**	**C.48**	Limiting antimicrobial use in farmed animals
	I.29	**C.35**	Responding to consumer demand for quality food

FICHE CONTENTS

Indicator Name	*Title of the indicator used in the commission implementing regulation/guidance documents*
Definition	*Concise definition of the concept, including if the indicator already exists, e.g. Agri-environmental indicator (AEI), EUROSTAT indicator. If appropriate, include the methodology/formula for establishment of the indicator*
Unit of measurement	*Unit used to record the value (e.g. ha, tonnes, €, %)*
Data source	*Identification of existing data sources (e.g. EUROSTAT identifying relevant data set, Farm Accountancy Data Network (FADN), European Environmental Agency, etc.)*
References/location of the data	*Links (other references) to data sources (e.g. in EUROSTAT specifying exact tables, FAO, World bank) AEI definitions, regulations establishing indicators, etc.*
Data collection / dissemination level	*Identification of the geographical level at which the data is available and at which level the indicator should be established*
Frequency	*Frequency at which the indicator is collected/calculated*
Timeliness	*How old are the data when they become available*
Comments/caveats	*Comments concerning interpretation of the indicator for monitoring and evaluation purposes and its caveats, if appropriate*

INDICATOR C.01	
Indicator Name	**Population numbers**
Definition	This indicator refers to the **population on 1st of January of any given year** and consists of 3 specific indicators: 1. **total population** 2. **share of total population by type of region** (predominantly rural, intermediate and predominantly urban) **and by degree of urbanisation** (cities, towns and suburbs, rural areas) 3. **share of total population by sex**
Unit of measurement	1: number of persons (in thousands) (where 'persons' comply with the 'usually resident population' concept as defined in EU Regulation 1260/2013 on European demographic statistics) 2 - 3: %
Data source	Eurostat – Demography and migration Eurostat – Demography statistics by other typologies
References / location of the data	National data: tables Population change - Demographic balance and crude rates at national level [demo_gind] and Population on 1 January by age and sex [demo_pjan] National data, by typology: table Demographic balance and crude rates by other typologies [urt_gind3] Regional data: Tables Population change - Demographic balance and crude rates at regional level (NUTS 3) [demo_r_gind3] and Population on 1 January by age group, sex and NUTS 3 region [demo_r_pjangrp3] Most recent urban-rural typology definition: Methodology - Rural development - Eurostat (europa.eu). The distribution of population by degree of urbanisation will be available by 2023 onwards (census – Eurostat).
Data collection / dissemination level	EU, National (NUTS 0) and demographic data at regional level (NUTS 3) which are used to compute population by regional typology (predominantly rural, intermediate and predominantly urban)
Frequency	Annual
Timeliness	1 year
Comments/caveats	The distribution of population by type of region has been calculated using the Commission's urban-rural typology, which classifies NUTS 3 regions into predominantly rural, intermediate and predominantly urban. Some Member States have only some types of regions, or data for some regions: - MT – only predominantly urban regions, - CY and LU – only intermediate regions, - SI – only predominantly rural and intermediate regions.

INDICATOR C.02	
Indicator Name	**Population density**
Definition	This indicator is calculated as the **annual average population** divided by the **land area** and refers to the number of inhabitants per km^2. It consists of 2 specific indicators: 1. **population density** 2. **population density by type of region** (predominantly rural, intermediate and urban regions).
Unit of measurement	1 – 2: Number of persons/km^2 (where 'persons' comply with the 'usually resident population' concept as defined in EU Regulation 1260/2013 on European demographic statistics)
Data source	Eurostat – Demography and migration Eurostat – Demography statistics by other typologies
References / location of the data	National and regional data: Table: Population density by NUTS 3 region [demo_r_d3dens] National data, by typology: table Population density by other typologies [urt_d3dens]
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 1, 2 and 3) by type of region (predominantly rural, intermediate and predominantly urban)
Frequency	Annual
Timeliness	1 year
Comments/caveats	The distribution of population by type of region has been calculated using the Commission's urban-rural typology, which classifies NUTS 3 regions into predominantly rural, intermediate and predominantly urban. Total area (including inland waters) is used when land area is not available. All tables at regional level include data at national level. Starting with the year 2016, the population density included in the table [demo_r_d3dens] is computed using the area data included in the table [reg_area3]. Regional data by type of region calculated as demo_r_gind3 (average population) / demo_r_d3area and classified according to the Commission's urban-rural typology. Most recent urban-rural typology definition: https://ec.europa.eu/eurostat/web/rural-development/methodology

INDICATOR C.03	
Indicator Name	**Age structure of the population**
Definition	This indicator refers to the age structure of the EU population **on 1st of January of any given year.** It consists of 3 specific indicators: 1. **share of total population by broad age groups** (less than 15 years / from 15 to 64 years / 65 years or over) 2. **share of population by sex and by broad age groups** (less than 15 years / from 15 to 64 years / 65 years or over) 3. **share of population by broad age groups** (less than 15 years / from 15 to 64 years / 65 years or over) and **by type of region** (predominantly rural, intermediate and predominantly urban).
Unit of measurement	1 - 3: %
Data source	Eurostat - Demography and migration Eurostat - Demography statistics by other typologies
References / location of the data	National data: Table Population on 1 January by broad age group and sex [demo_pjanbroad] National data, by typology: Table Population by sex and age groups on 1 January [urt_pjanaggr3] Regional data: Table Population on 1 January by broad age group, sex and NUTS 3 region [demo_r_pjanaggr3] Alternatively, there is more detailed data age structure of the population by NUTS 3 regions starting with the year 2014: data by 5-year age group are available in the table [demo_r_pjangrp3].
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 1, 2 and 3) by type of region (predominantly rural, intermediate and predominantly urban)
Frequency	Annual
Timeliness	1 year
Comments/caveats	

INDICATOR C.04	
Indicator Name	**Total area**
Definition	This indicator refers to the total area, with 2 specific indicators: 1. **total area** (including inland waters) 2. **share of total area by type of region** (predominantly rural, intermediate and predominantly urban) **and by degree of urbanisation** (cities, towns and suburbs, rural areas)
Unit of measurement	1: km^2 2: %
Data source	Eurostat - Demography and migration Eurostat - Demography statistics by other typologies
References / location of the data	National data: users should use total area figures from Table Area by NUTS 3 region [reg_area3] National data, by typology: Table Area of the regions by other typologies [urt_d3area] Regional data: Area by NUTS 3 region [reg_area3] Most recent urban-rural typology definition: Methodology - Rural development - Eurostat (europa.eu). The distribution of population by degree of urbanisation will be available by 2023 onwards (census – Eurostat).
Data collection / dissemination level	EU, National (NUTS 0) and Regional (NUTS 1, 2 and 3)
Frequency	Annual
Timeliness	1 year
Comments/caveats	In case of missing data, land area has to be used instead of total area.

INDICATOR C.05	
Indicator Name	**Land Cover**
Definition	The indicator measures the area in the different categories of land cover and it consists of 5 specific indicators: 1. **Artificial surface** 2. **Agricultural areas** 3. **Natural grassland** 4. **Forest including transitional woodland-shrub** 5. **Wetlands and water bodies** Land cover is the actual distribution of forests, water, desert, grassland and other physical features of the land, including those created by human activities. Land use, on the other hand, characterises the human use of a land cover type.
Unit of measurement	1 – 4 : total area in km^2 and in %
Data source	**CORINE Land Cover (CLC) 2012, 2018, CLC Change (CHA) 2012-2018**
References / location of the data	European Environment Agency https://www.eea.europa.eu/data-and-maps/data/copernicus-land-monitoring-service-corine https://land.copernicus.eu/pan-european/corine-land-cover/clc2018 https://land.copernicus.eu/pan-european/corine-land-cover/lcc-2012-2018
Data collection / dissemination level	EU, National (NUTS 1), Regional (NUTS 2).
Frequency	Depending on the frequency foreseen in the new CLC+ (see https://www.copernicus.eu/sites/default/files/2019-01/Copernicus_Work_Programme_2019.pdf)
Timeliness	CORINE Land Cover/CLC+: 1.5 years or less
Comments/caveats	The total area here could be different from total area in C.04 because of the different source. 1: CLC class 1 2: CLC class 2 3: CLC class 321 4: CLC class 3.1 and 324 5: CLC class 4 and 5

INDICATOR C.06	**Indicator I.24 Contributing to jobs in rural areas:** Evolution of the employment rate in rural areas, including a gender breakdown
Indicator Name	**Employment rate in rural areas**
Definition	**Employed persons aged 15-64 years and 20-64 years[1] as a share of the total population of the same age group in rural areas**: Employed persons are all persons aged 15-64 (or 20-64) years and over who, during the reference week, worked at least one hour for pay or profit or were temporarily absent from such work. Employed persons comprise employees, self-employed and unpaid family workers. Population covers persons aged 15-64 (or 20-64) years and over living in private households. This comprises all persons living in the households surveyed during the reference week. This definition also includes persons absent from the households for short periods (but having retained a link with the private household) owing to studies, holidays, illness, business trips, etc. Persons on compulsory military service are not included. There are 3 specific indicators: 1. **total employment rate and by age groups** 2. **total employment rate by sex and by age groups** 3. **total employment rate by age groups in rural areas** **Methodology**: Based on the Labour Force Survey (LFS), the total employment rate of each country can be disaggregated by degree of urbanisation. This degree of urbanisation classifies the territory (Local Administrative Units (LAU)) into rural areas, towns and suburbs and cities. The rural employment rate of each Member State could then be compared with the employment rates in the other two types of areas or with the employment rate for the whole country. Additionally, employment rates could also be calculated for men and women and even for other age groups.
Unit of measurement	1 – 3: %
Data source	Eurostat – Labour Force Survey
References / location of the data	Employment rates are calculated by Eurostat and disseminated on its website: National data, including by typology: table Employment rates by sex, age and degree of urbanisation (%) [lfst_r_ergau] Regional data: table Employment rates by sex, age and NUTS 2 regions (%) [lfst_r_lfe2emprt]
Data collection / dissemination level	LFS data are collected at LAU level (LAU2), with a sample defined to be significant at NUTS 2 level and at national level. By degree of urbanisation (rural areas, towns and suburbs, cities)

[1] In the programming period 2007-2013, the employment rate was calculated for the age group of 15-64 years. In the Europe 2020 strategy, reaching an employment rate of 75% of the population aged 20-64 years is one of the five headline targets to be achieved; however, in rural areas the employment of people below 20 is also an important indicator. Thus it is proposed to keep both age groups, which is also Eurostat's approach.

Frequency	LFS data are collected on a continuous basis and quarterly/annual results are produced. Data by degree of urbanisation are disseminated by Eurostat annually
Timeliness	4 months
Comments/caveats	Although the use of the degree of urbanisation has been selected as the most appropriate for the indicator "rural employment rate", the urban/rural typology is the one to be used when the information is available at NUTS level 3 (for example, for the indicator "Rural GDP per capita").

INDICATOR C.07	
Indicator Name	**Unemployment rate in rural areas**
Definition	This indicator provides the number of unemployed persons aged 15-24 years **(youth unemployment rate)** and 15-74 years **(total unemployment rate)** as a share of the total economically active population of the same age class. It consists of 6 specific indicators, expressed as a share of total active population of the same age class: 1. **total unemployment rate** 2. **youth unemployment rate** 3. **total unemployment rate in rural areas** 4. **youth unemployment rate in rural areas** 5. **total unemployment rate by sex** 6. **youth unemployment rate by sex** Unemployed persons comprise persons who were (all three conditions must be fulfilled simultaneously): 1. without work during the reference week, 2. available for work at the time, 3. actively seeking work. Economically active population is employed (see definition in indicator C.06) plus unemployed. **Methodology**: Based on the Labour Force Survey (LFS), the total/youth unemployment rate of each country can be disaggregated by degree of urbanisation. The degree of urbanisation classifies the territory (Local Administrative Units (LAU)) into 'rural areas', 'towns and suburbs' and 'cities'. The rural unemployment rate of each Member State could then be compared with the unemployment rates in the other two types of areas or with the unemployment rate for the whole country. Additionally, unemployment rates could also be calculated for men and women and even for other age groups, if needed for a better analysis.
Unit of measurement	1 - 6: %
Data source	Eurostat – Labour Force Survey
References / location of the data	National data: Unemployment rate by sex, age and degree of urbanisation: [lfst_r_urgau] Population by sex, age, degree of urbanisation of residence and labour status (1 000) [lfsa_pgauws] (for absolute values) Regional data (NUTS 1 and 2): Unemployment rates by sex, age and NUTS 2 regions [lfst_r_lfu3rt]
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 1 and 2) by degree of urbanisation (rural areas, towns and suburbs, cities)
Frequency	LFS data are collected on a continuous basis and quarterly/annual results are produced. Data by degree of urbanisation are disseminated by Eurostat annually
Timeliness	4 months

Comments/caveats	The age classes 15-74 and 15-24 are used both for national and regional tables.

INDICATOR C.08	
Indicator Name	**Employment** **by sector, by type of region and by economic activity**
Definition	This indicator shows employment figures for 4 specific indicators: 1. **total employment and by sex** 2. **share of total employment by sector** (primary, secondary, tertiary) **and by sex** 3. **share of total employment by type of region** (predominantly rural, intermediate and predominantly urban) 4. **share of total employment by economic activity** (agriculture, forestry, the food industry, tourism) **and by sex**. The absolute change and the annual growth of employment by economic activity at national level are calculated as three-year averages. If the available data allow, the calculation of five-year averages is also possible.
Unit of measurement	1: number of persons (in thousands) 2 - 4: %
Data source	1: Tables on EU policy 3: Eurostat – Regional Economic Accounts 2 and 4 : Eurostat – Labour Force Survey
References / location of the data	1 : National data, Employment and activity by sex and age - annual data [lfsi_emp_a] 2 and 4: Eurostat website, Labour Force Survey: national data, Employment by sex, age and detailed economic activity (from 2008 onwards, NACE Rev. 2 two digit level) - 1 000 [lfsa_egan22d] 3: Regional data: [nama_10r_3empers] and [lfst_r_lfe2en2] for totals; Most recent urban-rural typology definition: https://ec.europa.eu/eurostat/web/rural-development/methodology 4: Employment by economic activity on special request to Eurostat
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 1, 2 and 3). For 3, by type of region (predominantly rural, intermediate and predominantly urban)
Frequency	Annual For 2 and 4, LFS data are collected on a continuous basis and quarterly/annual results are produced. Data at NUTS 2 level are disseminated by Eurostat annually Regional data are published as annual averages of quarterly data
Timeliness	For 1 and 3: 1 year (national data) and 3 years (regional data) For 2 and 4: 4 months
Comments/caveats	For 2 and 4: Sectors in NACE rev.2: Primary sector = branch A (agriculture, forestry and fishing); Secondary sector = branches B-E + F (industry + construction); Tertiary sector = branches G-I + J + K + L + M-N + O-Q + R-U.

	For 2: The distribution of employment by type of region has been calculated using the Commission's urban-rural typology, which classifies NUTS 3 regions into predominantly rural, intermediate and predominantly urban. For 3: Eurostat's Labour Force Survey (LFS) is the main data source for the domain employment. The EU LFS is a large household sample survey providing quarterly results on labour participation of people aged 15 years and over (16 years and over in Spain, Italy and the UK, 15-74 years in Estonia, Latvia, Hungary, Finland, Sweden and Denmark). In the Eurostat LFS database (according to the NACE rev.2 divisions) agriculture corresponds to "crop and animal production, hunting and related activities" (A01), while forestry means "forestry and logging" (A02), the food industry is equal to "manufacture of food products" (C10) and "manufacture of beverages" (C11) and "manufacture of tobacco products" (C12), tourism corresponds to "accommodation" (I55) and "food and beverage service activities" (I56).

INDICATOR C.09	**Indicator I.25 Contributing to growth in rural areas:** Evolution of Gross Domestic Product (GDP) per capita in rural areas
Indicator Name	**Gross Domestic Product per capita**
Definition	**Gross Domestic Product (GDP)** per capita in rural regions, in **Purchasing Power Standard (PPS)**[2] The index of GDP per capita in Purchasing Power Standards (PPS) is expressed in relation to the European Union average set to equal 100. In particular, the following 2 specific indicators are calculated: 1. **Index of GDP expressed in PPS per inhabitant at national level** 2. **Index of GDP expressed in PPS per inhabitant in percentage of the EU average** for rural areas.
Unit of measurement	1 - 2: index of GDP in PPS per inhabitant
Data source	Eurostat – National and Regional Economic Accounts Eurostat — Rural development statistics
References / location of the data	National data: table [nama_10_gdp], [nama_10_pc], , Regional data: table [nama_10r_3popgdp], [nama_10r_3gdp] National data, by typology: table Gross domestic product (GDP) at current market prices by other typologies [urt_10r_3gdp] Most recent urban-rural typology: https://ec.europa.eu/eurostat/web/rural-development/methodology
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 1, 2 and 3) by type of region (predominantly rural, intermediate and predominantly Urban)
Frequency	Annual
Timeliness	1 year (national data) and 3 years (regional data)
Comments/caveats	As an average, this indicator does not measure the distribution of income within a given geographical area. Furthermore, non-monetary exchanges (production for self- consumption; public goods and externalities; barter; unpaid family labour) are not taken into account but can be substantial in some sectors (especially in agriculture) and regions.

[2] The Purchasing Power Standard, abbreviated as PPS, is an artificial currency unit. Theoretically, one PPS can buy the same amount of goods and services in each country. However, price differences across borders mean that different amounts of national currency units are needed for the same goods and services depending on the country. PPS are derived by dividing any economic aggregate of a country in national currency by its respective Purchasing Power Parities.

