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DIRECTORATE-GENERAL FOR AGRICULTURE AND RURAL DEVELOPMENT

Directorate L. Economic analysis, perspectives and evaluations

IMPACT INDICATORS

DRAFT – WORK IN PROGRESS

UPDATED FOLLOWING POLITICAL AGREEMENT ON CAP REFORM

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IMPACT INDICATORS

FICHE CONTENTS

INDICATOR N°	
Indicator Name	*Title of the indicator which will be used in implementing regulation/guidance documents*
Related general objective(s)	*Identification of the general objective(s) as defined in the CAP intervention logic*
Definition	*Concise definition of the concept, including if the indicator already exists, e.g. 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, €, %)*
Methodology/formula	*Identification of what is needed to transform data from the operation database into value for the indicator*
Data required for the individual operation	*Data required from the operation database in order to calculate the relevant indicator (e.g. area of solar panels, ha of trees planted per species…). The Units of measurement of these outputs should be specified*
Data source	*Identification of existing data sources (e.g. EUROSTAT identifying relevant data set, 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 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 indicators is collected/calculated*
Delay	*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*

1

INDICATOR N° 1	
Indicator Name	**Agricultural entrepreneurial income**
Related general objective(s)	**Viable food production**
Definition	The indicator a) gives **the share of real net agricultural entrepreneurial income per unpaid annual work unit (non-salaried AWU) over time**, and b) **compares the standard of living of farmers (self-employed in agriculture) to working units employed in all NACE activities**. The NACE system and its definitions are described at: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/NACE_backgrounds The components of the indicator are: - **Agricultural entrepreneurial income** (in real and current prices), which represents the income generated by farming activities only and which is used to reward its own production factors (work and/or enterprise, own capital and owned land) (2). Agricultural entrepreneurial income is often referred to as "family farm income" and can be seen as the income concept which is the closest to an indicator of standard of living of the farmers. **Value of agricultural production** **- variable inputs (fertilisers, pesticides, feed etc)** **- depreciation** **- total taxes (on products and production)** **+ total subsidies (on products and production)** **= Factor income** **- wages** **- rents** } **borrowed/rented production factors (1)** **- interest paid** **= Entrepreneurial income (family farm income)** **which includes own production factors (2)** - The **annual working unit (AWU) in agriculture** which is defined as full-time equivalent employment (corresponding to a full-time equivalent job) i.e. as total hours worked divided by the average annual number of hours worked in a full-time job within the economic territory. A distinction is made between salaried and non-salaried AWU, which together make total AWU. The indicator uses in its calculation non-salaried AWU in order to show results on the standard of living of self employed in agriculture per working unit. In order to compare the standard of living in agriculture and in the total economy, AWUs in agriculture need to be converted in number of hours: a standard quantity of 1800 hours per AWU and per year is used. - **Gross wages and salaries in all NACE activities** at current prices in cash and in kind. Wages and salaries in cash include the values of any social contributions, income taxes, etc. payable by the employee, even if withheld and actually paid directly by the employer on behalf of the employee.

	- The **total number of hours worked per employee in all NACE activities**. The index of agricultural entrepreneurial income per unpaid AWU is already available in the Eurostat Economic Accounts for Agriculture as Indicator B.
Unit of measurement	a) EUR/non-salaried AWU or index b) %
Methodology/ formula	In the EUROSTAT Economic Accounts for Agriculture the share of agricultural entrepreneurial income/non-salaried AWU can be calculated in real terms or as index. 1. **In real terms**: data on agricultural entrepreneurial income in real prices (EUR million) is divided by the number of non-salaried AWU in agriculture in thousand persons. Results are shown in EUR/non-salaried AWU 2. The **index** of agricultural entrepreneurial income/unpaid AWU is available as Indicator B in Eurostat's Economic Accounts on Agriculture. The comparison with the rest of the economy is done in three steps: - data on agricultural entrepreneurial income in current prices (EUR million) is divided by the number of hours worked by non-salaried AWU in agriculture in thousand hours (using 1800 hours/AWU/year as standard value). Results are shown in EUR/hour worked by non-salaried AWU in agriculture. - data on salaries and wages in the rest of the economy in current prices (EUR million) is divided by the thousand of hours worked by employees in all NACE activities. Results are shown in EUR/hour worked per employee. - the obtained EUR/hour worked by non-salaried AWU in agriculture is divided by the obtained result for the total economy (EUR/hour worked per employee in all NACE activities)
Data required for the individual operation	1. For the calculation of the share of agricultural entrepreneurial income/non-salaried AWU in **real terms** the following data is needed: - agricultural entrepreneurial income in real terms (EUR million) - non-salaried AWU in thousand persons 2. The **index** of the share of agricultural entrepreneurial income/unpaid AWU is available as synthetic indicator B in the Eurostat Economic Accounts for Agriculture. For the calculation of agricultural entrepreneurial income/hours worked by non-salaried AWU as % of wages and salaries in total economy/hours worked by employee AWU the following data is also needed: - the gross wages and salaries in all NACE activities in current prices (EUR million) - the number of hours worked by employees in all NACE activities as thousand hours
Data source	Eurostat – Economic Accounts for Agriculture Eurostat – Agricultural Labour Input Statistics