INDICATOR C.10	**Indicator I.27 Promoting rural inclusion:** Evolution of poverty index in rural areas
Indicator Name	**Poverty rate**
Definition	**The indicator is defined as the share of population at risk of poverty or social exclusion in rural areas**, as defined in the classification of the degree of urbanisation (DEGURBA). It is calculated as the percentage of people who are at risk of poverty or severely deprived or living in a household with low work intensity over the total population. The at-risk-of-poverty rate is the share of people with an equivalised disposable income (after social transfer) below the at-risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income after social transfers (http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:At-risk-of-poverty_rate). The degree of rural poverty (share of population at risk of poverty or social exclusion) can be compared to the overall EU average, to the respective national average and/or to the average for intermediate and/or urban areas in a Member State or in the EU (choice to be made according to the policy objective). It consists of 3 specific indicators, expressed as share of total population: 1. **total poverty rate** 2. **poverty rate by type of area** 3. **poverty rate by sex** (at national level only)
Unit of measurement	1-3: %
Data source	Eurostat – Survey on income and living conditions (SILC) Eurostat – Degree of urbanisation
References / location of the data	National data: table People at risk of poverty or social exclusion by age and sex [ilc_peps01] National data, by degree of urbanisation: table [ilc_peps13] Regional data: table [ilc_peps11] (regional data are not available for some MS)
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 1 and 2) By degree of urbanisation (rural areas, towns and suburbs, cities)
Frequency	Annual
Timeliness	2 years
Comments/caveats	**This indicator is also used for the EU reporting on UN Sustainable Development Goals.**

INDICATOR C.11	**Indicator I.8 Improving farmers' position in the food chain:** Value added for primary producers in the food chain
Indicator Name	**Gross value added by sector, by type of region, in agriculture and for primary producers**
Definition	**The Total Gross Value Added (GVA)** (at basic prices), is defined as the value of output less the value of intermediate consumption Output is valued at basic prices, GVA is valued at basic prices and intermediate consumption is valued at purchasers' prices. It consists of 5 specific indicators: 1. **total GVA** 2. **GVA by sector** (primary, secondary, tertiary), total and share of total GVA 3. **GVA by type of region** (predominantly rural, intermediate and predominantly urban), total and share of total GVA 4. **GVA in agriculture** 5. **Indicator I.8: GVA of primary producers**, total and share of the primary production on the total value added generated by different participants of the food chain (primary production, food manufacturing, food distribution and food service activities)
Unit of measurement	1: EUR million 2: EUR million and % 3: EUR million and % 4: EUR million 5: EUR million and %
Data source	Eurostat – National and Regional Economic Accounts, Economic accounts for agriculture and Structural Business Statistics
References / location of the data	National data: table 1: Gross value added and income by A*10 industry breakdowns [nama_10_a10] 2: National data, by typology: table Gross value added at basic prices by other typologies [urt_10r_3gva] 3: Regional data: table Gross value added at basic prices by NUTS 3 regions [nama_10r_3gva] 4: Gross value added and income by A*64 industry breakdowns [nama_10_a64] 5: For agriculture and primary producers (I.8): Gross value added at basic prices + subsidies on production -other taxes on production (table Economic accounts for agriculture – [aact_eaa01]) ' Available at: http://ec.europa.eu/eurostat/web/products-datasets/-/aact_eaa01 Value added of the food and beverages manufacturing (food manufacturing) Manufacture of food products (C10)

	+ beverages (C11) + tobacco products (C12) (table Annual enterprise statistics for special aggregates of activities (NACE Rev. 2) – [sbs_na_sca_r2]) Available at: http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database Value added of the food and beverages distribution (food distribution) Agents involved in the sale of food, beverages and tobacco (G4617) + Wholesale of food, beverages and tobacco (G463) + Retail sale in non-specialised stores with food, beverages or tobacco predominating (G4711) + Retail sale of food, beverages and tobacco in specialised stores (G472) + Retail sale via stalls and markets of food, beverages and tobacco products (G4781) (table Annual detailed enterprise statistics for trade (NACE Rev. 2 G) – [sbs_na_dt_r2]) Available at: http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database Value added of the food and beverages consumer services (food service activities) Food and beverage service activities (table Annual detailed enterprise statistics for services (NACE Rev. 2 H-N and S95) - [sbs_na_1a_se_r2])' Most recent urban-rural typology: https://ec.europa.eu/eurostat/web/rural-development/methodology
Data collection / dissemination level	For sectors and type of regions: EU, National (NUTS 0), Regional (NUTS 1, 2 and 3) By type of region (predominantly rural, intermediate and predominantly urban) For agriculture and primary producers: EU and National (NUTS 0)
Frequency	Annual
Timeliness	1 year (national data, GVA in agriculture) and 3 years (regional data, Structural Business Statistics)
Comments/caveats	Sectors in NACE rev.2: Primary sector = branch A (agriculture, forestry and fishing); Secondary sector = branches B-E + F (industry + construction); Tertiary sector = branches G-I + J + K + L + M-N + O-Q + R-U. The distribution of GVA by type of region has been calculated using the Commission's urban-rural typology, which classifies NUTS 3 regions into predominantly rural, intermediate and predominantly urban. For GVA in agriculture: agriculture = A01 (Crop and animal production, hunting and related service activities) For the primary producers: The whole food manufacturing is covered as well as the food distribution of three products (food, beverages, tobacco). However, the share is still an over-

	estimate, as the value-added of the primary production includes also other products (e.g. textiles and bio-industries outlets, which have been excluded, when possible, in the rest of the food chain added value). Additionally, the food distribution covers all possible channels (both retail and wholesale) as their importance on sales in individual Member States differs. Food and beverages distribution - from 2011, EU is the sum of reported EU values for respective distribution channels. The discrepancy between the sum of individual MS and EU originates in rounding of the EU aggregate, to make it impossible to recalculate confidential data. The same applies to the food and beverage service activities.

INDICATOR C.12	
Indicator Name	**Agricultural holdings (farms)**
Definition	This indicator consists of 5 specific indicators: 1. **Number of agricultural holdings** 2. **Agricultural size of the holdings** - in utilised agricultural area (UAA) size classes 3. **Economic size of the holdings** - in standard output (SO) classes 4. **Average size of the holdings** - physical (UAA), 5. **Labour force** - in persons and in annual work units (AWU), total and by sex The first four specific indicators provide basic information on the total number of farms, ha of UAA, EUR of SO and the total number of persons employed or AWU for each EU Member State. Quantities are presented in absolute figures and serve as a basis for the calculation of the fifth specific indicator.
Unit of measurement	1: number of farms 2: number of ha 3: EUR/farm 4: ha/farm 5: number of AWU, number of persons, person/holding, AWU/holding
Data source	Eurostat – Farm Structure Survey (FSS) Eurostat – Integrated Farm Statistics (IFS)
References / location of the data	For number of farms, for the physical size (ha of UAA) and for the economic size of farms (SO) (national and regional): table [ef_m_farmleg] For the labour force size (national and regional): table [ef_lf_size]
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 1 and 2)
Frequency	FSS/IFS: full census every 10 years, intermediate surveys 2 times in-between.
Timeliness	2 years
Comments/caveats	IFS as of survey year 2020

INDICATOR C.13	
Indicator Name	**Farm labour force**
Definition	The indicator shows the **labour force directly employed by the agricultural holding and working regularly, and the temporary labour force.** The farm labour force of the holding includes all persons having completed their compulsory education (having reached school-leaving age) who carried out farm work on the holding during the 12 months ending on the reference day of the survey. All persons of retirement age who continue to work on the holding are included in the farm labour force. It consists of 2 specific indicators: 1. **total labour force and labour force by sex** for the different categories of farm regular labour force: sole holders working in the farm, members of sole holders' family working on the farm, family labour force (sole holders working in the farm + members of the sole holder's family working in the farm), non-family labour force 2. **non-regular labour force** (only AWU).
Unit of measurement	1: number of persons and AWU (in thousands) 2: number of AWU (in thousands)
Data source	Eurostat – Farm Structure Survey (FSS) Eurostat – Integrated Farm Statistics (IFS)
References / location of the data	For national and regional data and labour force by sex and farm work: table [ef_lf_size]
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 1 and 2)
Frequency	FSS/IFS: full census every 10 years, intermediate surveys 2 times in-between.
Timeliness	2 years
Comments/caveats	Due to the high share of part-time work in agriculture, labour input can be better assessed in terms of AWU than in terms of persons. IFS as of survey year 2020.

INDICATOR C.14	
Indicator Name	**Age structure of farm managers**
Definition	The indicator shows the distribution of the farm managers by age groups. It consists of 3 specific indicators: 1. **total number of farm managers** 2. **number and share of farm managers by age group** 3. **ratio between young farm managers** (less than 40 years) **and farm managers of 55 years or older**. The manager of the holding is the natural person responsible for the normal daily financial and production routines of running the holding concerned. The holder is the natural person, group of natural persons or legal person on whose account and in whose name the holding is operated and who is legally and economically responsible for the holding, i.e. who takes the economic risks of the holding. The manager and the holder can be the same person.
Unit of measurement	1: number of farm managers (in thousands) 2: number (in thousands) and % 3: ratio
Data source	Eurostat – Farm Structure Survey (FSS) Eurostat – Integrated Farm Statistics (IFS)
References / location of the data	National and regional data: table [ef_m_farmang]
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 1 and 2)
Frequency	FSS/IFS: full census every 10 years, intermediate surveys 2 times in-between.
Timeliness	2 years
Comments/caveats	Age classes in different data collections: FSS until 2000: <25 years, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, >65 FSS 2003 until 2013: <25 years, 25-34, 35-44, 45-54, 55-64, 65 and over. FSS 2016: -24 years, 25-34, 35-39, 40-44, 45-54, 55-64, 65 and over IFS as of survey year 2020: The year of birth of the manager of the agricultural holding

INDICATOR C.15	
Indicator Name	**Agricultural training of farm managers**
Definition	The indicator provides information on the level of agricultural training: basic training, practical experience only, full agricultural training. It consists of 2 specific indicators: 1. **number and share of farm managers by level of agricultural training** 2. **number and share of farm managers by age group and by level of agricultural training** . The different categories of agricultural training are defined as follows: • Only practical agricultural experience: experience acquired through practical work on an agricultural holding. • Basic agricultural training: any training courses completed at a general agricultural college and/or an institution specialising in certain subjects (including horticulture, viticulture, silviculture, pisciculture, veterinary science, agricultural technology and associated subjects). A completed agricultural apprenticeship is regarded as basic training. • Full agricultural training: any training course continuing for the equivalent of at least two years full time training after the end of compulsory education and completed at an agricultural college, university or other institute of higher education in agriculture, horticulture, viticulture, silviculture, pisciculture, veterinary science, agricultural technology or an associated subject.
Unit of measurement	1 and 2: number of farm managers and %
Data source	Eurostat – Farm Structure Survey Eurostat – Integrated Farm Statistics (IFS)
References / location of the data	National data until 2013: table [ef_mptrainman], table [ef_mp_training] for 2016 data Regional data: on special request to Eurostat
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 1 and 2)
Frequency	FSS/IFS: full census every 10 years, intermediate surveys 2 times in-between.
Timeliness	2 years
Comments/caveats	IFS as of survey year 2020. In the case of Italy, the definition of "training in agriculture" does not correspond to the content described above. It refers rather to the general education level of the farmer. According to the Italian definition: - practical experience means: the farmer has completed no type of education (primary school, secondary education, higher education); - basic training means: the farmer completed at least primary education, but did not complete agricultural higher education; - full training means: the farmer has completed higher or tertiary education at an agricultural college/university/college-level institute/vocational school.

INDICATOR C.16	**Indicator I.23 Attracting young farmers:** Evolution of number of new farm managers and the number of new young farm managers, including a gender breakdown
Indicator Name	**New farm managers and new young farm managers**
Definition	The indicator shows the evolution of number of new farm managers including new young farm managers. For the definition of new farmer it will be adopted the one proposed by Eurostat.
Unit of measurement	1: number of new farm managers by sex 2: number of new young farm managers by sex
Data source	Eurostat Integrated Farm statistics (IFS)
References / location of the data	The Integrated Farm Statistics Regulation (EU) 1091/2018 will provide data for the following variables: • A number of new entrant (including young) farmers in the previous 3 years • The year in which the manager of the agricultural holding took up this role • The year of birth of the manager of the agricultural holding
Data collection / dissemination level	EU, national (NUTS 0) and regional (NUTS 1 and 2)
Frequency	IFS: full census every 10 years, intermediate surveys 2 times in-between.
Timeliness	2 years
Comments/caveats	First data on new farm managers will be available towards end of year 2022 (for reference year 2020)

INDICATOR C.17	
Indicator Name	**Utilised agricultural area**
Definition	The indicator is expressed as the total utilised agricultural area (UAA) in absolute terms (ha) and as the share of UAA in different categories of land use. It consists of two specific indicators: 1. **total utilised agricultural area** (UAA) 2. **total and share of UAA by categories of land cover**. According to the definition applied in the Eurostat database, the categories of land use are as follows: • Arable land • Permanent grassland • Permanent crops • others
Unit of measurement	1: number of ha(in thousands) 2: ha (in thousands) and %
Data source	Eurostat – Agricultural production – Crop production
References / location of the data	National and regional data:[apro_cpsh1]; [apro_cpshr]
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 1 and 2)
Frequency	Annual
Timeliness	1 year
Comments/caveats	Codes for land use: main area (MA), arable land (ARA), permanent grassland (J0000) and permanent crops (PECR). Others: calculation UAA minus (ARA + J0000 + PECR)

INDICATOR C.18	
Indicator Name	**Irrigable area**
Definition	The indicator shows the irrigable area and it consists of 2 specific indicators: 1. **total irrigable area** 2. **share of the Utilised Agricultural Area** (UAA). Irrigable area is defined as the maximum area which could be irrigated in the reference year using the equipment and the quantity of water normally available on the holding. Crops under glass and kitchen gardens, which are assumed to be generally irrigable and irrigated, are not considered. Utilised Agricultural Area consists in the total area taken up by arable land, permanent grassland, permanent crops and others.
Unit of measurement	1: number of ha 2: %
Data source	Eurostat - Farm Structure Survey (FSS) Eurostat – Integrated Farm Statistics (IFS) Survey on Agriculture Production Methods (SAPM) 2010.
References / location of the data	National and regional data: 1:table [ef_mp_irri] 2: table [aei_ef_ir]
Data collection / dissemination level	National (NUTS 0), Regional (NUTS 1 and 2)
Frequency	FSS/IFS: full census every 10 years, intermediate surveys 2 times in-between. Survey on Agricultural Production Methods (SAPM) is a one off survey carried out in 2010.
Timeliness	2 years
Comments/caveats	IFS as of survey year 2020. Because of the varying factors affecting water abstraction in agriculture, irrigated areas change from year to year depending on the weather conditions, while irrigable areas are used instead to present irrigation trends, showing the expectation on farmers for the need for irrigation.

INDICATOR C.19	
Indicator Name	**Farming in Natura 2000 areas**
Definition	The indicator provides information on the area protected under Natura 2000 that is used for agriculture and/or forestry. It consists of 5 specific indicators: 1. **share of territory under Natura 2000 by categories** (Special Protection Areas - SPAs, Sites of Community Importance - SCIs, Natura 2000's network) 2. **share of agricultural area under Natura 2000** (excluding natural grassland) 3. **share of agricultural area and natural grassland under Natura 2000** 4. **share of forest area under Natura 2000** (excluding transitional woodland-shrub) 5. **share of forest area and transitional woodland-shrub under Natura 2000** Under Natura 2000, a network of areas is designated to protect sites with rare and threatened species, and some rare natural habitat types of concern at the European Union level. The Natura 2000 network consists of sites: • designated by Member States as Special Protection Areas (SPA) under the Birds Directive (Council Directive 79/409/EEC of 2 April 1979), • proposed by Member States as Sites of Community Importance (pSCI) and later designated as Special Areas of Conservation (SAC) under the Habitats Directive (Council Directive 92/43/EEC of 21 May 1992). For the Special Protection Areas designated under the Birds Directive, the responsibility for designation lies entirely with the Member States. The Commission (DG Environment) has to be informed when new areas are designated or existing areas are modified. The information received on new or revised areas is passed on to the European Environment Agency (EEA), which regularly produces consolidated versions of the SPA database for the whole EU. For the proposed Sites of Community Importance, which will in the future be Special Areas of Conservation under the Habitats Directive, there is a three-stage process that starts with a proposal by Member States. The proposals are transferred to the Commission, which evaluates with the European Topic Centre on Biological Diversity (ETC_BD) whether or not the proposed sites ensure sufficient protection and, on the basis of that evaluation, asks the Member States to propose more sites whenever necessary. The EEA regularly (once a year) compiles all the information received into a single EU database. The lists of sites foreseen in the Habitats Directive are divided into nine bio-geographic regions (Pannonian, Boreal, Continental, Atlantic, Alpine, Macaronesian, Black Sea, Steppic and Mediterranean) within the territory of the Union. The first list for the Macaronesian region was agreed in December 2001. The second list was adopted in December 2003 for the Alpine region, followed in 2004 by the lists for the Continental and Atlantic regions. The list for the Boreal region was adopted in 2005, and the list for the Mediterranean region in 2006. The lists for the Steppic and the Black Sea regions were adopted in 2008. Natura 2000 sites include different types of European ecosystems. Some sites

	are in coastal areas or in open marine waters, some contain lakes or are riverine, and many include forest and farmland. For calculating an improved version of this indicator, geo-referenced information is required. The data sets used consist of the Natura 2000 Spatial Dataset and the CORINE Land Cover (CLC) raster dataset. Although CLC categories do not fully correspond to the statistical definitions of agricultural area (UAA) or forests, the overlay of the two data sets allows an accurate geographical estimation of land use data inside Natura 2000 sites. To reduce and explain the discrepancies with other surveys and national inventories, the estimation of the UAA and forest includes separately the CLC classes "Natural grassland" and "Transitional woodland –shrubs". CLC classes used are: - Agricultural area: CLC 2 - Agricultural area including natural grassland: CLC 2+ 321 - Forest area : CLC 3 - Forest area including transitional woodland-shrub: CLC3 +324
Unit of measurement	1-5: %
Data source	Natura 2000 Barometer Statistics Report (release version End2016 – 2017-02-02) Natura 2000 data CORINE Land Cover (CLC)
References / location of the data	Natura 2000 Barometer statistics https://www.eea.europa.eu/themes/biodiversity/document-library/natura-2000/natura-2000-network-statistics/natura-2000-barometer-statistics/statistics/barometer-statistics Natura 2000 data - the European network of protected site Natura 2000 data - the European network of protected sites — European Environment Agency (europa.eu) Natura 2000: Birds and Habitats Directives — European Environment Agency (europa.eu) CORINE Land Cover (CLC) https://www.eea.europa.eu/data-and-maps/data/natura2000-clc-by-nuts
Data collection / dissemination level	EU, National (NUTS 1), Regional (NUTS 2)
Frequency	Natura 2000: every year CORINE Land Cover: Depending on the frequency foreseen in the new CLC+ (see https://www.copernicus.eu/sites/default/files/2019-01/Copernicus_Work_Programme_2019.pdf)
Timeliness	Natura 2000: 1 year CORINE Land Cover: CLC/CLC+: 1.5 years or less.
Comments/caveats	**This indicator has common ground with the one used for the EU reporting on UN Sustainable Development Goals.**

INDICATOR C.20	
Indicator Name	**Areas facing natural and other specific constraints - ANCs**
Definition	The characterisation of agricultural areas designated as areas facing natural or other specific constraints provides useful information on the environment in which the policy is implemented. The indicator measures the **share of agricultural area in the three different categories of areas facing natural or other specific constraints (ANCs)** (ex-LFAs as they were defined in the period 2007-2013), expressed as a share of the utilised agricultural area (UAA): 1. Mountain areas (incl. areas north of the 62nd parallel); 2. Areas, other than mountain areas, facing significant natural constraints; 3. Other areas affected by specific constraints. Article 32 of Regulation (EU) No 1305/2013 defines the areas facing natural or other specific constraints, which are eligible for payments to farmers, if such support is programmed. They are classified according to three categories, each of which describes a specific cluster of natural or other specific constraints affecting agricultural production in the area concerned. The area designations and other requirements for ANCs have changed in comparison to the programming period 2007-2013 and to Regulation (EC) No 1698/2005 and Regulation (EC) No 1257/99, which are repealed. While no revision of the designation of mountain areas or areas affected by specific constraints is foreseen in Regulation (EU) No 1305/2013 (apart from the possibility to apply the combination of biophysical criteria for the designation of areas affected by specific constraints), areas facing natural constraints other than mountain (former LFA intermediate) should be delimited according to eight biophysical criteria, as defined in Annex III of Regulation (EU) No 1305/2013, covering climate, poor soil productivity and steep slopes. Each (sub)criterion has a predefined threshold, e.g. slopes with a gradient of 15% (or more) which identifies the trigger for the area to be considered as severely constrained from the agricultural production point of view. Measurement of constraint(s) takes place at the level of Local Administrative Units (LAU) 2 (which corresponds to municipality level in most Member States) or at the level of clearly delineated, contiguous local units. The latter should have a definable economic and administrative identity. Farming in the respective local unit can be considered as being constrained if constraints are present on at least 60 % of the local unit's agricultural area. Regulation 1305/2013 also stipulates the mechanism of fine-tuning, i.e. for excluding those administrative units where a constraint has been documented but it has been overcome by investments or by economic activity. The fine-tuning exercise is a part of the designation exercise. New data on ANCs are reported by Member States within the programming period 2014-2020.
Unit of measurement	1 – 3: %
Data source	DG Agriculture and Rural Development: data on ANC areas are reported by Member States during the programming period 2014-2020. Eurostat – crop statistics for total UAA
References / location of the data	ANC areas: DG Agriculture and Rural Development on request. Total UAA: Eurostat, table [apro_cpsh1]
Data collection /	National (NUTS 0).

dissemination level	Areas facing natural constraints, other than mountain: Data are reported at the level of LAU2 or another LAU (a number of Member States use different administrative units for the delimitation of these areas). Areas affected by specific constraints: Data collection may be carried out at the level of area designation. In case the designation is carried out according to the "combination of biophysical criteria", as defined in the third paragraph of Article 32(4) of Regulation (EU) No 1305/2013, the data collection level should be LAU2 or another clearly delineated local unit.
Frequency	Data available at present: At the moment data on LFAs are from 2005 (and from 2007 in the case of BG and RO). Data on ANCs are complete since 2020.
Timeliness	Whenever MS update their ANC delimitation.
Comments/caveats	

INDICATOR C.21	**Indicator I.21 Enhancing provision of ecosystem services**: Share of agricultural land covered with landscape features
Indicator Name	**Agricultural land covered with landscape features**
Definition	This indicator aims to estimate the area covered by landscape features in the agricultural land. Landscape features may include linear elements (e.g. hedgerows) and patches (e.g. trees, woodland, etc.), water & wet spots (ponds, water bodies, streams, etc.); moderately managed areas (e.g. field margins), etc. Landscape features support biodiversity and ecosystem services. Therefore, they provide many benefits to agro-ecosystems and the wider environment, including habitat provision, mitigation of soil erosion, improvement of soil fertility, water flow regulation, water courses protection, climate change mitigation and adaptation. This indicator consists of 2 specific indicators: 1. The share of agricultural land covered with landscape features (I.21), and 2. An elaborated index of landscape elements structure (under development).
Unit of measurement	1: % 2: Still to be defined (Could be complemented with some statistics to reflect on spatial configuration of features)
Data source	2 possible sources: Copernicus Land Monitoring Service fed with LPIS/IACS. Copernicus is the European Union's Earth Observation Programme. Land use/cover Area frame statistical Survey (LUCAS-landscape features module).
References / location of the data	• Copernicus Land Monitoring Service high resolution layers (https://land.copernicus.eu/pan-european/high-resolution-layers) • LUCAS (https://ec.europa.eu/eurostat/statistics-explained/index.php/LUCAS_-_Land_use_and_land_cover_survey)
Data collection / dissemination level	EU, National (NUTS 1), Regional (NUTS 2 and 3), based on detailed maps / samples covering the full EU.
Frequency	Copernicus: data starting from 2015 are used to assess Small Woody Features; updates are currently planned every three years, i.e. for 2018, 2021, 2024, 2027, etc. New products with more landscape features (under assessment) may be ready in 2020. LUCAS: Starting from 2009, updates are in principle planned every 3 years. However, in 2018 the collection of the data relevant for this fiche was not implemented. Next LUCAS landscape features survey is planned for 2022.
Timeliness	To be defined
Comments/caveats	There is abundant literature on the relationship between landscape features and biodiversity and certain ecosystem services. The challenge is to find a combination of features that can be mapped reliably to be valid in all EU countries, considering the diversity of landscapes, biogeographic and socio-

	economic conditions. This indicator would provide a valuable proxy, although not a precise measurement of all relevant landscape features in farming landscapes. The indicator is conceptually under development and therefore not available. A first version should be made available by the end of 2021. It will be subject to periodic revision, when methodological developments allow. Detecting some landscape features with Copernicus is promising. Small Woody Features are available and ready for use and can be used as a first proxy to mapping plant-related woody landscape features; additional landscape features (e.g. water spots, hedges) might be incorporated when available. The indicator will therefore be built following a stepwise approach and updated retrospectively. Because the Copernicus Small Woody Features product is a detailed spatially explicit wall-to-wall mapping, it can be used at all possible scale levels (from local to national and pan-European). Estimates of various landscape feature types (e.g. strips, ditches) based on LUCAS landscape features survey could potentially complement and be downscaled to lower level (national, regional) but would require further assessment and processing. An issue to test is the capacity of the indicator to detect actual landscape change, including changes triggered by agricultural practices, considering the estimated accuracy and the pace of landscape change at the EU level.

INDICATOR C.22	**Indicator I.22 Increasing agro-biodiversity in farming system:** Crop diversity
Indicator Name	**Crop diversity**
Definition	This indicator comprises two sub-indicators: 1. **Crop diversity on farm (number of farms by number of crops and size)** Number and % of farms by number of crops (1, 2, 3, and >3) and by size of arable land (arable land < 10ha; 10ha< arable land < 30 ha; 30 ha < 100 ha; arable land>100 ha), at NUTS 2 level. 2. **Crop diversity in a region** Average number of crops grown on a holding at NUTS 2 level as one, and broken down by arable land size classes (arable land < 10ha; 10ha< arable land < 30 ha; arable land > 30 ha).
Unit of measurement	1, 2: Number, %
Data source	1-2: Eurostat - Farm Structure Survey Example: % of holdings 1 crop 2 crops 3 crops >3 crops Total Total <10 ha x% y% z% w% 100% 10< <30 xy% xx% xz% yy% 100% 30< <100 xy% xx% xz% yy% 100% 100< xz% xx% yz% wy% 100% Total x% y% z% w% 100% Eurostat – Integrated Farm Statistics (IFS) as of survey year 2020.
References / location of the data	1: special request to Eurostat for extraction from Eurofarm Database 2: from sub-indicator 1
Data collection / dissemination level	National (NUTS 0)
Frequency	Farm Structure Survey – every 3-4 years (2013; 2016) IFS: full census every 10 years, intermediate surveys 2 times in-between
Timeliness	Farm Structure Survey – 2-3 years (=> 2013 FSS results are available mid-2015; 2016 FSS will be available in 2018)
Comments/caveats	

INDICATOR C.23	
Indicator Name	**Livestock units**
Definition	This indicator gives the total **number of livestock units (LSU) of the holdings with livestock and by species**. LSU coefficients are used instead of the actual number of animals in order to make comparable aggregations of different animal categories. The indicator consists of 2 specific indicators: 1. **total number of livestock units** 2. **total number and share of livestock units by species**. According to the definition applied in the Eurostat database, the categories of livestock units are as follows: • bovine • ovine • poultry • swine
Unit of measurement	1: number of LSU2: number of LSU and %
Data source	Eurostat – Farm Structure Survey (FSS) Eurostat – Integrated Farm Statistics (IFS)
References / location of the data	For national and regional data: table [ef_lsk_main]
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 1 and 2)
Frequency	FSS/IFS: full census every 10 years, intermediate surveys 2 times in-between.
Timeliness	2 years
Comments/caveats	IFS as of survey year 2020. For the coefficients used to calculate the LSU in FSS/IFS, see Annex I of Commission Regulation (EC) No 1091/2018: http://data.europa.eu/eli/reg/2018/1091/oj

INDICATOR C.24	
Indicator Name	**Livestock density**
Definition	The livestock density is an indicator for the pressure of livestock farming on the environment. This indicator consists of 2 specific indicators: 1. **Total livestock density** - LSU/ha of utilised agricultural area (UAA): it measures the stock of animals (cattle, sheep, goats, equidae, pigs, poultry and rabbits) converted in livestock units (LSUs) per hectare of utilised agricultural area (UAA). 2. **Grazing livestock density** (grazing LSU/ha of fodder area): it measures the stock of grazing animals (cattle, sheep, goats and equidae) per fodder area (consisting of fodder crops grown on arable land as well as permanent grassland). It is the ratio of the number of livestock units (LSUs) (converted from the number of animals using standard coefficients published by EUROSTAT[3], per hectare of fodder area.
Unit of measurement	1 – 2: LSU/ha
Data source	Eurostat – Farm Structure Survey (FSS) Eurostat – Integrated Farm Statistics (IFS)
References / location of the data	For national and regional data: [ef_kvftaa] [ef_lsk_main] [ef_m_farmleg]
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 1 and 2)
Frequency	FSS/IFS: full census every 10 years, intermediate surveys 2 times in-between.
Timeliness	2 years
Comments/caveats	IFS as of survey year 2020. LSU (or sometimes as LU) is a reference unit which facilitates the aggregation of livestock from various species and age as per convention, via the use of specific coefficients[4] established initially on the basis of the nutritional or feed requirement of each type of animal. Grazing livestock density is not published in the dataset but can be calculated separately.

[3] See https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Livestock_unit_(LSU)

[4] Ibidem

INDICATOR C.25	**Indicator I.3 Reducing farm income variability:** Evolution of agricultural income
Indicator Name	**Agricultural factor income**
Definition	**Agricultural factor income** measures the remuneration of all factors of production (land, capital, labour) regardless of whether they are owned or borrowed/rented and represents all the value generated by a unit engaged in an agricultural production activity. It corresponds to the **net value added at factor cost.** Value of agricultural production - intermediate consumption as defined in Eurostat's 'Manual on the economic accounts for Agriculture and Forestry - depreciation - total taxes (on products and production) + total subsidies (on products and production) **= agricultural factor income (net value added at factor costs)** The indicator consists of 3 specific indicators: 1. **Agricultural factor income per annual work unit (AWU)**. It measures the income generated by a farm (as defined above) per annual working unit, where an AWU in agriculture corresponds to the work performed by one person who is occupied on an agricultural holding on a full-time basis. For this indicator, total (paid and unpaid) AWU are used. 2. **The index of agricultural factor income per AWU** is already available in Eurostat's Economic Accounts for Agriculture as specific indicator 1. This index is a measure of relative labour productivity and is particularly suited for showing developments over time. 3. **Indicator I.3**: % variation of the Index compared to the last 3-year average.
Unit of measurement	1: EUR (in real terms)/AWU 2: Index 2010 =100 3: %
Data source	1: Eurostat, Economic Accounts for Agriculture and Agricultural Labour Input Statistics 2 - 3: Eurostat, Economic Accounts for Agriculture (EAA)
References / location of the data	**1. Agricultural factor income:** *Economic accounts for agriculture - values at real prices* [aact_eaa04] • Production value at basic price • Factor income: code 26000 **2. Agricultural labour input:** *Agricultural Labour Input Statistics: absolute figures (1 000 annual work units)* [aact_ali01] **3. Index of agricultural factor income/AWU (Indicator A):** *Economic accounts for agriculture - agricultural income (indicator A)* [aact_eaa06]

Data collection / dissemination level	1. EU, National (NUTS 0), Regional (NUTS 1 and 2) – where data are available 2. EU, National (NUTS 0)
Frequency	Annual
Timeliness	1 year
Comments/caveats	Agricultural factor income is best suited for evaluating the impact of changes in the level of public support (i.e. direct payments) on the capacity of farmers to reimburse capital, pay for wages and rented land as well as to reward their own production factors. In this context one should note that the proportion of own and external production factors varies in some cases significantly between and within Member States and that the remuneration of own and external production factors is often unequal at farm level. Caution should be exercised when comparing absolute levels of agricultural factor income per AWU as they are influenced by different calculations of AWU depending on national rules and are not specifically designed to be comparable across countries. Regional data are not available for all Member States. The EAA provide timely data, however to assess income development and variability by region or farm type, Member States might complement the analysis using FADN data. **This indicator is also used for the EU reporting on UN Sustainable Development Goals.**

INDICATOR C.26	**Indicator I.2 Reducing income disparities:** Evolution of agricultural income compared to the general economy
Indicator Name	**Comparison of agricultural income with non-agricultural labour cost**
Definition	Labour costs (wages and salaries plus non-wage costs such as employers' social contributions)[5] in industry, construction and services are compared to **3 specific indicators** for agricultural income: 1. **Agricultural entrepreneurial income plus compensation of employees per annual work unit** This specific indicator is based on data from the economic accounts for agriculture provided by Eurostat for the agricultural sector of the EU as a whole and of individual Member States. Agricultural entrepreneurial income[6] measures the income derived from agricultural activities that can be used for the remuneration of own production factors, i.e. non-salaried (= family) labour, land belonging to the agricultural holding and own capital. It is obtained by deducting compensation of employees, rent and net interest from agricultural factor income (see C. 24). For the purpose of this indicator, compensation of employees[7] are added back in, so that the resulting indicator represents the compensation of all work (salaried and non-salaried) performed in the agricultural sector, as well as the income remaining with the enterprise. Value of agricultural production - intermediate consumption as defined in Eurostat's 'Manual on the economic accounts for Agriculture and Forestry - depreciation - total taxes (on products and production) + total subsidies (on products and production) **= agricultural factor income (net value added at factor costs)** - compensation of employees - rents - net interest **= agricultural entrepreneurial income** + compensation of employees **= agricultural entrepreneurial income plus compensation of employees** This income indicator is divided by **total AWU** in order to show the

[5] See https://ec.europa.eu/eurostat/statistics-explained/index.php/Wages_and_labour_costs#Labour_cost_components

[6] See also Annex I Chapter V Agricultural Income Indicators of Regulation (EC) No 138/2004 of the European Parliament and of the Council of 5 December 2003 on the economic accounts for agriculture in the Community.

[7] The compensation of employees is defined as total remuneration, in cash or in kind, payable by an employer to an employee in return for work done by the latter during the accounting period. It includes gross wages and salaries (in cash and kind); employers' social contributions (actual and imputed). (See Regulation (EC) No 138/2004, Part III C).

	average remuneration of agricultural labour (salaried and non-salaried combined). 2. **Farm net income plus wages and social security charges by total AWU** This specific indicator is based on farm-level data collected through the EU Farm Accountancy Data Network (FADN). Farm net income is defined as farm net value added minus wages and social security charges, rent and interest paid; it is therefore equivalent to agricultural entrepreneurial income described above. Again, wages and social security charges are added back into the equation so that the resulting indicator represents the compensation of all work (salaried and non-salaried) performed in the agricultural sector, as well as the income remaining with the enterprise. As for specific indicator A, the result is expressed per AWU (total labour input, salaried and non-salaried combined). 3. **Farm net income minus opportunity costs for own production factors (land and capital) by total family work units** For the subset of farms with family labour, this specific indicator looks specifically at the opportunity costs of own production factors (land and capital) and deducts them from farm net income, based on farm-level data collected through FADN (same as for specific indicator B). • **Opportunity costs for land** are calculated as total area of owned land multiplied by the average rent paid on rented land: (SE025-SE030) * SE375/SE030 Where SE025 = total utilised agricultural area; SE030 = rented utilised agricultural area; SE375 = rent paid. • **Opportunity costs for capital** are calculated as total net assets (excluding land, permanent crops and quotas) multiplied by the average interest paid on loans in the country: (SE436 – SE485 – SE446) * (SE380/SE485) Where SE436 = total assets closing valuation; SE485 = total liabilities; SE446 = land, permanent crops, quotas; SE380 = interest paid. The result is expressed per family work unit (unpaid labour unit). **Labour costs in industry, construction and services** are available in the Eurostat database [lc_lci_lev]. Since they are expressed per hour, they

	are converted into AWU by using the conversion factors provided in the 2015 inventories for Agricultural Labour Input (ALI) statistics[8]. Number of hours used for one AWU in agriculture: BG: 1856; CZ: 1800; DK: 1665; DE: 1800; EE: 1800; IE: 1800; EL: 2200; ES: 1824; HR: 1800; IT: 1951 (self-employed); CY: 2080; LV: 1840; LT: 2016; LU: 2200; HU: 1800; AT: 2000 (non-salaried); PL: 2120; PT: 1920; RO: 1800 ; SI: 1800; SK: 1800; FI: 1800; SE: 1800; UK: 2200 BE, FR, MT, NL: no figures provided. 1800 hours/AWU will be used. The main components of the various specific indicators are: **From the economic accounts for agriculture (Eurostat):** • Agricultural entrepreneurial income; • Compensation of employees. **From agricultural labour input statistics (Eurostat):** • **AWU in agriculture,** which corresponds to the work performed by one person who is occupied on an agricultural holding on a full-time basis. A distinction is made between salaried and non-salaried AWU, which together make total AWU. **From the national inventories for agricultural labour statistics (Eurostat):** • Number of hours considered to define one AWU. **From FADN (DG AGRI):** • Farm net income; • Wages and social security charges; • Total labour input[9]; • Unpaid labour input; • Opportunity costs for land (see calculation method above); • Opportunity costs for capital (see calculation method above). **From labour cost statistics (Eurostat):** • **Labour costs in industry, construction and services,** defined as core expenditure borne by employers for the purpose of employing staff. They include employee compensation, with wages and salaries in cash and in kind, employers' social security contributions and employment taxes regarded as labour costs minus any subsidies received, but not vocational training costs or other expenditure such as recruitment costs and spending on working clothes (by contrast with

[8] See https://ec.europa.eu/eurostat/web/agriculture/methodology.

[9] For specific indicator b, AWU data from FADN will be used to ensure internal consistency of the calculations. The FADN sample is different from the total agricultural sector as described in the economic accounts, since small farms are excluded.

	multiannual and annual labour cost data).
Unit of measurement	All three specific indicators are expressed in EUR/AWU. The comparison with non-agricultural labour costs is expressed as a percentage.
Data source	Eurostat – Economic Accounts for Agriculture (agricultural entrepreneurial income; compensation of employees); Eurostat – Agricultural Labour Input Statistics (AWU in agriculture; hours per AWU) Eurostat – Labour Cost Statistics (labour costs in industry, construction and services) DG AGRI - FADN (Farm Net Income; wages and social security charges; opportunity costs for land and capital; total labour input; unpaid labour input)
References / location of the data	1. **EUROSTAT DATABASE**[10]**:** 1.1. **Agricultural entrepreneurial income plus compensation of employees:** *Economic accounts for agriculture - values at current prices* [aact_eaa01] • Production value at basic price • Entrepreneurial income: code 31000 • Compensation of employees: code 23000 Since non-agricultural labour costs are only available at current prices, agricultural income indicators will also be used at current prices only. 1.2. **Agricultural labour input**: *Agricultural Labour Input Statistics: absolute figures (1 000 annual work units)* [aact_ali01] • Total labour force input 1.3. **Labour costs:** *Labour cost levels by NACE Rev. 2 activity* [lc_lci_lev]*:* • Labour cost for LCI (compensation of employees plus taxes minus subsidies): Industry, construction and services (except public administration, defence, compulsory social security) 2. **FADN DATABASE**[11]**:** • Farm net income: SE420 • Wages and social security charges: SE370 • Total labour input: SE010 • Unpaid labour input: SE015 • Total utilised agricultural area: SE025 • Rented utilised agricultural area: SE030;

[10] https://ec.europa.eu/eurostat/data/database

[11] European Commission | Agri food-data | Farm Economics (europa.eu)

	• Rent paid: SE375 • Total assets closing valuation: SE436 • Total liabilities: SE485 • Land, permanent crops, quotas: SE446; • Interest paid: SE380.
Data collection / dissemination level	National
Frequency	Annual
Timeliness	1 year
Comments/caveats	Figures should be interpreted with care owing to conceptual differences between the measurement of farmers' income from agricultural activities and average wages in the economy, and to the lack of reliable data on full-time equivalent labour statistics for the total economy for some Member States. Caution should also be exercised when comparing absolute levels of agricultural entrepreneurial income per AWU since they are not specifically designed to be comparable across countries and are influenced by different calculations depending on national rules.