	Eurostat – National Accounts
References/location of the data	Agricultural entrepreneurial income in current and real terms (EUR million) is available on the Eurostat website http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database Economic Accounts for Agriculture, Tables *Economic accounts for agriculture - values at current prices (aact_eaa01) and Economic accounts for agriculture - values at real prices (aact_eaa04)* Non-salaried AWU is available in thousand persons on the Eurostat website http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database under Agricultural Labour Input Statistics, Table *Agricultural Labour Input Statistics: absolute figures (1 000 annual work units) (aact_ali01)* Agricultural entrepreneurial income/non-salaried AWU as index (Indicator B) is available on the Eurostat website http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database under Economic Accounts for Agriculture, Table *Economic accounts for agriculture – agricultural income (indicators A, B, C) (aact_eaa06)* The gross wages and salaries in the total economy in current prices (EUR million) is available on the Eurostat website http://epp.eurostat.ec.europa.eu/portal/page/portal/national_accounts/data/database under National Accounts, National Accounts aggregates and employment by branch (NACE Rev1.1), Table *National Accounts by 6 branches - aggregates at current prices (nama_nace06_c)* The hours worked by employees in all NACE activities is available on the Eurostat website http://epp.eurostat.ec.europa.eu/portal/page/portal/national_accounts/data/database under National Accounts, National Accounts aggregates and employment by branch (NACE Rev1.1), Table *National Accounts by 6 branches - employment data (nama_nace06_e)*
Data collection level	EU and Member State
Frequency	Annually
Delay	Y-1
Comments/caveats	Agricultural entrepreneurial income ("family farm income") as indicator of the standard of living of the self-employed in agriculture can be used to assess the impact of changes in the level of public support, i.e. direct payments, on the standard of living/ purchasing power of farmers. The indicator farm household income cannot be calculated as there is no methodology or data in Eurostat for this purpose.

2

INDICATOR N° 2	
Indicator Name	**Agricultural factor income**
Related general objective(s)	**Viable food production**
Definition	The indicator represents **the share of gross value added at factor cost (factor income in agriculture) per annual work unit (AWU), over time**. The components of the indicator are: - **Agricultural factor income**, which represents income generated by farming activities (i.e. off-farm activities are not included), and is used to remunerate (1) borrowed/rented production factors (capital investment, wages for salaries and rented land), and (2) its own production factors (work and/or enterprise, own capital and owned land). **Value of agricultural production** **- variable inputs (fertilisers, pesticides, feed etc)** **- depreciation** **- total taxes (on products and production)** **+ total subsidies (on products and production)** **= Factor income** **- wages** **- rents** } **borrowed/rented production factors (1)** **- interest paid** **= Entrepreneurial income (family farm income)** **which includes own production factors (2)** - The **annual working unit (AWU)** which is defined as full-time equivalent employment (corresponding to a full-time equivalent job), i.e. as total hours worked divided by the average annual number of hours worked in a full-time job within the economic territory. A distinction is drawn between non-salaried and salaried AWUs, which together make up total AWUs. One person cannot represent more than one AWU. The indicator uses total AWUs. The index of agricultural factor income per AWU is already available in the Eurostat Economic Accounts for Agriculture as Indicator A. This yardstick corresponds to the real net value added at factor cost of agriculture per total AWU.
Unit of measurement	EUR/AWU or index
Methodology/ formula	In the Eurostat Economic Accounts for Agriculture the share of agricultural factor income/AWU can be calculated in real terms or as index. 1. **In real terms**: data on agricultural factor income in real prices (EUR million) is divided by the total number of AWUs in agriculture in thousand persons. Results are shown in EUR/AWU. 2. The **index** of agricultural factor income/AWU is available as Indicator A in Eurostat's Economic Accounts on Agriculture
Data required for the individual operation	1. For the calculation of the share of agricultural factor income/AWU in **real terms** the following data is needed: - agricultural factor income in real terms (EUR million) - total AWU in thousand persons

	2. The **index** of the share of agricultural factor income/AWU is available as synthetic indicator A in the Eurostat Economic Accounts for Agriculture.
Data source	Eurostat – Economic Accounts for Agriculture and Eurostat - Agricultural Labour Input Statistics
References/location of the data	Agricultural factor income in real terms (EUR million) is available on the Eurostat website http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database Economic Accounts for Agriculture, Table *Economic accounts for agriculture - values at real prices (aact_eaa04)* Total AWU is available in thousand persons on the Eurostat website http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database under Agricultural Labour Input Statistics, Table *Agricultural Labour Input Statistics: absolute figures (1 000 annual work units) (aact_ali01)* Agricultural factor entrepreneurial income/AWU as index (Indicator A) is available on the Eurostat website http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database under Economic Accounts for Agriculture, Table *Economic accounts for agriculture - agricultural income (indicators A, B, C) (aact_eaa06)*
Data collection level	EU and Member State
Frequency	Annually or periodically
Delay	Y as estimates; validated as Y+1
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 its own production factors. In this context one should note that the proportion of own and external production factors varies in some cases significantly between Member States and that the remuneration of own and external production factors is often unequal at farm level. The indicator farm household income cannot be calculated as there is no methodology or data in Eurostat for this purpose.