INDICATOR C.27	**Indicator I.4 Supporting viable farm income**: Evolution of agricultural income level by type of farming (compared to the average in agriculture) **Indicator I.5 Contributing to territorial balance**: Evolution of agricultural income in areas with natural constraints (compared to the average)
Indicator Name	**Farm income by type of farming, region, by farm size, in areas facing natural and other specific constraints**
Definition	**Farm net value added (FNVA)** is the portion of agricultural output value that can be used to remunerate the fixed factors of production (labour, land and capital), whether they are external or family-owned factors. As a result, agricultural holdings can be compared regardless of the family/non-family nature of the factors of production used. It is calculated as follows: Value of agricultural production + Pillar I and Pillar II payments + any national subsidies + VAT balance - intermediate consumption - farm taxes (income taxes are not included) - depreciation. **= Farm Net Value Added** The value is calculated per annual work unit (AWU) in order to take into account the differences in the scale of farms and to obtain a better measure of the productivity of the agricultural workforce. The indicator consists of 5 specific indicators: 1. **Farm net value added by type of farming** 2. **Farm net value added by region** 3. **Farm net value added by economic farm size** 4. **Farm net value added by physical farm size** 5. **Farm net value added in areas facing natural and other specific constraints** For the grouping according to type of farming and economic size, the general types of farming (TF8) and economic size class (ES6) definitions, as implemented in the Farm Accountancy Data Network (FADN), will be used (see European Commission | Agri food-data | Farm Economics (europa.eu)). **Indicator I.4 Supporting viable farm income:** Evolution of agricultural income level by type of farming (compared to the average in agriculture). **Indicator I.5 Contributing to territorial balance:** Evolution of agricultural income in areas with natural constraints (compared to the average). 1: **TF8** 3: **ES6 grouping**

	1 Fieldcrops — 4 000 - < 8 000 EUR 2 Horticulture — 8 000 - < 25 000 EUR 3 Wine — 25 000 - < 50 000 EUR 4 Other permanent crops — 50 000 - < 100 000 EUR 5 Milk — 100 000 - < 500 000 EUR 6 Other grazing livestock — >= 500 000 EUR 7 Granivores 8 Mixed 2: Region: FNVA is provided by the FADN regions (European Commission | Agri food-data | Farm Economics (europa.eu)) 4: FNVA by physical farm size = Utilised Agricultural Area (UAA) (SE025) => 5 ha => 10 ha => 20 ha => 30 ha => 50 ha => 75 ha => 100 ha => 150 ha => 200 ha => 250 ha => 500 ha => 1000 ha => more 5: according to 3 classes: "ANC/LFA areas other than mountain", "mountain ANC/LFA areas" and "not in ANC/LFA areas".
Unit of measurement	1-5: Euro per AWU
Data source	**FADN sample survey of farms**
References / location of the data	SE425 in the FADN public database
Data collection / dissemination level	**National and by FADN division (similar to NUTS 2)**
Frequency	Annually
Timeliness	2-3 years
Comments/caveats	

INDICATOR C.28	
Indicator Name	**Gross fixed capital formation in agriculture**
Definition	The indicator measures **producers' investments, deducting disposals, in fixed assets during a given period plus certain additions to the value of non-produced assets** realised by the productive activity of producer or institutional units (ESA 2010 definition). Therefore, Gross fixed capital formation in agriculture (GFCF) is a key element for future competitiveness. It consists of 2 specific indicators: 1. **Gross Fixed Capital Formation (GFCF)** 2. **share of Gross Value Added (GVA) in agriculture**.
Unit of measurement	1: EUR million (in current prices) 2: %
Data source	Eurostat – Economic Accounts for Agriculture (EAA), National Accounts
References / location of the data	National data: table [aact_eaa01] (aact_eaa05 and aact_eaa07 were used to calculate GFCF at constant prices) Regional data: table [nama_10r_3gva] (GVA in agriculture, forestry and fishing) and table [nama_10_2gfcf]
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 1 and 2)
Frequency	Annual
Timeliness	1 year
Comments /caveats	GFCF variables for table [aact_eaa01]: Production value at basic price; 34000 Gross fixed capital formation (excluding deductible VAT); variables for table [nama_10r_2gfcf]: Agriculture, forestry and fishing. GVA variables for table [aact_eaa01]: Gross value added at basic prices; variable for table [nama_10r_3gva]: Agriculture, forestry and fishing. There are differences between national and regional data since the former is based on the Economic accounts for agriculture and the latter is related to the National Accounts (ESA 2010).

INDICATOR C.29	**Indicator I.6 Increasing farm productivity**: Total factor productivity in agriculture
Indicator Name	**Total factor productivity in agriculture**
Definition	**Total factor productivity (TFP) compares total outputs relative to the total inputs used in production of the output. As both output and inputs are expressed in term of volume indices, the indicator measures TFP growth.** The change in production and input volumes is measured over a defined period (2010=100). To aggregate the different output (and input) volume indices, the production (and input) values are used as weights. This allows capturing the relative importance between outputs, or inputs. **TFP reflects output per unit of some combined set of inputs: an increase in TFP reflects a gain in output quantity, which is not originating in from an increase of input use.** As a result, TFP reveals the joint effects of many factors including new technologies, efficiency gains, economies of scale, managerial skill, and changes in the organisation of production. TFP index is defined as the ratio between an Output Index (i.e. the change in production volumes over a considered period) and an Input Index (the corresponding change in inputs/factors used to produce them). Output and input indices are calculated as weighted averages of changes in produced quantities and in input quantities respectively, where the weights are represented by the production value of the various products and the expenditure for each of the four considered production factors (intermediate inputs, land, labour, capital). Depending on the type of average applied and the chosen reference period for the weights, the TFP indicator assumes different analytical forms. Laspeyres indices are defined as arithmetic means with weighting factors referring to the time 0 (base year), while Paasche indices are harmonic means with weighting factors referring to the time t (current year). $$TFP_{0}^{t}\_L = \frac{O_{0}^{t}\_L}{I_{0}^{t}\_L} =$$ In formula, the TFP Laspeyres index is given by: $$\frac{\left(\frac{q_{1t}}{q_{10}} * w_{10} + \frac{q_{2t}}{q_{20}} * w_{20} + \ldots + \frac{q_{nt}}{q_{n0}} * w_{n0}\right) / \left(w_{10} + w_{20} + \ldots + w_{n0}\right)}{\left(\frac{i_{1t}}{i_{10}} * x_{10} + \frac{i_{2t}}{i_{20}} * x_{20} + \ldots + \frac{i_{rt}}{i_{r0}} * x_{r0}\right) / \left(x_{10} + x_{20} + \ldots + x_{r0}\right)},$$ while TFP Paasche index is defined as:

	$$TFP_0^t\_P = \frac{O_0^t\_P}{I_0^t\_P} = \frac{\left(\left(\frac{q_{10}}{q_{1t}} * w_{1t} + \frac{q_{20}}{q_{2t}} * w_{2t} + \ldots + \frac{q_{n0}}{q_{nt}} * w_{nt}\right)/\left(w_{1t} + w_{2t} + \ldots + w_{nt}\right)\right)^{-1}}{\left(\left(\frac{i_{10}}{i_{1t}} * x_{1t} + \frac{i_{20}}{i_{2t}} * x_{2t} + \ldots + \frac{i_{r0}}{i_{rt}} * x_{rt}\right)/\left(x_{1t} + x_{2t} + \ldots + x_{rt}\right)\right)^{-1}},$$ where q_{jt} and i_{kt} are respectively the quantity of product j and factor k at time t, while w_{jt} and x_{kt} are the weights of product j and factor k within the agricultural sector. Finally, the geometrical average of the Laspeyres and the Paasche index gives the Fischer index, which benefits from the most suitable statistical properties. In formula, the TFP Fisher index is computed as follows: $$TFP\_F = \sqrt{TFP\_L * TFP\_P}$$
Unit of measurement	Index (3-year moving average)
Data source	The **Economic Accounts for Agriculture (EAA)** from Eurostat. The volume indices calculated by Eurostat are Laspeyres indices and changes in volume are measured using the weightings for the preceding year to guarantee the weightings are relatively up-to-date (see Reg. N° 138/2004). They correspond to the term q_{It}/q_{I0} of the equations displayed above. Precise indicators chosen in the EAA: - Change in output volume (q_{It}/q_{I0}): Volume Indices, n-1 = 100, Production value at basic price [aact_eaa05] - Output weights: Real price in Euro, 2010 = 100, Production value at basic price [aact_eaa04] - Change in input volume (i_{It}/i_{I0}) for every input except land and labour cost: Volume Indices, n-1 = 100, Production value at basic price [aact_eaa05] - Input weights: Real price in Euro, 2010 = 100, Production value at basic price [aact_eaa04] - Volume index for labour costs: Change in Total labour input measured in 1000 AWU [aact_ali01] - Correction of the weight for labour costs to cover the family labour costs: the compensation of employees is divided by the share of paid labour also directly available from the EAA [aact_ali01] Complementary data is required from: - the **Farm Structure Survey (FSS - Eurostat)** to assess the share of rented land (in order to correct the weight of land by including the own land) [ef_mptenure] - Integrated Farm Statistics (IFS - Eurostat) as of survey year 2020. - the **Agricultural Production Data – Crop Products** (**Eurostat**) for the volume index of the UAA [apro_cpnh]

	- the **Farm Accountancy Data Network** to estimate the national average depreciation rate. - **Annual Crop statistics:** Volume index for land costs: Change in Total UAA, UAA available in Eurostat – crop statistics [apro_cpnh]
References / location of the data	Eurostat: EAA, APRO, ALI, FSS (IFS); FADN
Data collection / dissemination level	EU, National (NUTS 0)
Frequency	Annual
Timeliness	1 year
Comments/caveats	The climatic conditions affecting crop yields have strong impact on the crop output and as a consequence on the indicator. Therefore a moving average over 3 years is to be calculated to smooth the weather effect. The level of detailed information required to compile the indices (especially for the Paasche Index) does not allow for calculating long time series and complicates the calculation for the EU aggregates. The length of the time series varies according to MS. There are breaks in time series and data is missing for some years, especially in the Agricultural Production Data. The methodology to value the fixed capital consumption seems to vary over time. Concerning the labour input any change in accounting rules has been normally smoothed. Nevertheless, this volume index is to be checked very carefully because the TFP indicator is very sensitive to any variation in labour input. The calculation of regional values is not possible due to the lack of data at such detailed geographical level.

INDICATOR C.30	
Indicator Name	**Labour productivity in agriculture, in forestry and in the food industry**
Definition	This indicator consists of 3 specific indicators: 1. **Labour productivity in agriculture** 2. **Labour productivity in forestry** 3. **Labour productivity in the food industry** For each specific indicator, labour productivity is calculated as Gross Value Added (GVA) per unit of labour input. GVA is recorded at basic prices. It is output valued at basic prices less intermediate consumption valued at purchasers' prices. The basic price is defined as the price received by the producer, after deduction of all taxes on products but including all subsidies on products. GVA is measured in chain linked volumes (2015), million euro. Labour input includes both employees and self-employed to provide total employment in the respective sector. It is measured in thousand persons. A three-year average mitigates short-term fluctuations. Labour productivity is then calculated as the ratio of the averages: (three year average GVA) / (three year average labour input). 1 **–** The agricultural sector corresponds to division A01 in NACE rev.2 (crop and animal production, hunting and related service activities). 2 - The forestry sector corresponds to division A02 in NACE rev. 2 (Forestry and logging). 3 – The food industry corresponds to division C10-C12 in NACE rev.2 (manufacture of food products; beverages and tobacco products)
Unit of measurement	1 - 3: EUR million/number of persons (in thousand)
Data source	Eurostat
References / location of the data	For GVA: National Accounts: table [nama_10_a64] For labour input: National Accounts, table [nama_10_a64_e]
Data collection / dissemination level	EU, National (NUTS 0)
Frequency	Annual
Timeliness	National data: 1-2 years EU aggregates: 3-4 years
Comments/caveats	

INDICATOR C.31	**Indicator I.7 Harnessing Agri-food trade:** Agri-food trade imports and exports
Indicator Name	**Agricultural imports and exports**
Definition	This indicator consists of 4 specific indicators covering the EU trade agri-food (intra-, extraEU; total, exports, imports, and trade balance); as well as 7 sub-indicators providing more in-depth information (total and separate values for commodities, other primary products, processed, food preparations, beverages, non-edible products): 1. **Indicator I.7 EU agri-food (intra + extra) trade value** (imports + exports) a. **Total agri-food intra-EU trade value** (imports + exports) b. **Total agri-food extra-EU trade value** (imports + exports) 2. **EU agri-food trade balance (intra + extra)**) a. **Agri-food trade balance extraEU** 3. **EU agri-food exports (intra + extra)** a. **EU agri-food exports intra** b. EU **agri-food exports extra** 4. **EU Agri-food imports (intra + extra)** a. **Agri-food imports intraEU** b. **Agri-food imports extraEU** The indicator is calculated by Directorate-General for Agriculture and Rural Development (DG AGRI) yearly on the basis of EUROSTAT Comext data, using the definition of agricultural products developed internally by DG AGRI unit A.1 and used in DG AGRI publications on agri-food trade (cf. https://ec.europa.eu/agriculture/trade-analysis/statistics_en).
Unit of measurement	1 – 4: EUR billion
Data source	Data: EUROSTAT COMEXT database Information on product coverage/categories: https://ec.europa.eu/agriculture/trade-analysis/statistics_en
References / location of the data	COMEXT database – declarant: EU, partner: intra-,extra-EU, trade flow: export and import; Combined Nomenclature codes as defined in DG AGRI agricultural trade statistics publications; trade regime: 4
Data collection / dissemination level	EU, National (NUTS 0)
Frequency	Data availability: monthly Indicator calculation: yearly
Timeliness	Year N is available in March N+1
Comments/caveats	

INDICATOR C.32	
Indicator Name	**Tourism infrastructure**
Definition	Tourism infrastructure in rural areas is measured through 2 specific indicators : 1. **number of bed places in tourist accommodations** 2. **share of total bed places by degree of urbanisation** From 2012, data are collected at NUTS 2 level, according to Regulation (EU) No 692/2011 concerning European statistics on tourism and repealing Council Directive 95/57/EC. Under this regulation, **data are collected according to the following degrees of urbanisation:** 1. Densely-populated area (cities/large urban area) 2. Intermediate urbanised area (towns and suburbs/small urban area) 3. Thinly populated area (rural area) According to the definitions of urban areas used in Europe (in line with the United Nations Population Division (UNPD)), urban areas correspond to densely populated and intermediate density areas while rural areas equal thinly populated areas.
Unit of measurement	1: number of bed places 2: %
Data source	Eurostat – Tourism statistics According to Regulation (EU) 692/2011 of the European Parliament and of the Council, the data is available from 2012 onwards.
References / location of the data	For national data: table [tour_cap_natd] For regional data: table [tour_cap_nuts2d]
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 1 and 2)
Frequency	Annual and monthly. Annual for regional data
Timeliness	1 year
Comments/caveats	Collective tourist accommodation establishments include hotels, holiday and other short-stay accommodation, camping grounds, recreational vehicle parks and trailer parks (NACE r.2 divisions I551-I553). When the number of bed places in one category of establishment is missing, the sum of available data is provided. The number of bed places in an establishment or dwelling is determined by the number of persons who can stay overnight in the beds set up in the establishment (dwelling), ignoring any extra beds that may be set up by customer request. The term bed place applies to a single bed, double bed being counted as two bed places. The unit serves to measure the capacity of any type of accommodation. A bed place is also a place on a pitch or in a boat on a mooring to accommodate one person. One camping pitch should equal four bed places if the actual number of bed places is not known. Countries can apply a data collection threshold (to reduce burden on administrations and on smaller SMEs). In practice, most countries exclude establishments offering less than 10

	(some countries: 20) bed-places from the scope of observation. The structure of accommodation (in terms of size/capacity) of the establishments can be different in cities and in countryside, with the first having more relatively big chain hotels and the latter having more small family businesses. It should be pointed out that this could affect the indicator (= underestimating the absolute infrastructure as well as its share in total).