3

INDICATOR N° 3	
Indicator Name	**Total factor productivity in agriculture**
Related general objective(s)	**Viable food production**
Definition	**Total factor productivity** (TFP) **compares total outputs relative to the total inputs used in production of the output (both output and inputs are expressed in term of volumes).** 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 an increase of input use. As a result, TFP reveals the joint effects of many factors including new technologies, economies of scale, managerial skill, and changes in the organization of production.
Unit of measurement	Index, 3 year-average
Methodology/ formula	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 indexes 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). In formula, the TFP Laspeyres index is given by: $TFP_0^t\_L = \frac{O_0^t\_L}{I_0^t\_L} =$ $\frac{\left(\frac{q_{1t}}{q_{10}} * w_{10} + \frac{q_{2t}}{q_{20}} * w_{20} + \ldots + \frac{q_{nt}}{q_{n0}} * w_{n0}\right) / \left(w_{10} + w_{20} + \ldots + w_{n0}\right)}{\left(\frac{i_{1t}}{i_{10}} * x_{10} + \frac{i_{2t}}{i_{20}} * x_{20} + \ldots + \frac{i_{rt}}{i_{r0}} * x_{r0}\right) / \left(x_{10} + x_{20} + \ldots + x_{r0}\right)},$ while TFP Paasche index is defined as: $TFP_0^t\_P = \frac{O_0^t\_P}{I_0^t\_P} =$

	$$\frac{\left(\frac{q_{10}}{q_{1t}} * w_{1t} + \frac{q_{20}}{q_{2t}} * w_{2t} + ... + \frac{q_{n0}}{q_{nt}} * w_{nt}\right) / \left(w_{1t} + w_{2t} + ... + w_{nt}\right)}{\left(\frac{i_{10}}{i_{1t}} * x_{1t} + \frac{i_{20}}{i_{2t}} * x_{2t} + ... + \frac{i_{r0}}{i_{rt}} * x_{rt}\right) / \left(x_{1t} + x_{2t} + ... + x_{rt}\right)},$$ 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: $TFP\_F = \sqrt{TFP\_L * TFP\_P}$
Data required for the individual operation	- volume indices and values of agricultural products at the most detailed level of disaggregation. All products of the holding are covered including the services and the non-separable secondary activities like transformation of agricultural products. In other terms the output of the whole agricultural 'industry' is accounted for. - volume indices and expenditure for land, labour and all intermediate consumption items at detailed level. For inputs without an explicit monetary value (i.e. own factors, such as family labour or owned land), an estimate should be calculated based on the cost of corresponding rented factors. For the own capital the volume index of gross capital consumption is used as a proxy. The opportunity cost of the own capital is estimated as the gross capital consumption divided by the national average depreciation rate (calculated based on FADN data is used to gross capital formation). Given the difficulty to estimate a depreciation rate by detailed items of the gross capital consumption, in this case only the aggregate is used. Interests are not considered to avoid any double counting. To summarise, capital cost is estimated as the gross capital consumption and the opportunity cost of own capital.
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_{lt}/q_{l0} of the equations displayed above. <u>Precise indicators chosen in the EAA</u>: - Change in output volume ($q_{lt}/q_{l0)}$: Volume Indices, n-1 = 100, Production value at producer price - Output weights: Real price in Euro, 2005 = 100, Production value at producer price - Change in input volume ($i_{lt}/i_{l0)}$ for every input except land and labour cost: Volume Indices, n-1 = 100, Production value at basic price

	- Input weights: Real price in Euro, 2005 = 100, Production value at basic price - Volume index for labour costs: Change in Total labour input measured in 1000 AWU - 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 - Volume index for land costs: Change in Total UAA available in the EAA. 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). - the **Land Use Survey** (**Eurostat**) for the volume index of the UAA. - the **Farm Accountancy Data Network** to estimate the national average depreciation rate.
References/location of the data	Eurostat: EAA, Land Use Survey and FSS
Data collection level	Member States
Frequency	On request
Delay	Year N-2
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 (from 1980 for FR, UK, FI till 2005 for CY). They are breaks in time series and data is missing for some years, especially in the land use survey. 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.

4

INDICATOR N° 4	
Indicator Name	**EU commodity price variability**
Related general objective(s)	**Viable food production**
Definition	EU and world market commodity market price variability will be established for a number of selected agricultural commodities. It will be calculated on the basis of monthly commodity market prices as reported in the data sources identified below. It will be calculated as the coefficient of variation measuring the dispersion of commodity prices around the mean over the period of 3-5 years. The coefficient of variation will be calculated as standard deviation of a set of prices / mean average. The indicator will be calculated for EU and world prices of the following agricultural commodities: - Soft wheat - Maize - Barley - Sugar - Butter - Skimmed milk powder - Cheese - Beef - Pork - Poultry - Eggs
Unit of measurement	%
Data source	Agriview, FAOSTAT, World Bank (Pink Sheet)
References/location of the data	1) Commodity Price Data (Pink Sheet), available at http://go.worldbank.org/2O4NGVQC00 - Wheat (US), no. 2, soft red winter, export price delivered at the US Gulf port for prompt or 30 days shipment - Maize (US), no. 2, yellow, f.o.b. US Gulf ports - Barley (Canada), feed, Western No. 1, Winnipeg Commodity Exchange, spot, wholesale farmers' price - Meat, beef (Australia/New Zealand), chucks and cow forequarters, frozen boneless, 85% chemical lean, c.i.f. U.S. port (East Coast), ex-dock, beginning November 2002; previously cow forequarters (or alternatively Brazilian price) - Meat, chicken (US), broiler/fryer, whole birds, 2-1/2 to 3 pounds, USDA grade "A", ice-packed, Georgia Dock preliminary weighted average, wholesale 2) World dairy prices: FAO compilation of average of mid-point of price ranges reported bi-weekly by Dairy Market News (USDA). Available at http://www.fao.org/es/esc/prices/PricesServlet.jsp?lang=en - Butter, Oceania, indicative export prices, f.o.b. ; Cheddar Cheese, Oceania, indicative export prices, f.o.b.; Skim Milk Powder, Oceania, indicative export prices, f.o.b.; Whole Milk Powder,

	Oceania, indicative export prices, f.o.b. 3) Other international sources: - Pork (US) carcass lean hogs US Iowa Minnesota (167-187 lb) at www.feedstuffs.com or pork (Brazil) at www.pecuaria.com.be/cotacoes.php - Beef (Brazil) at www.pecuaria.com.br or Argentina (Ministry of Agriculture, www.oncca.gov.ar) - Poultry (Brazil – IEA Sao Paolo, www.iea.sp.gov.br/out/ivarpre.php) or US (www.feedstuffs.com) - Eggs (US) from USDA http://www.usda.gov/wps/portal/usda/usdahome 4) EU prices from AGRIVIEW: as recorded in http://ec.europa.eu/agriculture/markets/prices/monthly_en.pdf Product codes: BLTPAN (Breadmaking common wheat), MAI (Feed maize), ORGFOUR (Feed barley), LAI 249 (SMP),LAI 254 (Butter), LAI 259 (Cheddar), C R3 (Bœufs) or A R3 (Young bovines), POULET ALL (Poultry), REGULATED (Pork, 0203 2 E)
Data collection level	Collection at EU level (MS level available in some cases) Calculation at EU level
Frequency	Price data are collected on monthly basis, but calculation of the indicator will be made on a yearly basis Comparison of indicator value should be made over 3-5 year long periods
Delay	Monthly
Comments/caveats	Using a small number of observations may give misleading results EU and world prices should be comparable In previous calculations pork and sugar for world trade was not included, appropriate comparable prices should be identified. The comparison of the development of coefficient of variation values for the selected agricultural commodities over a given time period will measure the level of price variability on the EU market as compared to the price variability on the world market. This comparison would indicate the extent to which the CAP instruments contribute to attaining the CAP general objective of viable food production and in particular the specific objective of maintaining market stability.

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INDICATOR N° 5	
Indicator Name	**Consumer price evolution of food products**
Related general objective(s)	**Viable food production**
Definition	The consumer price index for food measures the changes in the retail prices of food products purchased by households (resident and non-resident). It covers prices paid for goods in monetary transactions and the prices measured are those actually faced by the consumer (including sales taxes on products, such as the VAT). Food is divided in sub-categories: bread and cereals, meat, milk, cheese and eggs, fish and seafood, fruits and vegetable, sugar, oils and fats, etc. Other food aggregates are also available either by type of food (unprocessed food, processed food and beverages and tobacco, etc) or by place of consumption (the food consumed in restaurants, canteens).
Unit of measurement	Indices and rates of change
Methodology/ formula	Data exists in Eurostat database; no further calculation needed
Data required for the individual operation	
Data source	EUROSTAT – theme "Economy and finance", Harmonised Indices for Consumer Prices (HICP).
References/location of the data	http://epp.eurostat.ec.europa.eu/portal/page/portal/hicp/data/database - Index, monthly (prc_hicp_midx) - Index, annual (prc_hicp_aind) - Monthly change (prc_hicp_mmor) - Annual change (prc_hicp_manr)
Data collection level	Collected at national level Calculated at EU, Eurozone, EEA level
Frequency	Monthly. According to a calendar, in general between 17-19th of each month for the previous (reference) month. Flash estimates are available on the last day of the reference month.
Delay	1 month
Comments/caveats	