INDICATOR C.33	
Indicator Name	**Agricultural area under organic farming**
Definition	The indicator has 2 specific indicators: 1. **number of hectares under organic farming** 2. **share of area under organic farming in the total utilised agricultural area (UAA)** The area under organic farming is classified as follows: • fully converted to organic farming • under conversion to organic farming • total fully converted and under conversion to organic farming Farming is considered to be organic if it complies with the relevant EU legislation (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32007R0834&from=EN). The area defined refers to the UAA excluding kitchen garden from Eurostat's statistical table "Organic crop area by agricultural production methods and crops" [org_cropar]. It might not be strictly comparable with the definition of UAA (only area of main crops) in the crop production statistics. Data on the area under organic farming at regional level come from the FSS/IFS.
Unit of measurement	1: number of ha 2: %
Data source	Eurostat – Organic farming annual data collection Eurostat – Farm Structure Survey (FSS)/Integrated Farm Statistics (IFS) Eurostat – Crop production statistics
References / location of the data	For national data: Area under organic farming table [org_cropar] from 2012 onwards For regional data: Table [ef_lus_main] contains data from 2013 onwards. Data from FSS is available on request to Eurostat.
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 2)
Frequency	Annual for the area under organic farming. FSS/IFS: full census every 10 years, intermediate surveys 2 times in-between.
Timeliness	1 year FSS/IFS: 2 years
Comments/caveats	There are differences between national and regional data because the former is collected annually mainly based on administrative data, and the latter is based on the Farm structure survey (FSS). It means that the

	samples and data collection methods are different. **This indicator is also used for the EU reporting on UN Sustainable Development Goals.**

INDICATOR C.34	
Indicator Name	**Farming intensity**
Definition	**Farming intensity** is expressed as the percentage of **utilised agricultural area (UAA) that is farmed with low, medium or high input intensity.** The input intensity of a farm can be defined as the level of inputs used by the farm per unit of production factor (in general land). Intensification is defined as the increase in farm intensity, while extensification describes the opposite trend. Farms are classified into intensity categories according to an estimate of input volume per hectare of UAA. The inputs considered are fertilisers, pesticides, other crop protection products and purchased feed. This approach allows covering both crop and livestock productions. The volume of inputs used (per hectare) is estimated by dividing input expenditures (per hectare) by the input price index for the year and country in question. This results in input expenditures per hectare in constant national input prices. Fertiliser expenditure (purchased fertilisers and soil improvers) is divided by the fertiliser price index in the country of the same year in order to estimate the volume used. Similarly, crop protection expenditure (plant protection products, traps and baits, bird scares, anti-hail shells, frost protection) is divided by the pesticide price index in the country of the same year. Purchased feed cost is also divided by the feed price index in the country of the same year. The result is thus expressed in constant inputs prices (Euro per ha). The method allows not only to deduct inflation, but also the fluctuation of input prices. Thus, it estimates the trend in the volume of inputs used per hectare. However, it does not capture differences in input prices between countries and the differences in prices within each category of inputs (for example between a pesticide A and a pesticide B). Therefore, it does not give the exact volume of inputs used for a specific country and year. In a second step, the distribution of the UAA is considered by the ranked input intensity (bivariate approach) in each geographical level (EU, MS, NUTS) for the specific year of reference (2010 for all MSs, 2013 for HR). Three classes of intensity (low, medium, high) are then defined, by deriving the associated level of input corresponding to the 33rd (q33) and the 66th (q66) UAA quantiles. A farm is classified under the class "low intensity" if its input level is below or equal to the intensity value associated to the Q33 of UAA. A farm is classified under the class "high intensity" if its input level is greater than the intensity value associated to the Q66 of UAA. A farm is classified under the class "medium intensity" if its input level is greater than the intensity value associated to the Q33 of UAA and it is below the intensity value associated to the Q66 of UAA. Considering the 2017 FADN data, for EU-28, as well as for EU-27 without the UK, those thresholds are represented by 88 euros/ha for low intensity farms, by 560 euros/ha for high intensity farms, and by between 88 and 560 euros/ha for medium intensity farms. These levels should not be considered as strict cut-off values, but rather as reference in time, in order to be able to study the evolution of farm intensification through the years. Intensification in a country with very low intensity does not mean the same for the environment than intensification in a country with high

	intensity. The indicator is expressed as the share of total UAA by farming intensity, broken down by MS, and in addition by Type of Farming and by Economic Size.
Unit of measurement	%
Data source	- The main data source is DG AGRI - Farm Accountancy Data Network (FADN). - Eurostat - Economic accounts for agriculture - indices: volume, price, values.
References / location of the data	- DG AGRI - Farm Accountancy Data Network (FADN). Name of current variables defined in the FADN: SE295 Fertilisers; SE300 Crop protection; Purchased feed, SE025 Utilised Agricultural Area: European Commission | Agri food-data | Farm Economics (europa.eu); Eurostat - Economic accounts for agriculture - indices: volume, price, values [aact_eaa05]. Products: 19030 - FERTILISERS AND SOIL IMPROVERS, 19040 - PLANT PROTECTION PRODUCTS AND PESTICIDES, 19060 - ANIMAL FEEDINGSTUFFS.
Data collection / dissemination level	EU, National (NUTS 0), Regional (NUTS 2); primary data refer to FADN regions.
Frequency	Annual
Timeliness	2 years
Comments/caveats	The same methodology is applied to the agri-environmental indicator 12 Intensification/Extensification http://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental_indicators

INDICATOR C.35	**Indicator I.29 Responding to consumer demand for quality food**: Value of production under EU quality schemes and organics
Indicator Name	**Value of production under EU quality schemes and organics** compared to total value of agricultural and food production
Definition	It consists of 3 specific indicators: 1. **total value of production under EU quality schemes and organics** as well as the share of the total agricultural and food production value 2. **value of production by EU quality schemes** – PDO, PGI and TSG (Council Regulation (EC) No 510/2006) and share of total agricultural and food production value 3. **value of certified organic production** and share of total agricultural and food production value It covers the four EU quality schemes: agricultural products and foodstuffs (Reg. (EU) No 1151/2012), wines (Reg. (EU) No 1308/2013), spirit drinks (Reg. (EC) No 110/2008), and aromatised wine products (Reg.(EU) No 251/2014), as well as certified organic production (Reg. (EC) No 834/2007).
Unit of measurement	1 – 3: sales in EUR and %
Data source	External study commissioned by the Commission.
References / location of the data	
Data collection / dissemination level	Data are available at the producer's level. Their availability depends on the readiness of producer to provide them. There is no systematic data collection established EU wide but some Member States have national data collections. The indicator will be established at EU level, based on an estimation provided by a study.
Frequency	Every four years
Timeliness	Approximately 2 years
Comments/caveats	Given the lack of a clear definition of quality, the EU PDO/PGI schemes were taken as a proxy for quality production as well as the certified organic production. The indicator could be biased in case some producers (notably the larger ones) do not provide data. So far this is the only method to obtain data; Member States are reluctant to ensure a systematic data collection of the value of production under EU quality schemes and certified organic. The latest study, finalised in 2019, is available here.

INDICATOR C.36	**Indicator I.19 Increasing farmland bird populations**: Farmland Bird Index
Indicator Name	**Farmland Bird Index**
Definition	The Farmland Bird Index is intended as proxy to assess the biodiversity status of agricultural landscapes in Europe. Birds are high in the food chain and therefore are considered good indicators for the overall state of biodiversity. The Farmland Bird Index is a composite index that measures the rate of change in the relative abundance of common bird species that are dependent on farmland. Member States select their own species set, following guidelines from the European Bird Census Council (EBCC). The species basket is different for each Member State, because of their distribution ranges and their different relevance concerning different agricultural habitats in the EU. Population trends are derived from the counts of individual bird species at census sites and modelled as such through time. In the absence of other biodiversity monitoring networks, producing this indicator takes profit of the existing networks of birdwatchers, coordinated by NGOs. Population counts are carried out by a network of experts and volunteer amateurs, fieldworkers coordinated within national sampling schemes. Other reporting frameworks: An EU aggregated indicator is used in a number of reporting frameworks,: ○ Agri-environmental indicator (AEI) 25: Population trends of farmland birds; http://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental_indicator_-_population_trends_of_farmland_birds ○ SDGs – Biodiversity: Common Birds Index (Eurostat). https://ec.europa.eu/eurostat/statistics-explained/index.php?title=SDG_15_-_Life_on_land_(statistical_annex)#Common_bird_index For producing the EU aggregate index, a list of selected species is used (the so-called "EU list of species", currently consisting of 39 species). The national indices for these species are combined into a European index, by using a weighting factor accounting for the national proportion of the total European population. Then the methodology described below is followed for calculating the index. Methodology: The index for each Member State should be calculated based on the national species list. An index is first calculated for each species independently. The indices for the set of species are then combined on a geometric scale to create a multi-species aggregate index. National indices are compiled by each Member State using common software and methodology. A software modelling tool carries out the modelling work for estimating the index. For more detailed information on the methodology: https://pecbms.info/methods/, and the Eurostat indicator metadata: (https://ec.europa.eu/eurostat/cache/metadata/EN/t2020_rn130_esmsip2.htm)
Unit of measurement	The index is calculated with reference to a base year, set at 100. Trend values express the overall population change over a period of years.
Data source	• EBCC/RSPB/BirdLife/Statistics Netherlands: the European Bird Census Council (EBCC) and its Pan-European Common Bird Monitoring Scheme (PECBMS),

	https://pecbms.info/ Eurostat does not receive any of these data directly from the Member States: • National index: Eurostat, as of 2018, receives data from the OECD, which receives data from national offices who are part of the PECBMS network. • European index: data are transmitted to Eurostat and published in the statistics database: Environment/Biodiversity.
References / location of the data	Location of the data: Eurostat, Environment statistics, Biodiversity: • Table [env_bio2]: national farmland bird index. • Table [env_bio3]: EU farmland bird index. References: • Agri-environmental indicator 25: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agri-environmental_indicator_-_population_trends_of_farmland_birds • EBCC/PECBMS : European Birds Census Council/ Pan-European Common Bird Monitoring Scheme https://pecbms.info/
Data collection / dissemination level	EU (on the basis of the number of Member States which delivered data every year. E.g.: in 2008 only 15 Member States delivered data; for the 2014 EBCC/PECBMS updates data is available for 25 EU Member States, from 1990 to 2012), National (NUTS 0) (some Member States are not covered. See caveats section).
Frequency	Annual (In principle, these data are updated on a yearly basis at national and EU level. Ability to provide updates of indicators at national level depends on the capacity of the national data providers). Data availability 2019: 2017 national data Common farmland bird index, EU aggregates Common farmland species 2016. For a small number of Member States data are available from 1980 and cover different periods depending on data availability in each Member State.
Timeliness	1-3 years
Comments/caveats	[Indication capacity]: The relation between agricultural activities and farmland bird populations should be interpreted very cautiously. There is abundant literature on the impact of agricultural activities on farmland birds, but there are many other factors affecting the status of their populations, and the relative importance of these factors along time is not well understood. There is also a number of methodological caveats that need to be addressed to properly use and interpret this indicator, concerning the design of the national monitoring schemes. The fluctuations between model runs show that small rises or falls in the indicator should be regarded as artefacts. It is best to look only at the trends from the defined baseline. [Readily available?]: 25 EU countries are currently covered. The quantity and quality of data at national level, and the support of national authorities toward these monitoring schemes, are other challenges under analysis. Ability to provide updates of indicators at national level depends on the capacity of the national data providers. [Downscaling] The index can be estimated at national and EU level. Downscaling

	at regional (NUTS 2) level is currently not possible. The main limiting factor is the insufficient number and spatial heterogeneity of sampling units. [Quality:] The amount of sampling plots/transects and the statistical representativity of birdwatchers widely varies at regional, national and EU levels. This is taken into account in the statistical analysis to calculate the indicators. As for the time series, the number and type of species chosen from the selected common list by each country is remaining stable over time unless solid justification is provided. [Baseline:] The baseline year needs to be defined. In Eurostat's database, data are presented with four different bases: 1990, 2000, the latest year available and the national base year. **This indicator is also used for the EU reporting on UN Sustainable Development Goals (SDGs).** For SDGs the first year in the time series with sufficient points has been established to be year 2000 (table sdg_15_60).

INDICATOR C.37	**Indicator I.20 Enhancing biodiversity protection**: Percentage of species and habitats of Community interest related to agriculture with stable or increasing trends, with breakdown of the percentage for wild pollinators species[12]
Indicator Name	**Percentage of species and habitats of Community interest related to agriculture with stable or increasing trends**
Definition	This indicator assesses the conservation status trends of those habitats and species of Community interest, i.e. listed in the relevant Habitats Directive annexes that are considered to be strongly linked to agro-ecosystems. In addition, it provides the conservation status trends specifically for pollinators. 1. Percentage of species and habitats of Community interest related to agriculture with stable or increasing trends 2. Percentage of pollinators species of Community interest related to agriculture with stable or increasing trends Species and habitats of Community interest are those in danger of disappearance in their natural range, rare or endemic, or characteristic of one or more of the EU biogeographical regions; these species and habitats are listed in the annexes of the Habitats Directive. The existence and long-term survival of some of these habitats and species is strongly linked to the presence and good conditions of certain agricultural ecosystems; their conservation status is influenced by the management of agricultural systems, the practices implemented, land abandonment, intensification and conversion into other land uses. The Habitats Directive does not explicitly identify species and habitats dependent on agro-ecosystems. The lists of species and habitats (one list per Member State with indication of the relevant biogeographical regions) are elaborated taking into account the works of inter alia Halada et al. (2011), Roscher et al. (2015) and the guidance "farming and Natura 2000" (European Commission (2014) [13]. These have been updated to reflect updated knowledge, and validated by the Member States. The species and habitats composition will vary between biogeographical regions and between Member States. For calculating the indicator, only species and habitats most dependent on farming and related management will be considered. For pollinators, the indicator will build on a subset of the same species lists, i.e. the relevant species among the 38 butterflies listed in the Habitats Directive under Annex II and Annex IV, but needs to be tested. For both, species and habitats, and for pollinators, the overall assessment of

[12] The assessment of the trends for pollinators shall be performed by using relevant Union measures for pollinator indicators, in particular by a pollinator indicator and other measures adopted through the governance framework of the EU Biodiversity Strategy for 2030 (Commission Communication of 20 May 2020) on the basis of the EU Pollinators Initiative (Commission Communication of 1 June 2018).

[13] http://ec.europa.eu/environment/nature/natura2000/management/docs/FARMING%20FOR%20NATURA%202000-final%20guidance.pdf

	conservation trend is as follows: 'improving +', 'deteriorating -', 'stable =', 'unknown x'. Methodology: $I.19 = \frac{\text{Number of assessments that indicate an improving or stable trend}}{\text{Total number of assessments}}$ Number of assessments: depends on total number of species and habitats, and on the number of biogeographical regions where they are represented (e.g. a species present in 2 biogeographic regions will have two assessments).
Unit of measurement	Percentage of assessments with a stable or improving conservation status trend.
Data source	Member States regularly report in accordance with Article 17 of the Habitats Directive on the status and trends of habitats and species of Community interest.
References / location of the data	Data are reported to the European Environment Agency (EEA) by MS. The EEA would carry out the necessary calculations.
Data collection / dissemination level	National (NUTS 0). Values are assessed at the biogeographical level of each Member State, in such a way that results can be aggregated at the level of the Member States.
Frequency	Member States report every six years taking the developments over the six-year period into consideration. Next reports due in 2019 (for 2013-2018), 2025 (2019-2024) and 2031 (2025-2030). Information relating to State of Nature (2019) report is available at https://www.eea.europa.eu/themes/biodiversity/state-of-nature-in-the-eu/state-of-nature-2020
Timeliness	Producing the indicator is estimated to take 6-12 months from reporting time. Delivery time will depend on the reporting timeliness by Member States.
Comments/caveats	Assessing the conservation status and its trend of species and habitats of Community interest dependent on agriculture will contribute to reflect on the impact of agriculture in maintaining and restoring important components of the EU biodiversity. However: a) there can be a variable time lag between changes in agricultural practices pattern and the impact on habitats and species, which depend on agro-ecosystems; b) Other factors, such as climate change and invasive species and other human pressures, influence the status and trends of those species and habitats. The indication of the high-ranked pressures and threats for species and habitats associated with agriculture is available in the State of Nature report[14]. The main indicator is under development and should be ready by the second half of 2021. Possibilities for some weighting factors in the formula (e.g. to reflect representativeness of habitats/species) are being considered. The indicator could be scalable by biogeographic regions. Options for downscaling

[14] https://www.eea.europa.eu/publications/state-of-nature-in-the-eu

	at NUTS 2 level have to be analysed. The simplicity of this indicator is a strong asset and the focus on trends make it robust. Due to the fact that Member States apply different approaches to collect the data (complete inventories, sampling, expert opinion), the level of accuracy of the data set provided by Member States will vary. An index, based on the 'Method used' as reported by Member States for most of the data, will provide contextual information on the robustness and relevance of the impact indicator. Reporting by Member States does not fit with the CAP timing; the baseline would be set at the beginning of the funding period, and then using the reporting dates (2019-2025-2031). There would persist a gap between the period reported and the CAP implementation period. The mid-term evaluation of the indicator can be problematic due to the legal 6-year frequency of reporting obligations by MS.

INDICATOR C.38	**Indicator I.17 Reducing pressure on water resource**: Water Exploitation Index Plus (WEI+)
Indicator Name	**Water use in agriculture**
Definition	1. Water use in agriculture is assessed with the WATER EXPLOITATION INDEX PLUS (WEI+), which provides an estimated measure of the total water use as a percentage of the renewable freshwater resources (groundwater and surface water) for a given territory and time period. It is an advanced version of the WEI. The WEI+ addresses regional and seasonal aspects of water scarcity. In addition, it also takes water use (water abstraction minus water returned) into account. It identifies areas prone to water stress due to exceeding water abstraction and use on a seasonal scale in relation to the resources available. Methodology: $\textbf{WEI+} = \frac{\textbf{Water use}}{\textbf{Renewable water resources (RWR)}}$ RWR= Outflow + (Abstraction – Return) + Change in storage Change in storage= Water in (Lakes + Reservoirs) – Water out (Lakes + Reservoirs) Water use= Abstraction – Return (all economic sectors covered) As an impact indicator for the CAP, two specific indicators could be derived from the WEI+: 2. **A specific indicator expressing the relative pressure of agriculture compared to other economic sectors**, at national level and on an annual basis. 3. **A specific indicator expressing the change over time in the volume of water used by agriculture**, at national level and on an annual basis. More details on the calculation and units of measurement are being developed. WEI+ is expressed as a percentage of water use over the renewable water resources available.
Unit of measurement	%
Data source	- **WISE SoE 3** - **Eurostat and OECD joint Questionnaire on Inland Waters** - **National Statistical Offices** (on ad-hoc basis, not part of formal data collection by the EEA) - **E-OBS gridded dataset** (on hydro-climatic variables) - **'Return'**: The average water return rate, which is implemented in the WEI+, reflects differences in irrigation technology and efficiency improvements..
References / location of the data	- **WISE SoE 3:** https://rod.eionet.europa.eu/obligations/184 - **Eurostat** [sdg_06_60] - **Eurostat and OECD Joint questionnaire**

	https://ec.europa.eu/eurostat/documents/1798247/6664269/Data+Collection+Manual+for+the+OECD_Eurostat+Joint+Questionnaire+on+Inland+Waters+%28version+3.0%2C+2014%29.pdf/f5f60d49-e88c-4e3c-bc23-c1ec26a01b2a - **National Statistical Offices**: on MS nat. stat. offices website - **E-OBS gridded dataset:** https://www.ecad.eu/download/ensembles/download.php https://www.knmi.nl/over-het-knmi/about
Data collection / dissemination level	National (NUTS 0) and potentially applicable at River Basin District or Sub Unit level.
Frequency	The updating frequency will be carried out when demanded. Result will depend on updating frequency of data sources. - WISE SoE 3: annual on MS level or monthly/ seasonal/ annual River Basin District (RBD) or Sub Unit (SU) level. All on voluntary basis. - Eurostat and OECD joint Questionnaire: annual at MS level - National Statistical Offices: no formal consultation/reporting process. - E-OBS gridded dataset: published daily, then aggregated to monthly scale.
Timeliness	
Comments/caveats	[Indication capacity] It sets environmental conditions in relation to pressures from sectors. It allows estimating the pressure a sectors exerts on the natural water resources, compared to other sectors. For both specific indicators it should be further explored how much a comparison between years is conceptually reasonable when considering the level of gap filling. *[Readily available?]:* The indicator is now available: - Q4 2019: WEI+ will be available at MS level (currently, at River Basin district and sub-basin level). *[Downscaling*] There are different options to present the information of the WEI+: - at MS level on annual resolution, or - at finer spatial and temporal scales i.e. RBD or SU level on seasonal resolution. Both options come with pros and cons, notably on the interpretation of the results. For evaluation purposes, all the above ways to express the indicator could be useful. *[Quality:]* Some caveats remain: - WISE SoE 3: holds large gaps in the data coverage particularly on water abstraction and water use for irrigation. Since 2010, the reporting rate of Member States on the water abstraction for irrigation has been dramatically decreasing. No or very low reporting together with large breaks in the time series on water abstraction for agriculture from some MS. - Similar to the streamflow data which needs large gap filling to be implemented with the Joint Research Centre (JRC) LISFLOOD data.