6

INDICATOR N° 6	
Indicator Name	**Agricultural trade balance**
Related general objective(s)	**Viable food production**
Definition	**Agricultural trade balance = value of EU exports of agricultural goods – value of EU imports of agricultural goods**. It indicates whether the EU has a trade surplus or deficit in agricultural products and its size. The indicator may be broken down by different agricultural products, as defined by CN codes, and by different EU export/import geographical areas. The indicator is calculated by DG AGRI yearly on the basis of EUROSTAT Comext database, using the definition of agricultural products developed internally (available in the annexes of Agricultural Trade Statistics published by DG AGRI L2, http://ec.europa.eu/agriculture/statistics/trade/2010/index_en.htm)
Unit of measurement	€
Data source	EUROSTAT COMEXT database (http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:COMEXT)
References/location of the data	COMEXT database – declarant EU27, partner – extra-EU27, trade flow: export and import; Combined Nomenclature codes as defined in AG AGRI Agricultural Trade Statistics publication (see link above); trade regime: 4
Data collection level	Availability at MS level Indicator at EU level
Frequency	Data available monthly Indicator calculation - yearly
Delay	Year Y is available FEB Y+1
Comments/caveats	

7

INDICATOR N° 7	
Indicator Name	**Emissions from agriculture**
Related general objective(s)	**Sustainable management of natural resources and climate action**
Definition	The emissions from agriculture indicator is composed of two sub-indicators, one assessing GHG emissions and one ammonia emissions. Indicator 1) **GHG emissions from agriculture** The indicator measures net GHG emissions from agriculture including agricultural soils: 1. Aggregated annual emissions of methane (CH_4) and nitrous oxide (N_2O) from agriculture reported by MS under the 'Agriculture' sector of the national greenhouse gas inventory submitted to the United Nations Framework Convention on Climate Change (UNFCCC). That sector includes the following sources of greenhouse gases (GHG) from agriculture i) enteric fermentation of ruminants (CH_4); ii) manure management (CH_4, N_2O); iii) rice cultivation (CH4); iv) agricultural soil management (mainly CH4, N2O). 2. Aggregated annual emissions and removals of carbon dioxide (CO2), and (where these are not reported under the agriculture inventory) emissions of methane (CH4) and nitrous oxide (N2O) from agricultural land uses (grassland and cropland), are reported by MS under the 'Land Use, Land Use Change and Forestry' (LULUCF)) sector of the national greenhouse gas inventory to UNFCCC. Emissions of CO_2 from the energy use of agricultural machinery, buildings and farm operations, which are included in the 'energy' inventory under UNFCCC, are not included in this indicator. The indicator is a further development of AEI 19, 'Greenhouse Gas Emissions from Agriculture', which, however, only covers CH_4 and N_2O from agricultural activities. Indicator 2) **Ammonia emissions from agriculture** Total annual ammonia emissions from agriculture, also broken down by subcategory as follows: - Synthetic N-fertilizers (NFR subsector 4 D 1 a) - Cattle dairy (NFR subsector 4 B 1 a) - Cattle non-dairy (NFR subsector 4 B 1 b) - Swine (NFR subsector 4 B 8)

	- Laying hens (NFR subsector 4 B 9 a) - Broilers (NFR subsector 4 B 9 b) - All other subsectors (NFR subsectors 4 B 2-7 (except 4 B 5) + 4 B 9 c,d + 4 B 13 + 4 D 2 a,b,c + 4 F + 4 G + 4 B 13) - Total agri emissions of NH3 (NFR subsectors 4 B 1-9 [except 4 B 5] + 4 B 13 + 4 D 1 a + 4 D 2 a,b,c + 4 F + 4 G) (NFR means National Format for Reporting, in accordance with the reporting categories under the UNECE CLRTAP (Convention on Long Range Transboundary Air Pollution and the National Emission Ceilings Directive, 2001/81 EC)
Unit of measurement	1) **GHG emissions from agriculture** Absolute net GHG emissions are reported in tonnes CO_2 equivalents. Relative net emissions are reported as a percentage of the net emissions in the reference year 1990. All GHGs are accounted on the basis of their global warming potentials (GWP) over a 100 year time period. GWP values are taken from IPCC (2007): CO_2 = 1; CH_4 = 25; N_2O = 298. 2) **Ammonia emissions from agriculture** Kilotons of NH_3
Data source	1) **GHG emissions from agriculture** Annual official data submitted by MS to the United Nations Framework Convention on Climate Change (UNFCCC), and the EU Monitoring Mechanism (managed and compiled by the EEA/EIONET). MS calculate sectoral emissions using standard methodologies (2006 IPCC guidelines) and according to a common reporting framework agreed under UNFCCC. 2) **Ammonia emissions from agriculture** The European Environment Agency Data is available through the existing reporting requirements under the NEC Directive (2001/81 EC)
References/location of the data	1) **GHG emissions from agriculture** CH_4 and N_2O emissions from agriculture are provided in table EU27_TrendTable_10.xls of Annex-2.8-crf-tables-agriculture_EU27.zip (compiled each year by the EEA) which includes standard reporting table (SRT) for sector 4 (agriculture). CO_2 emissions from agricultural soils are recorded in table EU27_SRT5.xls of Annex-2.9-crf-tables-lulucf_EU27.zip (compiled each year by the EEA), which includes standard reporting table (SRT) for sector 5 (LULUCF). Only categories 5.A.B (cropland) and 5.A.C (grassland) are included. These account for emissions of cropland/grassland remaining the same type of

	land use, and emissions from land converted to cropland/grassland. 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/categories 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 2) **Ammonia emissions from agriculture** Annual emission data on ammonia emissions from agriculture, broken down by Member State and sub-category is provided through the web-based tool "Air pollutant emissions data viewer (NEC Directive)". It also shows overall ammonia emission trends over time, and allows for comparison between Member States. The link is: http://www.eea.europa.eu/data-and-maps/data/data-viewers/emissions-nec-directive-viewer
Data collection level	Member State
Frequency	Data collected annually
Delay	1) **GHG emissions from agriculture** Year Y in June Y+2 (for instance GHG emissions data of 2010 are provided in summer 2012) 2) **Ammonia emissions from agriculture** One year (year Y in December Y + 1)
Comments/caveats	1) **GHG emissions from agriculture** IPCC guidance allows countries to report GHG emissions and removals according to different level of 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 the national circumstances. Methodologies for GHG emission estimates should follow IPCC guidance, but need not be identical across MS. In particular when using low tier level, GHG emission estimates do not capture the effects of all mitigation measures that are supported by the CAP. That would require a high level of stratification of activity data, and corresponding information on emission factors, which often is not available. As a result, GHG emission estimates, in particular in the 'agriculture sector' (non-CO_2 gases) may not reflect the impact of all measures put in place and have a high level of uncertainty. However, the bulk of emissions and removals is captured by low-tier methods. For example, the bulk of emissions in relation to agricultural soils is caused by the cultivation of organic soils and the conversion of grasslands, which can be represented by activity data. This indicator differs from the Pillar I result indicator as it includes both agricultural non-CO2 GHG emissions and emissions/removals from agricultural soils. This more comprehensive approach is followed as instruments under Pillar I and II address emissions/removals of both categories.

	MS are encouraged to improve GHG inventories towards higher tier levels, which would allow demonstrating the effects of technological improvements. It is recognised that data limitations limit the level of information in some MS for this indicator. However, the situation should improve over time as inventories become better developed. 2) **Ammonia emissions from agriculture** Collection of this data is required under an existing reporting regime in the National Emission Ceilings Directive (2001/81 EC) and will not add any additional administrative burden for Member States.

8

INDICATOR N° 8	
Indicator Name	**Farmland birds index**
Related general objective(s)	**Sustainable management of natural resources and climate action**
Definition	The indicator is **a composite index that measures the rate of change in the abundance of common bird species at selected sites**, i.e. relative abundance. These species, chosen from a list of selected common species at EU level, are dependent on farmland for feeding and nesting and are not able to thrive in other habitats. The species on the list constitute a maximum, from which the countries select the species relevant to them. No rare species are included. Population trends are derived from the counts of individual bird species at census sites and modeled as such through time. Indices are first calculated for each species independently at the national level by producing a national population index per species. Then, the national species indices are combined into supranational ones. To do this, they are weighted by estimates of national population sizes. Weighting allows for the fact that different countries hold different proportions of the European population of each species. In a third step, the supranational indices for each species are then combined on a geometric scale to create a multi-species aggregate index at European level (For more detailed information on the methodology used, species, etc. please refer to the EBCC website http://www.ebcc.info/) The index is calculated with reference to a base year, when the index value is set at 100%. In Eurostat's database, data are presented with four different bases: 1990, 2000, the latest year available and the national base year. Trend values express the overall population change over a period of years. The indicator already exists: - Agro-environmental indicator (AEI) 25: Population trends of farmland birds: Population trends of up to 36 selected bird species that are common and characteristics of European farmland landscapes (Eurostat); - Sustainable development indicators (SDI) – Biodiversity: Common Birds Index (Eurostat). - SEBI indicator 01: abundance and distribution of selected species, which includes common farmland bird index (Pan-European Streamlining European Biodiversity Indicators (SEBI) initiative, EEA, DG ENV, etc.)
Unit of measurement	Index - (base year = 100)
Data source	The European Bird Census Council (EBCC) and its Pan-European Common Bird Monitoring Scheme (PECBMS), http://www.ebcc.info/. Data are transmitted to Eurostat and published on Statistics: Environment and Energy – Environment – Biodiversity. National indices are compiled by each country using common software and methodology. The supranational indices are compiled by Statistics Netherlands together with the Pan-European Common Bird Monitoring