	- Eurostat and OECD Joint questionnaire: data presents large temporal and spatial gaps in time series. That limits to provide robust overview on the irrigation pressure on renewable water resources. - National Statistical Offices: minor benefit as websites are in national languages and it is difficult to find data sets and also definitions are very diverse. - "Return": Some of Member States have reported data on this variable during the last data-reporting stream in 2018 but it is still far from being sufficient. **An earlier version of this indicator is used for the EU reporting on UN Sustainable Development Goals.**

INDICATOR C.39	**Indicator I.15 Improving water quality:** Gross nutrient balance on agricultural land
	The indicator C.39 Water quality is composed by three specific indicators: **1. Gross nutrient balance – nitrogen;** **2. Gross nutrient balance – phosphorus** **3. Nitrates in groundwater**
Indicator Name	**Water quality** **1. Gross nutrient balance - nitrogen**
Definition	The indicator illustrates the potential threats to water quality in the presence of a nutrient surplus from agricultural soils, at an annual basis. For nitrogen, a deficit in agricultural soils represents a threat to soil quality. The **gross nutrient balance for nitrogen** presents a link between the agricultural activities responsible for high nitrogen loads and the environmental impact and helps identifying the factors which contribute to the nitrogen surplus and shows the change over time. Nitrogen is added to the soil by mineral and organic fertilisers, grazing animals, atmospheric deposition and biological nitrogen fixation, while harvesting of crops, grazing and removal of residues remove nitrogen from the soil. A lack of nitrogen may cause degradation in soil fertility and erosion, while an excess may cause surface and groundwater (including drinking water) pollution and eutrophication. Nitrogen balances are monitored for the purposes of the Water Framework Directive and for the Nitrates Directive. The following indicator already exists: Agri-environmental indicator 15 Gross Nitrogen Balance: Potential surplus of nitrogen on agricultural land, http://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental_indicator_-_gross_nitrogen_balance The indicator is part of the Resource Efficiency Scoreboard, the Agri-environmental indicators, and the SDG indicators. Some countries prefer to use the fertilised areas, i.e. they have removed rough grazings from the agricultural area.
Unit of measurement	kg N/ ha/ year
Data source	Statistical Office of the European Union (Eurostat), based on data reported by the countries (currently only available for those countries that report. Compulsory transmission of Gross Nutrient Balance data are planned to be part of the future legislation on agricultural statistics, in the Regulation on Statistics of Agricultural Input and Output (SAIO), planned to be adopted by the Commission by the end of 2020. Data come from multiple sources including the consumption of mineral fertilisers and seeding and plant material, livestock population and manure import and exports, use of other organic fertilisers in agricultural production, atmospheric deposition, biological nitrogen fixation, crop and fodder production and crop/fodder residues removal or burning, and areas of various types of crops. The land types included are arable land, permanent crops and permanent grassland. Further, coefficients are required, among other to estimate nutrient excretion per livestock and fodder yields.

	For the countries which don't provide data, estimates are calculated and published by Eurostat based on various available data sources, most importantly the Eurostat fertilizers, crop and livestock statistics, National inventory submissions to UNFCCC and CLRTAP, Fertilizers Europe and FAO database. The EU aggregate is also estimated.
References / location of the data	Eurostat: Gross nutrient balance [aei_pr_gnb] https://ec.europa.eu/eurostat/cache/metadata/en/aei_pr_gnb_esms.htm https://ec.europa.eu/eurostat/cache/metadata/en/t2020_rn310_esmsip2.htm
Data collection / dissemination level	National (NUTS 0), covering <20 countries of the EU
Frequency	Data are annual. Indicator is updated every two years.
Timeliness	> T+2 years New data points are disseminated within 3 years after the reference year.
Comments/caveats	[*Indication capacity*] Data at national level and annual national balances can mask important regional or monthly variations. As the indicator integrates the most important agricultural parameters with regard to potential nitrogen surplus, it is a robust measure for nutrient leaching risk, directly linked with agriculture. However, the indicator is only indirect; it shows the potential risks, depending on local soil conditions and farm management practices, rather than the actual water quality trends. The indicator is captive of the methodologies used to calculate coefficients and the availabilities of national coefficients, plus the recalculation of coefficients when national practices change. The use of Tier 1 approaches may prevent tracking progress and policy effectiveness. With no work on the coefficients, the only changes recorded are related to changes in production. Data are not comparable between countries, but the trends are. *[Readily available?]:* The indicator is already available 2004-2015 for EU-28. As of reference year 2016, it will be available for all EU MS who submit the necessary data to Eurostat, currently around 17 countries. *[Downscaling*] In the future, it could be considered how to make data available at regional (NUTS 2) level, using JRC modelling data, or with MS data when they have them available. *[Quality:]* Details on accuracy can be found in the metadata of the source datasets. There is high uncertainty in some coefficients used. The problem is that the indicator is only a snapshot at a point in time. It does not consider the past-cumulated surplus. I.e, the risk to water quality degradation does not come from the actual surplus, but also from past surpluses.

INDICATOR C.39	**Indicator I.15 Improving water quality:** Gross nutrient balance on agricultural land
Indicator Name	**Water quality** **2. Gross nutrient balance – phosphorus**
Definition	**Gross Phosphorus Balance (GNB-P)**: Potential surplus of phosphorus on agricultural land (Gross Phosphorus Surplus). The gross nutrient balance provides an estimate of the potential water pollution. It represents the total potential threat of phosphorus surplus in agricultural soils to the environment. When P is applied in excess, it can cause surface and groundwater (including drinking water) pollution and eutrophication.
Unit of measurement	kg P/ ha/ year.
Data source	Statistical Office of the European Union (Eurostat), based on data reported by the countries (only available for those countries that report).
References / location of the data	Eurostat: Gross nutrient balance (aei_pr_gnb) https://ec.europa.eu/eurostat/cache/metadata/en/t2020_rn310_esmsip2.htm
Data collection level	National (NUTS 0), covering <20 countries of the EU
Frequency	Data are annual. Indicator is updated every two years.
Timeliness	> T+2 years New data points are disseminated within 3 years after the reference year.
Comments/caveats	Contrary to nitrogen, phosphorus can be loaded into agricultural soils. In several places in the EU, soil is lacking phosphorus and a surplus (loading) can improve soil fertility in the longer run. The problem is that the indicator is only a snapshot at a point in time. It does not consider the past-cumulated surplus. I.e., the risk to water quality degradation does not come from the actual surplus, but also from past surpluses. This is particularly true for phosphorus saturated soils, where P leaching occurs even in negative surplus areas.

INDICATOR C.39	**Indicator I.16 Reducing nutrient leakage**: Nitrates in ground water - Percentage of ground water stations with nitrates concentration over 50 mg/l as per the Directive 91/676/EEC
Indicator Name	**Water quality** **3. Nitrates in groundwater**
Definition	Nitrate pollution is measured by current values and trends in nitrate concentrations in groundwater and rivers, expressed in mg NO3/l for groundwater and mg N/l for rivers. This indicator shows the potential impact of agriculture on groundwater quality due to pollution by nitrates. It consists on an index measuring the % of groundwater monitoring sites with nitrates' concentration (NO3-mg/l) over 50 mg/l for groundwater. It makes a linkage with the Nitrates Directive (91/676/EEC) aiming to control nitrogen pollution and requiring Member States to identify groundwaters that contain more than 50 mg/l nitrate. The following related indicators already exist, but there might be some differences with I.16: - Agri-environmental indicator 27.1 Water quality – Nitrates in freshwater: nitrate pollution of water. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:Agri-environmental_indicator_-_nitrate_pollution_of_water - CSI 020 Nutrients in freshwater (European Environment Agency). Concentrations of nitrate in rivers and groundwater. https://www.eea.europa.eu/data-and-maps/indicators/nutrients-in-freshwater/nutrients-in-freshwater-assessment-published-9 Indicator I.15 Gross Nitrogen Balance on agricultural land, supplements this water quality indicator.
Unit of measurement	% of groundwater stations above the concentration threshold (50 mg NO3/l)
Data source	Data from the Nitrates Directive reporting system (DG Environment): national and river basin level. European Environment Agency (EEA) – Nutrients in freshwater: Data voluntarily reported by Member States (EEA Member Countries) via the WISE/SOE (State of Environment) data flow annually. (Potential supplement)
References / location of the data	Location of data: EEA website, based on data reported to EIONET: Waterbase_rivers, Waterbase_groundwaters, CSI020 , http://www.eea.europa.eu/data-and-maps/indicators/nutrients-in-freshwater References: - European Environment Agency (EEA): WISE-SoE Water Information System for Europe – State of Environment - Council Directive 91/676/EEC concerning the protection of waters against pollution by nitrates from agricultural sources.
Data collection / dissemination level	National (NUTS 0) and river basin level
Frequency	Under the Nitrates Directive, Member States have the obligation to report every 4 years.

	Data from the European Environment Agency: annual but voluntary, could supplement.
Timeliness	Data from the European Environment Agency: Data available 1 ½ year later. Data under the Nitrates Directive, the frequency of data collection is every 4 years. The timeliness (delay for availability of the data) is between 1 and 2 years (Member States often provide their national report with delay). For the period 2015-2019 had to be notified by 31st June 2020; some MSs still have to do so which lead to a delay for the Commission report on the implementation for the Directive.
Comments/caveats	[Indication capacity]: - It is acknowledged that agriculture is a main contributor to diffuse nitrates pollution. - Inter-annual variation in hydrology may give rise to variation in river nitrate concentrations in surface water bodies, but this does not affect long-term trends. Moreover, this indicator refers only to groundwater. [Readily available?]: An indicator (AEI 27.1) is available, but has not been updated since 2009, needing checking on the sources of information (unofficial MS's reporting) used for its estimation. The current AEI 27.1 is built as follows: for groundwater, groundwater monitoring station data are used for the current situation and groundwater bodies for the time series and trend analysis. However, the density and the stability of the monitoring station networks varies among Member States. The 4 yearly Commission reports on the implementation of the Nitrates Directive includes the percentage of stations with average values equal to or exciding 25, 40 or 50 mg nitrate per litter during the reporting period in question as well as previous ones, for each single Member State. [Downscaling:] Nationally averaged groundwater nitrate concentrations are all below the Nitrates and Drinking Water Directives limit of 50 mg NO_3/l. National aggregation masks considerable variation at the scale of individual groundwater monitoring stations (e.g. approx. 13 % of groundwater monitoring stations across Europe, in 2009, exceeded the 50 mg NO3/l limit). [Quality:] The sampling frequency and density of stations monitored varies between countries. Similarly, the computation of the percentage of stations above the limit of 50 mg NO3/l is not meaningful if the stations location and sampling frequency is not spatially representative, or changes from one year to another. According to reports on Nitrates Directive: 'efforts are needed to ensure that the turnover of monitoring stations does not affect the accuracy of water quality trends'. The data provided via WISE-SoE Groundwater might be for the future combined with the data coming from the Nitrate Directive (which reflect more the impact of agriculture). DG Environment and EEA are together with Member States (MS) working on a streamlining of the different MS reporting on water quality including coordination of WISE-SOE and Nitrate Directive reporting. **This indicator has common ground with the one used for the EU reporting on UN Sustainable Development Goals.**

INDICATOR C.40	**Indicator I.11 Enhancing carbon sequestration**: Soil organic carbon in agricultural land
Indicator Name	**Soil organic carbon in agricultural land**
Definition	The indicator estimates the **total organic carbon content in soils on agricultural land**. Soil organic carbon (SOC), the major component of soil organic matter, is extremely important in all soil processes. Organic matter in soil is essentially derived from residual plant tissues, while microbial, fungal and animal contributions constitute a small part of its total amount. Microbes, fungi and animals decompose organic matter more or less efficiently depending on temperature, moisture and environmental soil conditions, which is then stabilised with the mineral matrix. The annual exchange of carbon between soil and the atmosphere can vary greatly, depending on cultivation practices, the type of plant/crop cover, drainage status of the soil and weather conditions. There are two groups of factors that influence inherent organic matter content and accumulation: • natural factors (climate, soil parent material, land cover and/or vegetation and topography), • and human-induced factors (land use, management and degradation) The indicator is expressed with 3 specific indicators: 1. **estimate of the total organic carbon content in soils on agricultural land** of EU Member States (with a breakdown by arable land, grassland and permanent crops) 2. **the mean organic carbon content in agricultural land** 3. **estimate of SOC changes over time** The methodology is based on the integration of ground data, from the LUCAS soil survey, with an advanced modelling framework coupling process-based and machine learning models. The model will also include scenarios on actual implementation of practices which are relevant for SOC accumulation. The LUCAS Land Use and Coverage [15] Area provides a pan-European soil component measuring the soil organic carbon content (g/kg) in 27 000 topsoil (0-20 cm and 30 cm) samples. The LUCAS data are used to inform a biogeochemical model[16] which estimates SOC stock values (Mg/ha) in time. The model output are then up-scaled at spatial level by a machine learning approach, up to a resolution of 100 m. The final outputs are maps of SOC stock and changes in time at 100 m resolution, than can be aggregated at any administrative level.
Unit of measurement	1: megatonnes (Mt) of C;

[14] Orgiazzi et al., 2017. LUCAS Soil, the largest expandable soil dataset for Europe: a review. EJSS

[15] Lugato et al., 2018. Mitigation potential of soil carbon management overestimated by neglecting N2O emissions. NCC.

	2: g of C / kg 3: %
Data source	• High resolution map (100 m) of SOC stock in agricultural soils (in preparation by JRC) • Stock estimates in time (2009-2010) in LUCAS points by a biogeochemical modelling approach • Joint Research Centre (JRC Ispra) – LUCAS dataset (2015), consisting on 27.000 top-soil samples across Europe, of Topsoil Soil Organic Carbon content in EU-25 in 2009. The LUCAS soil Component was extended to Bulgaria and Romania in 2012 and repeated in 2015 (+ Croatia, Malta and Cyprus) and 2018.
References / location of the data	• European Soil Data Centre (ESDAC) - https://esdac.jrc.ec.europa.eu/
Data collection / dissemination level	EU, National (NUTS 0), NUTS2
Frequency	Currently, datasets for 2009-2012 and 2015 are available and completed, while data of 2018 campaign are under analysis. Planning is underway for a new campaign in 2022.
Timeliness	While the data-model framework is update according to LUCAS frequency, the output can be delivered any time and in the future under climatic projections and scenario analysis and implementation of practices relevant for SOC.
Comments/caveats	[Indication capacity:] Assessing the soil organic carbon is essential as this is a basis for all soil processes. However it can vary highly depending on natural (climate, land cover, soil parent material, etc.) and human induced factors such as land use and management. It is important that the uncertainty associated with the predicted values is understood by the end-users and should encourage careful use and interpretation of the higher resolution spatial values. As the indicator is an estimate of the topsoil only, the total SOC in agricultural soils is underestimated. Nevertheless, it can give a good indication on the change. [Readily available?]: The indicator is available. [Downscaling:] The indicator is downscaled at 100 m resolution and uncertainty of the estimation provided. [Quality:] The map produced gives the most up-to-date and harmonised picture of topsoil organic carbon stock at the European Union scale. The combination of ground data with different model approaches, allows to filter out the inherent survey variability. Anyway, the uncertainty estimates it's always associated to the outcomes provided. This method is complementary to national scale or local maps that are often based on more detailed information, and sometimes spatialised. Member States have used LUCAS, combined with national data, to enhance estimates within Member State inventories.

	[Baseline:] The Commission is currently analysing the LUCAS Soil Organic Carbon data comparing LUCAS 2015 data with previous data sets (LUCAS 2009 and 2012). This analysis will provide more information on the soil organic carbon trends in arable land and grassland in particular and this could serve as baseline or if available, the results of the LUCAS survey of 2018.

INDICATOR C.41	**Indicator I.13 Reducing soil erosion:** Percentage of agricultural land in moderate and severe soil erosion
Indicator Name	**Soil erosion by water** **Percentage of agricultural land in moderate and severe soil erosion**
Definition	This indicator consists of 2 specific indicators: 1. **estimated rate of soil loss by water erosion** 2. **percentage of agricultural land at risk of moderate and severe soil erosion** These specific indicators assess potential soil loss by water erosion processes (rain splash, sheetwash and rills) and identify the agricultural areas susceptible to a rate of soil erosion considered unsustainable, within the following thresholds: (moderate i.e. >5 t/ha/year to severe and severe i.e. >10 t/ha/year). The two soil erosion specific indicators have been produced by the Joint Research Center of the European Commission (JRC-Ispra), on the basis of an empirical computer model. Assessments of soil erosion are based on the output of an enhanced version of the Revised Universal Soil Loss Equation model (named RUSLE2015) (JRC-Ispra) which was developed to evaluate soil erosion by water in the European Union[17]. The model provides an estimate of soil erosion by water on the basis of scientific knowledge, peer review published manuscripts, technical judgment and input datasets. RUSLE2015 improves the quality of estimation by introducing updated (2010), high-resolution (100m) and peer-reviewed input layers of rainfall erosivity, soil erodibility, slope steepness and slope length, Land Cover and management and the support practices applied to control erosion. The Rainfall Erosivity was calculated based on high-resolution temporal rainfall data (5, 10, 15, 30 and 60 minutes) collected from 1 541 well-distributed precipitation stations across Europe. The Soil erodibility is estimated for the 20 000 field sampling points included in the Land Use/Cover Area frame (LUCAS) survey. The Slope Steepness and Slope Length have been calculated using the latest Digital Elevation Model (DEM) at 25 m. Only soil erosion resulting from rains plash, overland flow (also known as sheetwash) and rill formation are considered. Soil loss caused by gully erosion or wind erosion is not predicted by RUSLE. The total area of agricultural land has been defined on the basis of 2012 Corine Land Cover (CLC) classes and includes the area of arable and permanent crops, pastures and permanent grasslands. Estimated data on soil erosion are published following a qualitative assessment and compared with EIONET country estimates (available for 9 countries) showing that the model output matches general erosion patterns across Europe. A quantitative validation is foreseen to take place against field measurements on long-term erosion plots. Estimates of soil loss by water erosion in Europe are expressed in t/ha/year for cells of 100m x 100m for the EU. The following indicators are based on the JRC data/indicator:

[17] Panagos et al. "The new assessment of soil loss my water erosion in Europe', Environmental and Science Policy 54(2015) 438-447

	• Agri-environmental indicator (AEI) 21 – Soil erosion. https://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental_indicator_-_soil_erosion • An SDG indicator on severe soil loss https://ec.europa.eu/eurostat/statistics-explained/index.php?title=SDG_15_-_Life_on_land_(statistical_annex)#Estimated_soil_erosion_by_water
Unit of measurement	1: t/ha/year 2: %
Data source	• Joint Research Centre (JRC) – European Soil Data Centre (ESDAC); • Input data sources used for the model: LUCAS Topsoil 2009, European Soil Database, Corine Land Cover 2006/2012, Rainfall Erosivity Database in Europe (REDES), Copernicus Remote Sensing, Eurostat Statistics, Digital Elevation Model (DEM), Good Agricultural Environmental Conditions (GAEC), Lucas Earth Observations 2009/2012/2015, Farm Field Survey (FSS) statistical data 2010/2016 (source: Eurostat). • Potential sources available at national level (studies, surveys, reports) can be explored and used.
References / location of the data	Joint Research Centre (JRC) • European Soil Data Centre (ESDAC) https://esdac.jrc.ec.europa.eu/ Eurostat • [aei_pr_soiler] (full data set) • [sdg_15_50] (indicator table) National studies, surveys, reports.
Data collection / dissemination level	National (NUTS 0), Regional (NUTS 2-3) level (based on 100m cell – model output).
Frequency	Every 3-4 years depending on the data input availability
Timeliness	3 years delay between sampling (or surveying) and publication.
Comments/caveats	[Indication capacity:] Assessing the state and total soil erosion is important as soil degradation results in loss of soil fertility, loss of carbon and biodiversity, lowers the water retention capacity and makes disruption of gas and nutrient cycles. Soil erosion rates may change due to change in land cover or soil management (farming) practices (e.g. soil cover, reduced tillage, contour farming, terraces, grass margins). To evaluate significant changes in soil erosion over time it should be noted that an analysis over a time period of at least 10-15 years would be necessary (e.g. comparing the current situation to the 2000s by retrospective modelling and time series). The time interval of 6 years (e.g. 2000-2006-2012 for which data are available) is limited and differences are primarily due to changes in land cover (as indicated by Corine Land Cover data) and/or management practices (as indicated in the Farm Structure Survey and LUCAS survey). Therefore, any conclusion must be drawn with caution.