	scheme (PECBM), a joint project of the European Bird Census Council, the Royal Society for the protection of Birds, BirdLife International, and Statistics Netherlands.
References/location of the data	Location of the data: Eurostat – Environment statistics – Biodiversity: Table *Protection of natural resources - Common bird index* (env_bio2), data *Common farmland species*. http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database References - EBCC/PECBMS : European Birds Census Council/ Pan-European Comon Bird Monitoring Scheme http://www.ebcc.info/pecbm.html; - AEI 25 "Population trends of farmland birds", as defined in the COM (2006) 508 on "Development of agri-environmental indicators for monitoring the integration of environmental concerns into the CAP", http://epp.eurostat.ec.europa.eu/portal/page/portal/agri_environmental_indicators/introduction.
Data collection level	National and EU level aggregation (on the basis of the number of MSs which delivered data every year. In 2008 only 20 MSs delivered data; in the last EBCC/PECBMS updates data are available for 23 EU countries, up to 2010.). In the future the index could be calculated at a lower level, by bio-geographical areas (different agricultural habitats) on the basis of geo-referenced data (France already does it, but no harmonized data at EU level at the moment exist).
Frequency	Annual For a small number of Member States data are available from 1980 and cover different periods depending on data availability in each Member State. However, Eurostat considers 1990 to be the first year with sufficient geographic coverage for the EU as a whole and therefore time series should be calculated from 1990.
Delay	2/3 years (e.g. in 2012, data from 2009 are the most recent available)
Comments/caveats	Comparability between MSs is also possible since the index gives a measure of the rate of change in the abundance of common of bird species. Species may differ in each MS because their relevance changes in different agricultural habitats and their geographical distribution is not pan-european. Northern countries generally have fewer species than southern ones. The indicator can be further improved. As for time series, the number and type of species chosen among the selected common list of 36 (in 2009 the number of species has increased to 37) by each country, should remain

	stable over time unless solid justification is provided. It should also be noted that some EU countries use a slightly different selection of species to publish their own 'National farmland bird index' (e.g. the UK, France, and Norway) compared to the so-called EU list of 37 species used by the PECBM and Eurostat. This should be avoided because it can lead to confusion between the two datasets, because both are called "national FBI index". Time series starts from 1990 (for the period 1980-1989 data are not representative at EU level), but may be earlier for the national time series. More information on the methodology used to elaborate the indicator can be found at the following website *http://www.ebcc.info/ and in A best practice guide for wild bird monitoring schemes (2008).*

9

INDICATOR N° 9	
Indicator Name	**HNV Farming**
Related general objective(s)	**Sustainable management of natural resources and climate action**
Definition	This indicator is defined as the **Percentage of Utilised Agricultural Area farmed to generate High Nature Value**. High Nature Value (HNV) farming results from a combination of land use and farming systems which are related to high levels of biodiversity or the presence of certain species and habitats. The common definition established *inter alia* by the EEA and JRC, recognises three categories of farmland as HNV: Type 1: Farmland with a high proportion of semi-natural vegetation Type 2: Farmland with a mosaic of low intensity agriculture and natural and structural elements, such as field margins, hedgerows, stone walls, patches of woodland or scrub, small rivers etc Type 3: Farmland supporting rare species or a high proportion of European or world populations. This indicator is a further development of AEI 23 "High Nature Value Farmland", and the farmland component of the 2007-2013 CMEF Baseline indicator 18 "High Nature Value farmland and forestry". Methodology: For the purposes of this indicator, the common parameter "HNV farming", as defined above, is to be assessed within each Member State and individual RDP area using methods suited to the prevailing bio-physical characteristics and farming systems, and based on the highest quality and most appropriate data available. The Member State authorities are responsible for conducting this assessment and providing the values to the Commission. Methodological guidance for establishing values for this indicator has been provided in "The application of the High Nature Value impact indicator" Evaluation Expert Network (2009) : http://enrd.ec.europa.eu/app_templates/filedownload.cfm?id=6A6B5D2F-ADF1-0210-3AC3-AD86DFF73554 Several Member States raised the issue of comparability and/or aggregation if different methodologies are used. Agreement on the common parameter being measured, and transparency and acceptance of the various methodologies, whilst not ideal, allows for aggregation, since in all areas the land considered to fulfil the criteria for one of the three HNV types is assessed, provided that MS have selected methodology appropriate to identifying HNV in their biophysical situation. The purpose of this indicator is not to make comparisons between territories on the basis of the extent of HNV land, but rather to consider the trends in its preservation and /or enhancement. It is therefore important that in each territory the same methodology is used for each successive assessment, so that trends are estimated correctly.