	[Readily available?]: The indicator is available. [Downscaling:] The results of the soil erosion indicators are aggregated at NUTS 3 and NUTS 2 level and Member State level. [Quality:] The soil erosion map provides the most updated and harmonised picture of water erosion in EU based on the best available input factors. The soil erodibility is estimated for the 20 000 field sampling points included in the Land Use/Cover area frame (LUCAS) survey. LUCAS provides harmonised and comparable statistics across the EU. Results of LUCAS survey are subject of multi-steps quality assurance system. The Land cover data are inputs taken by CORINE LC (subject to QA) and Farm Structure Survey (source: Eurostat). The proposed map is not intended to substitute any national or local erosion map which is based on more detailed spatial data. [Baseline:] An update of the soil erosion dataset to be published by JRC in Autumn 2019, based on data from LUCAS 2015 & Farm Structure Survey 2016 could be used as baseline. **This indicator has common ground with the one used for the EU reporting on UN Sustainable Development Goals.**

INDICATOR C.42	**Indicator I.12 Increasing sustainable energy in agriculture**: Sustainable production of renewable energy from agriculture and forestry
Indicator Name	**Sustainable production of renewable energy from agriculture and forestry**
Definition	The indicator is a composite indicator of renewable energy from agriculture and forestry. This indicator consists of 3 specific indicators: 1. **production of renewable energy from agricultural biomass** 2. **production of renewable energy from forestry biomass** 3. **production of renewable energy from agriculture and forestry** 4. **share of the combined production of renewable energy from agricultural and forestry biomass** over the total primary energy production of renewable energy. 1. The **production of renewable energy** from **agricultural biomass** is calculated by summing the amount of energy from the following: • Biodiesel from oilseeds crops • Bioethanol from starch/sugar crops • 2nd generation biofuels (from non-food cellulosic materials) • Agricultural biogas (livestock manure and energy crops, waste and residues) • Where available, energy crops for electricity or heat (including short rotation coppice) Where available, Agricultural crop residues for electricity or heat. The total production of renewable energy from agriculture is the sum of biodiesel, bioethanol and biogas production, agricultural biomass for heat and power all expressed in ktoe (kilotonnes of oil equivalent). The following conversion factors, from the EUROSTAT [18] should be used. If other conversion factors are used, Member State should report the values. • 1 t biodiesel = 0.86 toe • 1 t bioethanol = 0.64 toe 2. The **production of renewable energy** from **forestry biomass** covers the forest biomass for renewable energy production, calculated by summing the amount of energy from: • Wood provided directly from forestry (fuel wood, wood chips, bark, shavings, forest residues) or transformed from any of the above (pellets, briquettes etc.) • forest-based industry by- and co-products in EU used for energy production (e.g. sawdust, black liquor) Member States can use the reporting obligations under the Governance of the Energy Union Regulation and/or the Progress Reports under the Renewable

[18] https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Tonnes_of_oil_equivalent_(toe)

	Energy Directive. Primary energy production from forestry biomass is expressed in ktoe (kilotonnes of oil equivalent). 3. **The production of renewable energy from agricultural and forestry biomass** is the sum of specific indicators 1 and 2
Unit of measurement	1 – 3: ktoe 4: %
Data source	Eurostat -Energy statistic Governance of the Energy Union Reporting, especially: • Annex IX • Annex VII, Part 1, paragraph (b) and (g) • Annex VII, Part 1, paragraph (m) (1) for forest biomass • Annex VII, Part 1, paragraph (m) (2) for agricultural biomass for heat and power MS Progress Reports according to Article 22 of Directive 2009/28/EC Complete energy balances - annual data
References / location of the data	Eurostat –Energy Statistics Reporting under the Governance of the Energy Union Regulation Progress Reports under the Renewable Energy Directive
Data collection / dissemination level	EU, National (NUTS 0)
Frequency	Annual
Starting point	Beginning of the CAP programming period
Timeliness	2 years
Comments/caveats	[Indication capacity] The category "energy from agricultural biogas", even though it predominantly covers agricultural biogas, also contains some biogas from municipal solid waste etc. [Readily available] Data are available [Downscaling] MS have the possibility to provide data at regional level if they are asked. So far, data are available at MS level. [Quality] [Baseline] Baseline can be set at 2020. The indicator have some similarities with the Agri-environnemental indicator 24; Renewable energy production. The indicator measures the production of renewable energy as reported under the Governance Regulation, and according to the requirements for production of

	renewable energy in accordance to the Renewable Energy Directive.

INDICATOR C.43	
Indicator Name	**Energy use in agriculture, forestry and food industry**
Definition	This indicator measures the **direct use of energy in agriculture and forestry and in food processing** It consist of 3 specific indicators: 1. **direct use of energy in agriculture and forestry** 2. **direct use of energy in agriculture and forestry per ha** 3. **direct use of energy in food processing** This indicator is based on Eurostat data from the joint IEA/OECD-Eurostat-UNECE questionnaires. There are some limitations of data and sources: • The indicator only refers to direct use of energy by agriculture. Indirect energy used in agriculture for fertilisers, pesticides, animal feed and agricultural machinery, which are produced using large amounts of energy, is not included. • Data on energy consumption by agriculture from the questionnaires include the use of energy by forestry since the separation of the different activities of a farmer/forest owner is not possible. Energy consumption by agriculture may therefore be overestimated in countries with significant forestry sector. • Data on food processing are taken from the category "Food and tobacco" and therefore include the NACE category "Manufacture of food products, beverages and tobacco products". Data on food processing are thus overestimated.
Unit of measurement	1: ktoe 2: ktoe/ha 3: ktoe
Data source	Eurostat - Energy statistics Eurostat – Crop statistics Eurostat – Food and Agriculture Organization of the United Nations (FAO), Forest Europe (FE)
References / location of the data	Direct use of energy in agriculture and forestry: Eurostat – Energy Statistics, Simplified energy balances TABLE [nrg_bal_s] - Standard international energy product classification (SIEC) "Total" – ENERGY BALANCE – "Final consumption – other sectors – agriculture and forestry – energy use" Direct use of energy in food processing: Eurostat – Energy Statistics, Simplified energy balances TABLE [nrg_bal_s] - Standard international energy product classification (SIEC) "Total" – ENERGY BALANCE – "Final consumption - industry sector - food, beverages and tobacco - energy use" Final Energy Consumption: Eurostat – Energy Statistics, Simplified energy balances TABLE [nrg_bal_s] - Standard international energy product classification (SIEC) "Total" – ENERGY BALANCE – "Final consumption - energy use"

	UAA: Eurostat – Crop statistics (from 2000 onwards) TABLE [apro_cpsh1] – Structure of production – "Main area", CROPS – "UAA" Forest area: Eurostat, Food and Agriculture Organization of the United Nations (FAO), Forest Europe (FE) TABLE [for_area] - INDIC_FO - Forests
Data collection / dissemination level	EU, National (NUTS 0).
Frequency	Every year for energy statistics. Every 5 years for forest area (e.g. 2010, 2015). Every year for UAA crop statistics.
Timeliness	2 years
Comments/caveats	

INDICATOR C. 44	**Indicator I.10 Contributing to climate change mitigation:** Greenhouse gas (GHG) emissions from agriculture
Indicator Name	**Greenhouse gas emissions from agriculture**
Definition	This indicator is composed of five specific indicators presenting anthropogenic emissions and removals from agriculture and land use. 1. **GHG emissions from agriculture** Aggregated annual emissions of methane (CH4) and nitrous oxide (N2O) from agriculture reported by Member States under the IPCC 'Agriculture' sector (Sector 3 Agriculture non-CO2) in the national greenhouse gas inventory submitted to the United Nations Framework Convention on Climate Change. That sector includes the following sources of greenhouse gases from agriculture: i. enteric fermentation (CH4); ii. manure management (CH4, N2O); iii. rice cultivation (CH4); iv. agricultural soil management (CH4, N2O, CO2), including burning of field residues, liming and application of C-containing fertilisers. These emissions are part of the binding emission reduction targets laid out under the Effort Sharing Regulation (Regulation 2018/842), and reporting on these emissions is mandatory under the Governance Regulation (Regulation 2018/1999). 2. **Share of GHG emissions from agriculture in total GHG emissions** 3. **GHG emissions and removals from LULUCF** Aggregated annual emissions and removals of carbon dioxide (CO2), and emissions of methane (CH4) and nitrous oxide (N2O) from cropland and grassland, reported by Member States under the IPCC Land Use, Land Use Change and Forestry (LULUCF) sector (cropland and grassland from sector 4 (LULUCF)) in the national GHG inventories to the UNFCCC. These emissions and removals are covered by the LULUCF Regulation (Regulation 2018/841), and reporting on these emissions and removals is mandatory under the Governance Regulation (Regulation 2018/1999). The LULUCF categories that are relevant to this indicator are those related to cropland and grassland management, as defined in the Implementing Act accompanying the Governance Regulation. This indicator does not include emissions of CO2 from the energy use of agricultural machinery, buildings and farm operations, which are included in the 'energy' inventory under UNFCCC, or emissions from production of inputs, such as inorganic fertilisers. 4. **GHG emissions from agriculture including cropland and grassland** Sum of GHG emissions from agriculture and GHG emissions and removals from LULUCF for cropland and grassland 5. **Share of GHG emissions from agriculture including cropland and grassland in total GHG emissions** 6. GHG emissions from livestock: sum of enteric fermentation and manure management/ hectares of Utilised Agricultural Area (UAA)

	7. GHG emissions from ruminants: enteric fermentation per livestock unit (LU) of ruminants Methodology: Member States calculate emissions and removals using standard methodologies (2006 guidelines of the Intergovernmental Panel on Climate Change – IPCC, and its 2019 refinement) according to a common reporting framework agreed under the UNFCCC.
Unit of measurement	1, 3, 4: Tonnes (Megatonnes) of CO2 equivalents per year for the absolute value and % for the change compared to baseline 2, 5: % 6: tonnes of CO_2 equivalents/ha 7: tonnes of CO_2 equivalents/LU
Data source	The indicator is based on the annual national inventory submissions to the EU and subsequently the UNFCCC through the Monitoring Mechanism Regulation (Regulation 2018/1999). This reporting framework moreover describes requirements for monitoring and reporting under the Effort Sharing Regulation and LULUCF Regulation, e.g., Geospatial data sources for meeting IPCC approach 3 for LULUCF, such as services from the Copernicus programme, IACS/LPIS, LUCAS and others compliant with the INSPIRE directive. The inventory is compiled by each Member State, and then collated and quality-assured by the European Environment Agency (EEA) and the European Topic Centre for Air Pollution and Climate Change Mitigation (ETC/ACM).
References / location of the data	1, 2: **GHG emissions from agriculture** • Annual EU GHG inventory, section 3, set out through Arts 26 and 37 of 2018/1999 • Like all sectors, GHG emissions from agriculture are provided in Common Reporting Format (CRF) Tables which includes standard reporting tables (SRT) 3: **GHG emissions and CO2 removals from LULUCF (cropland and grassland)** • Annual EU GHG inventory, (year X-2), sector 4 • CO2, CH4 and N2O emissions from cropland and grassland are reported annually in CRF Tables—European Environment Agency (EEA), which includes standard reporting table (SRT) for sector 4 (LULUCF), set out through Arts 26 and 37 of 2018/1999. • The reporting also has to take into account the MS compliance report as specified in the Article 14 of the LULUCF Regulation. 6: **GHG emissions from livestock** • Annual EU GHG inventory, sector 3A and 3B • Ha of UAA, ESTAT Crop production in EU standard humidity [APRO_CPSH1], main area 7: **GHG emissions from ruminants** • Annual EU GHG inventory, sector 3A • Livestock units of ruminants, ESTAT Main livestock indicators by NUTS 2 regions [ef_lsk_main] The full set of data on GHG emissions and removals (for both sectors 3 and 4), submitted by countries to the EU and subsequently the UNFCCC Governance

	regulations available at the EEA webpage: National emissions reported to the UNFCCC and to the EU Greenhouse Gas Monitoring Mechanism —European Environment Agency (EEA). The web-based tool EEA GHG viewer provides access and analysis of the data contained in the annual EU's GHG inventories since 1990. The EEA GHG data viewer shows emission trends for the main sectors and allows for comparisons of emissions between different countries and activities. This data set can be consulted at: http://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer Data are also published in the original format in which they were submitted to the UNFCCC: https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/national-inventory-submissions-2019 The same data are also published in the UNFCCC database: http://di.unfccc.int/time_series and the Eurostat database: http://ec.europa.eu/eurostat/product?mode=view&code=env_air_gge
Data collection / dissemination level	EU, National (NUTS 0)
Frequency	Data collected annually. Data are also recalculated annually for the whole time series due to update in coefficients or upgrading of Tiers. Therefore it is important to ensure an update of the whole time series each year this indicator is reported on.
Timeliness	2 years

Comments/caveats	[Indication capacity] IPCC guidance allows countries to report GHG emissions and removals according to different tiers. For most agriculture and LULUCF emissions and removals, tier 1 is based on the use of activity data (e.g. agricultural production statistics) and global emission factors. Tier 2 follows the same approach but applies nationally defined emission factors. Tier 3 involves the use of models and higher order inventory data tailored to national circumstances. Member States are encouraged to improve GHG inventories towards higher tiers, in accordance with the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, which would allow to reduce uncertainties and to design better targeted policies for decreasing emissions and increasing carbon sinks. The improvement of the inventories can be made more cost-effective by exploiting existing datasets (see 'Data sources'). Methodologies for GHG emission estimates should follow IPCC guidance, but need not be identical across Member States. In particular, when using lower tiers, GHG emission estimates might not capture the effects of all mitigation measures that are supported by the CAP, and therefore upgrading monitoring may in some cases be justified. [Readily available] Data [from 1990 to 2017] are already submitted annually by MS and the EU. The European Union, as a party to the UNFCCC, reports annually on GHG inventories from the years 1990 to (N) for emissions and removals within the area covered by its Member States (i.e. domestic emissions taking place within its territory) [Downscaling] Not applicable as regards lower spatial levels. [Quality] MS can use different tiers, linked to the availability of more specific data and coefficients, for example with high detail on mitigation measures. The use of IPCC standard would anyway ensure comparability among sectors and MS. Thematic resolution can also be very important, e.g. animal sub-categories, different farming systems etc. [Baseline] Relative net emissions are reported as a percentage of the emissions in the reference year 1990 and 2005. The two reference years are both important for the contextualisation of emissions reduction in agriculture with EU policies. European Green Deal and the current framework policy consider targets referring to 1990; while in terms of implementation, particularly for non-CO2 emissions from livestock and soil management, is it also relevant to refer to 2005, as Member States set their reduction targets for the Effort Sharing Regulation sectors, of which agriculture is part, using 2005 as baseline. Specifically for LULUCF agricultural-related land categories cropland and grassland, reference year would be the average of emissions and removals in the reference period 2005-2009 (specific indicator 3), as defined in LULUCF Regulation 2018/841.

INDICATOR C.45	**Indicator I.9 Improving the resilience of agriculture to climate change:** Agricultural sector resilience progress indicator
Indicator Name	**Agricultural sector resilience progress indicator**
Definition	The resilience of agriculture to climate change refers to the capability to maintain functions and services of the sector vis-à-vis increasing extreme events under climate change. Resilience can be strengthened through short-term adjustment of existing practices and management, and long-term transformational change, in response to the duration and the intensity of climate disturbances. Several factors can have an effect on sector's resilience to climate change, including socio-economic, innovation, governance and biophysical factors. The resilience indicator synthesises status and progress of different components with an impact on resilience or depending on resilience. The composite indicator builds on components already available in the current Common Monitoring and Evaluation Framework (CMEF), the future Performance Monitoring and Evaluation Framework (PMEF), and other data sources, such as Eurostat, JRC and EEA, which, when systematically analysed, can provide an indication of how the overall resilience of agriculture is progressing. The composite indicator displays for each MS the components positively contributing to resilience. Relative progress toward resilience of each component is defined by comparing the evaluation (programming) period to a reference period. The definition of the "progress level" compared to the reference period depends on the nature and variation of each component and is defined by JRC with appropriate methodology. As any composite indicator, understanding resilience requires an inspection of the progress of single components, which needs to be interpreted in the specific member States context. **Initial set of components** Financial: • Agricultural factor income stability (from C.25 data) Bio-physical components: • Crop production stability – annual cereals production resilience (from Eurostat) • Water exploitation index plus (WEI+) regionally and monthly for the agricultural sector (from C.38 data, supplemented with model results) • Soil organic carbon in agricultural land (from C.40 data), including regional change of modelled carbon stocks. The indicator illustrates progress in agriculture resilience in a simple way, while accounting for its different dimensions. It captures both the level of adaptation efforts (e.g. climate/environment investment support, advice

	and training), as well as effects on resilience (e.g. income stability, crop production stability). ** The references in brackets correspond to other PMEF indicators or to other existing sources of information* Agricultural sector resilience progress indicator = proportion of components exhibiting a good resilience status or progress toward good resilience - The components of the indicator have a value of 0, 0.5 or 1. - A value of 1 is attributed to components that have reached and maintain a good resilience status. A value of 0.5 is attributed to components which are currently less resilient, but showing significant progress towards resilience, or for components that are currently sufficiently resilient, but with significantly declining values. A value of 0 is attributed otherwise (less resilient without progress). Progress is assessed compared to baseline reference levels, i.e. the previous programming period, or a climate-relevant longer period depending on data availability. - Threshold values and related methodology are defined by JRC component by component, based on the nature and values of the component. - The composite indicator can have a maximum value of 100%, indicating a good status of all evaluated components.
Unit of measurement	Dimensionless. The synthetic value of the indicator is given by the cumulative score of components scaled to range between 0 and 100%. The fiche will display both the synthetic value of the indicator and the improvement score (0, 0.5 or 1) of all selected components. A dashboard approach provides additional visual support to the numerical values.
Data source	CAP CMEF and PMEF, JRC, Eurostat and EEA data.
References / location of the data	CAP CMEF and PMEF, JRC, Eurostat and EEA data.
Data collection / dissemination level	See the individual selected impact indicators
Frequency	Beginning, mid and end of programming period.
Timeliness	Corresponding to CAP PMEF, JRC and Eurostat data.
Comments/caveats	[Indication capacity] Resilience depends on a large number of context specific factors, the current selection is a subset of a larger number of possible components. Elements such as risk management, training, participation to innovation schemes, the farmer's age structure, investments and others directly or indirectly linked with resilience of the sector can be taken in consideration. It is important to recognise that a comprehensive assessment of the

	resilience would imply to describe dimensions such as i)Socio-economic aspects; ii) Governance; iii) Social and innovation and iv) Bio-physical aspects. For some components, data are not readily available or data collection will only start with the new programming period. For this reason, the indicator is initially based on components for which an assessment of the trend or a comparison with a reference period can be carried out. More components related to the socio-economic, governance, social, innovation and bio-physical aspects of resilience will be included at a later stage when data will be available in order to build a more comprehensive picture of agriculture resilience. Those will include for instance: implementation of (agro-management) adaptation measures to climate change, investments related to care for the environment or climate, risk assessment methods, including climate services, training, related to environmental/climate performance. This indicator provides a basic framework open to further development and selection of components. It is also possible that the overall system resilience will depend on the 'weakest' factor, and careful analysis of the contributing factors and importance in the local context remains imperative. Systematic analysis of relationships between driving factors that enhance or weaken aspects of resilience may help refining the indicator in the local context. The indicator fiche will display both the synthetic value of the indicator and the direction of each component, giving the possibility to use the fiche as a resilience dashboard. [Readily available] Directly depend on the readiness of the other components, typically with delays of 2-3 years. Several model based indicators can be further improved using detailed information on e.g. agro-management and other practices. [Downscaling/aggregation] The indicator provides aggregated information on MS level, however where possible makes use of (sub-) regional information. [Quality] Linked to the components, and the relative importance of these components for resilience aspects. [Baseline] The situation at the start of the programming period, some of underlying indicators with large variability are based on longer (climate relevant) reference periods prior to the start of the programming period.

INDICATOR C.46	
Indicator Name	**Direct agricultural loss attributed to disasters**
Definition	This indicator measures the direct agricultural losses attributed to disasters. It corresponds to a subset of the Sendai Monitoring Framework indicator C-2 which assesses the direct loss occurring in the agricultural sector as a result of disasters. It takes into consideration the specificities of each sub-sector, i.e. crops, livestock, forestry. It applies to disasters of various scales – from large-scale shocks to small and medium-scale events with a cumulative impact. It is calculated according to the following: Impact to agriculture = C2C + C2L + C2FO Where: C-2C: Direct crop loss C-2L: Direct livestock loss C-2FO: Direct forestry loss Each sub-sector is sub-divided into two main sub-components, production (loss from disasters on both production input and outputs) and assets (loss from disasters of facilities, machinery, tools, and key infrastructure). It takes into account losses (changes in economic flows arising from disasters, such as reduction in output of crops, livestock and forestry); and replacement or recovery costs of totally or partially destroyed physical assets and stocks in disaster-affected areas. Source: https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf
Unit of measurement	USD (US dollar) by year
Data source	Sendai Monitoring and Reporting Framework
References / location of the data	UNISDR: https://sendaimonitor.unisdr.org/ Member States
Data collection / dissemination level	EU, National (NUTS 0)
Frequency	Annual
Timeliness	N-1
Comments/caveats	The indicator is a subset of Sendai indicator C2, which records direct losses in aquaculture and fisheries in addition to crop, livestock and forestry. Member state who report on an aggregate C2 indicator under Sendai (thus including aquaculture and fisheries) should clearly mention it. A lag may exist in reporting data, depending on how soon the disaster losses are reported under Sendai. Appropriate information about data time reference should be provided. 23 EU MS have already engaged on reporting under this framework. To date,

	13 EU MS have already reported economic losses in the agricultural sector due to disasters and 5 have already validated their data (HR, CZ, EE, IE, SE), i.e. made them public. **This indicator has common ground with the one used for the EU reporting on UN Sustainable Development Goals.**

INDICATOR C.47	**Indicator I.14 Improving air quality**: Ammonia emissions from agriculture
Indicator Name	**Ammonia emissions from agriculture**
Definition	This indicator measures total annual ammonia emissions (NH_3) from agriculture, considering manure management, as well as application of fertilisers and manure to soils. It includes 2 specific indicators: 1. Total ammonia emissions 2. Change in ammonia emissions compared to 2005 Categories include[19]: **Manure management** • 3B1a - Manure management - Dairy cattle • 3B1b - Manure management - Non-dairy cattle • 3B2 - Manure management – Sheep • 3B3 - Manure management – Swine • 3B4a - Manure management – Buffalo • 3B4d - Manure management – Goats • 3B4e - Manure management – Horses • 3B4f - Manure management - Mules and asses • 3B4gi - Manure management - Laying hens • 3B4gii - Manure management - Broilers • 3B4giii - Manure management – Turkeys • 3B4giv - Manure management - Other poultry • 3B4h - Manure management - Other animals **Application to soil** • 3Da1 - Inorganic N-fertilisers (includes also urea application) • 3Da2a - Animal manure applied to soils • 3Da3 - Urine and dung deposited by grazing animals
Unit of measurement	- Kilotonnes of NH_3 per year - % this is not clear now. It can also mean % of total emissions. Original was better, also because NECD base year is 2005
Data source	The Member States report their total national emissions of NH_3 every year to the European Commission via the Member States national scale emission data (EEA) reported under the existing requirements from the Directive on the reduction of national emissions of certain atmospheric pollutants (2016/2284/EU)[20], and collected at the European Environment Agency. The reported data is available through the EEA's website.
References / location of the data	Annual data on ammonia emissions from agriculture is available at the EEA's website. The information, broken down by Member State and sub-category, is also provided through the web-based tool "Air pollutant emissions data viewer (NEC Directive)" https://www.eea.europa.eu/data-and-maps/dashboards/necd-directive-data-viewer-1 or Eurostat's table on ammonia emission [Tai07]
Data collection /	EU, National (NUTS 0)

[19] The codes used refer to the so-called NFR codes used for reporting under the UNECE Convention on Long Range Transboundary Air Pollution (LRTAP)

[20] The Directive on the reduction of national emissions of certain atmospheric pollutants (2016/2284/EU), also referred to as the (new) NEC, came into force in 2016 and sets national emission reduction targets for SO_2, NO_x, NMVOC, $PM_{2.5}$ and NH_3, for 2020 and 2030.

dissemination level	
Frequency	Data collected annually. Data are recalculated annually for the whole time series due to update in coefficients or upgrading of Tiers. Therefore it is important to ensure an update of the whole time series for each year this indicator is reported on.
Timeliness	One year (Member States shall report on the emissions in year Y no later than February of year Y + 2). Projections covering 2020, 2025, 2030 and where available 2040 and 2050, shall be reported by the Member States to the EEA on a biennial basis.
Comments/caveats	[Indication capacity:] Data are able to show emission trends over time and compare trends among Member States, and the distance to National Emission Ceilings[21] (NEC). Also, it is able to show differences in the subcategories, such as identifying main sources within the agricultural sector within a country, although these can be strongly dependent on the Tier used. Absolute values are not fully comparable due to the different Tiers available for use. [Readily available:] Data are already submitted by MS every year. [Downscaling:] National emission reporting (NECD; UNECE/CLTAP Gothenburg Protocol) follows recommendations of the 2016 EMEP/EEA air pollutant emission inventory guidebook, with 3 Tiers: Tier 1 (standard emission factors), Tier 2 (based on Total Ammonia Nitrogen (TAN) flows), Tier 3 (more sophisticated approaches, modelling, which can include spatial information on the implementation of specific abatement measures). Evaluation of impacts of air pollution of NH3 emissions, requires spatial information in conjunction with models. Science based gridded emission inventories, and gridded inventories from some MS are available. Satellite observations of NH3 provide new opportunities to derive spatial information. [Quality:] The use by MS of Tier 1 approaches may prevent tracking progress and policy effectiveness when using MS inventory information. Improvements such as on manure spreading methods or in productivity of milk, should be detected. Along with inventory MS submit an Informative Inventory Report (IIR). To link NH3 emission improvement to CAP, detailed information on which measures have been implemented, implementation rate (# livestock or m2 of UAA affected) are necessary, as well as improvement in emission factors. [Baseline:] Data on emissions of air pollutants, including ammonia, are available for every year, giving the possibility to define baselines. Collection of these data is required under the reporting regime in the Directive on the reduction of national emissions of certain atmospheric pollutants (2016/2284/EU) and will not add any additional administrative burden for Member States. Air Quality Directive consider the % of reduction from 2005. The same year can be proposed for the impact indicator. **This indicator is also used for the EU reporting on UN Sustainable Development Goals.**

[21] The absolute national emission ceilings will be replaced by (relative) national reduction targets in 2020.

INDICATOR C.48	**Indicator I.28 Limiting antimicrobials use in farmed animals**: Sales/use of antimicrobials in food producing animals
Indicator Name	**Sales/use of antimicrobials in food producing animals**
Definition	This indicator refers to action to improve the response of EU agriculture to societal demands on food and public health such as fighting antimicrobial resistance (AMR), promoting production of safe, nutritious and sustainable food, as well as animal welfare. - Data available per calendar year for any given year by MS - Provided by total sales for food-producing animals of veterinary medicinal products containing antimicrobial substances,
Unit of measurement	Quantity of antimicrobial active substances from veterinary medicinal products sold (product package level) corrected by a Population Correction Unit (PCU).
Data source	European Surveillance of Veterinary Antimicrobial Consumption (ESVAC) project, started by the European Medicines Agency (EMA) upon a request from the EC in 2009 to develop a harmonised approach for the collection and reporting of data on the use of antimicrobial agents in animals from EU Member States. Data is collected on a voluntary basis on sales of antimicrobial veterinary medicinal products (VMP) at package level from the EU Member States (MSs), EEA countries and Switzerland.
References / location of the data	- European One Health Action Plan against Antimicrobial Resistance (2017) https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52017DC0339 - ESVAC interactive database https://esvacbi.ema.europa.eu/analytics/saw.dll?PortalPages - ESVAC Annual Reports http://www.ema.europa.eu/ema/index.jsp?curl=pages/regulation/document_listing/document_listing_000302.jsp#annual
Data collection / dissemination level	EU, National (NUTS 0), European Economic Area (EEA)
Frequency	Annual, from 2010 onwards
Timeliness	2 years
Comments/caveats	- Once the new Regulation (EU) 2019/6 on veterinary medicinal products is to be applied (January 2022), all MS are obliged to collect data on sales and use of antimicrobials in animals, to enable in particular the direct or indirect evaluation of their use in food-producing animals at farm level, following a stepwise approach for different animal species, within the time limits set.[22]

[22] Article 57 of Regulation (EU) 2019/6.

INDICATOR C.49	**Indicator I.18 Sustainable and reduced use of pesticides**: Risks, use and impacts of pesticides
Indicator Name	**Risk, use and impacts of pesticides**
Definition	It consists of 3 specific indicators: 1. Sales of pesticides 2. The Harmonised Risk Indicator 1 3. Sales of more hazardous pesticides 1: Sales of pesticides is a proxy of pesticides use in agriculture. For this purpose, the indicator specifies sales of pesticides for each of the following categories: 'fungicides and bactericides', 'herbicides, haulm destructors and moss killers', 'insecticides and acaricides', 'molluscicides', 'plant growth regulators', and 'other plant protection products'. NB: Sales data currently available at EU level (Eurostat) covers both agricultural and non-agricultural activities. 2: The Harmonised Risk indicator 1 refers to the risk associated with pesticides and it is based on European Statistics on the placing on the market of pesticides. The indicator is available at EU and MS level. Sales data collected by Eurostat are categorised and weighted based on the regulatory status of the active substances under Regulation (EC) No 1107/2009. The resulting weights are aggregated according to the Commission Directive (EU) 2019/782 resulting in a harmonised, EU wide indicator. Methodology for categorisation and weighting is based on the definition in Annex IV to the Directive 2009/128/EC (adopted by the Commission in May 2019) NB: All references to pesticides refer to plant protection products only. Biocides are included in the term pesticides, but data on biocides are not included in this indicator. 3: Sales of more hazardous pesticides These are active substances that meet the cut-off criteria as set out in points 3.6.2. to 3.6.5 and 3.8.2 of Annex II to Regulation (EC) No 1107/2009 or active substances approved as candidates for substitution in accordance with the criteria in point 4 of that Annex. For plant protection products containing active substances that are candidates for substitution, Member States are required, when assessing an application for an authorisation, to evaluate if they can be replaced (substituted) by other adequate and less hazardous solutions (chemical or non-chemical).
Unit of measurement	1: kg 2: Index based on annual quantities of active substances placed on the market in the form of plant protection products multiplied by the relevant weights (100(= average for the period 2011-2013) 3: kg
Data source	1-3: Eurostat https://ec.europa.eu/food/plants/pesticides/sustainable-use-

	pesticides/harmonised-risk-indicators/trends-harmonised-risk-0_en All data not publicly available yet due to confidentiality reasons, but currently being addressed with the revision of annex 2 of Reg. (EC) No 1185/2009 concerning statistics on pesticides to overcome this problem and ensure that data will be publicly available. The trends (compared to a baseline of 100, rather than expressed in kg) for the EU, and for MS that agreed to have their national trends published, are available at the following webpage: https://ec.europa.eu/food/plants/pesticides/sustainable-use-pesticides/farm-fork-targets-progress_en
References / location of the data	1. Eurostat – Statistics on the placing on the market (sales) of pesticides table [aei_fm_salpest09] 2. The HRI 1 indicator at EU level published here . The indicator at MS level is published by each MS here. 3. Eurostat – Not published yet
Data collection / dissemination level	EU, National (NUTS 0)
Frequency	Annual
Timeliness	2 years (at the latest 20 months after the end of the year for which the Harmonised Risk Indicator is being calculated)
Comments/caveats	The HRI 1 indicator is based on the quantities of active substances sold in pesticides each year. Active substances are classified in 4 groups and 7 categories according to Annex IV to the Directive 2009/128/EC. A weighting is developed for each group: quantity sold of active substances are multiplied for the respective weights in order to calculate a harmonised index which can be monitored over time. **This indicator is also used for the EU reporting on UN Sustainable Development Goals.** 1. **Moreover, progress towards the first Farm to Fork target (50% reduction of risk and use of pesticides) is measured using the Harmonised Risk Indicator 1 methodology, excluding non-chemical pesticides. Progress towards the second target of the Farm to Fork (50% reduction of the more hazardous pesticides)[23] is measured using the sales of the more hazardous pesticides. For both indicators, the baseline is the average of the reference period 2015-2017.**

[23] For the purpose of the Farm to Fork, hazardous pesticides are defined as active substances meeting the cut-off criteria as set out in points 3.6.2. to 3.6.5 and 3.8.2 of Annex II to Regulation (EC) No 1107/2009 or identified as candidates for substitution in accordance with the criteria in point 4 of that Annex.

INDICATOR I.1	**Indicator I.1 Sharing knowledge and innovation:** Share of CAP budget for knowledge sharing and innovation
Indicator Name	**Share of CAP budget for knowledge sharing and innovation**
Definition	Share of CAP budget for knowledge sharing and innovation The main purpose of this index is to measure efforts for fostering innovation and knowledge sharing, as required under the cross-cutting objective on modernisation. The impact of knowledge and innovation will be resulting from the efforts made under the part of the CAP strategic plans related to Agricultural Knowledge and Innovation Systems (Art 102), and under the relevant articles of the sectorial programmes (e.g. Art 43(1)(b), (o) and (p). Article 43(2)(h) and (k)). Through its components it captures as well various types of **knowledge creation** (EIP Operational Group innovation projects and other interactive innovation projects, and/or multi-actor research under sectorial POs and experimental production) as well as **knowledge exchange/sharing** dimensions: knowledge exchange and advice, demonstration activities, actions to enhance the exchange of needs of farmers and the sharing of existing knowledge. In particular, it is expected that the cross-cutting objective on modernisation will incentivise multi-actor creation of new knowledge where needed, for instance through organising various types of encounters and knowledge sharing between AKIS actors such as farmers, advisors, researchers etc. with the help of the innovation strand of the CAP networks. "Experimental production" production is used in sectoral legislation and corresponds to a specific intervention which can be undertaken by Producers' Organisations (POs) in the F&V sector (Art. 43(1)(b)), or in 'other sectors' (Article 60(1)(a)). Experimental production may concern new varieties / more environmental friendly practices / digitised production, etc. and is usually carried out by research units of POs in greenhouses or open field as a test before production. For wine, the wording of Art 52.1.e is slightly different ("investments in innovation"). For apiculture too, art 49.1.f ("implementation of research programs") for example. Methodology/formula: Calculation based on annual financial transactions.
Unit of measurement	Share of CAP expenditure dedicated to knowledge exchange and information: • interventions under Article 72 (knowledge exchange and information), e.g. use of advice by farmers; training of advisors; cross-visits for advisors; knowledge exchange activities between advisors, CAP networks and research working together; setting up and implementing of EIP OG innovative projects etc.) • innovative projects of EIP operational groups (interventions funded under Article 71 according to specific requirements detailed in Art 114) Support to research, innovation and experimental production through PO's Operational Programmes and experimental production (Art 43(1)(b), (o) and (p).

	Article 43(2)(h) and (k), Art 52(1)(e))
Data source	Annual expenditure
References / location of the data	DG AGRI (Annual Performance Reports)
Data collection / dissemination level	National (NUTS 0)
Frequency	Annual
Timeliness	One year
Comments/caveats	

INDICATOR I.26	**Indicator I.26 A fairer CAP** Distribution of CAP support
Indicator Name	**Distribution of CAP support**
Definition	The indicator is composed by two specific indicators: 1. Share of support received by 20% of the largest beneficiaries of the CAP; 2. Interquartile range of CAP support by beneficiary. The main purpose of this indicator is to check the fairness of support distribution. It measures notably the impact of the redistributive payment to small and medium size farms, capping, degressivity, … Methodology/formula: Distribution analysis based on the ranked level of income support per beneficiary CAP support included: all direct payments, payment for natural or other area-specific constraints and payment for area specific disadvantages – Natura 2000 and Water framework directive.
Unit of measurement	1: % 2: EUR/beneficiary
Data source	Member States' operations database
References / location of the data	tbd
Data collection / dissemination level	National (NUTS 0)
Frequency	Annual
Timeliness	1-2 years
Comments/caveats	For the calculation, individual data (at anonymised beneficiary level) is necessary. A unique identifier of beneficiaries is required.