	When more accurate methods are developed, leading to a change in the methodology used, HNV assessments should be recalculated for the baseline year to ensure that the trend can be captured. If this is not possible, then the new methodology should be used alongside the old to allow trends to be assessed.
Unit of measurement	Percentage (%) The absolute area of UAA (hectares), and of HNV farmland, is also required, to allow for aggregation to MS/EU level.
Data source	The data sources for estimation of HNV farming are many and varied, and currently depend on the methods selected by the Member State authorities. Analysis relies principally on national/regional data, but also includes use of some EU data sets. Sources include: CORINE and other land cover data, IACS/LPIS, Agricultural census data, species and habitat databases, GIS, specific sampling surveys, RDP monitoring data, designations (NATURA, national nature reserves etc.).
References/location of the data	For assessment of HNV farmland national/regional data is required (see above) UAA: EUROSTAT FSS national and regional data: table ef oluaareg
Data collection level	The indicator should be established at either national, NUTS1 or NUTS2 level. Values should be obtained which correspond to RDP territory level. Large MS may consider it appropriate to have a regional assessment, particularly where there are large regional variations in climate, topography, biodiversity, landscape and/or farming patterns. The level at which the data is available varies with the data source (see description above).
Frequency	Variable. Minimum requirement is 3 times between 2013-2022: a baseline assessment at the start of the 2014-2020 period (ideally for 2012 or 2013), an assessment at the end of the period (to coincide with the ex-post evaluation of the RDP territory), and for one update during the period (ideally for 2017 or 2018).
Delay	Variable (depends on the data sources used, frequency of surveys/sampling etc).
Comments/caveats	Due to the variation in data availability, physical/ecological situation and farming systems and practices across MS, it is not appropriate to impose a common methodology for the assessment of HNV farming. Use of one single method would restrict the analysis to data available throughout the EU, which would exclude the richest and most relevant data sources, and preclude those MS which have developed more refined methods from using them, with a consequent reduction in the quality and accuracy of the assessment. A full assessment of HNV farming would consider both extent and quality/condition. The indicator definition proposed here only covers the extent of HNV areas, since in most Member States current methodology is not sufficiently developed to provide reliable indications of the condition of HNV areas. However, Member States are strongly encouraged to continue

	developing and refining the approaches used so that quality/condition can be incorporated into HNV assessments. Additional information on HNV farming throughout the EU is available in the recently published book “High Nature Value Farming in Europe”. The DG ENV study on "The High Nature Value farming concept throughout EU 27 and its maturity for financial support under the CAP" (starting October 2012) may also provide further information on assessment methodologies which could be a support to MS. As for all other impact indicators, it is necessary to have an estimated value for this indicator for all Member States. Until an appropriate specific method for estimating HNV is identified and used by the Member State authorities, there are two existing sources of data which could be used in the interim to provide a value, although both have considerable limitations and do not give a representative assessment of the extent of HNV. Use of these values is a second-best alternative compared to use of a more accurate and appropriate method. These data sources are mentioned here solely to provide an initial fallback option in cases where a Member State has not yet made sufficient progress to be able to provide more accurate starting values based on more appropriate and specific data and methods. The two fallback options are: 1) Estimation of HNV farmland from CORINE land cover data (EEA study) Limitations: • This approach does not take account of farming systems. • Land cover assessments do not always distinguish well between abandoned land with encroaching scrub, and extensive semi-natural grassland with patches of bushes or scattered trees. • The scale used may mean that smaller areas, such as agricultural parcels within wooded areas are missed completely. • The area of agricultural land estimated from CORINE land cover data does not correspond to EUROSTAT's UAA data. • The EEA exercise is not updated regularly, so does not provide a dynamic picture. 2) Area of UAA contained within designated NATURA 2000 sites. Limitations: • This approach does not take account of farming systems. • This is static rather than dynamic. • It underestimates the extent of HNV since it primarily addresses only Type 3 HNV farmland rather than all 3 types.

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INDICATOR N° 10	
Indicator Name	**Water abstraction in agriculture**
Related general objective(s)	**Sustainable management of natural resources and climate action**
Definition	The indicator refers to **the volume of water which is applied to soils for irrigation purposes.** Data concern water abstraction from total surface and ground water. In addition, information on the share of water abstraction in agriculture (for irrigation purposes) as a percentage of the total gross (freshwater) abstraction can also be used to complement the indicator. Agriculture is a major user of water used primarily for irrigation in order to enhance the yield and quality of crops. It is therefore an essential driving force in the management of water use. The indicator already exists: - Agro-environmental indicator (AEI) 20: Water abstraction: Agricultural contribution (irrigation) to total freshwater abstraction (Eurostat)
Unit of measurement	m^3
Data source	Two possible sources of data exists: 1) Eurostat – Statistics on agricultural production methods: in 2010, estimations of the volume of water used for irrigation have been collected in the Survey on agricultural production method (SAPM). Commission proposal to maintain this information in the new System of Farm Surveys post 2016 is under discussion. 2) Eurostat via the Joint OECD/Eurostat Questionnaire, Section Inland Water; data on water abstraction by agriculture for irrigation purposes are provided voluntarily by MSs.
References/location of the data	Location of the data: 1) Eurostat – statistics on the Structure of agricultural holdings - Survey on Agricultural production methods (SAPM) 2010– Table: *Irrigation - number of farms, areas and equipment by size of irrigated area and NUTS 2 regions* (ef_poirrig), data: *volume of water used for irrigation per year, m³.* 2) Eurostat – environment statistics - Table *annual water abstraction by source and by sector* (env_ env_watq2*)*, data *water abstraction for irrigation purposes.* Information on the share of water abstraction in agriculture (for irrigation purposes) as a percentage of the total gross (freshwater) abstraction is also available. References - Commission Regulation No 1200/2009, Implementing Regulation (EC) No 1166/2008 on farm structure surveys (FSS) and survey on agricultural production methods (SAPM), as regards livestock unit coefficients and definitions of the characteristics; - OECD/Eurostat Joint Questionnaire on inland waters – Metadata; - Agro-environmental indicator (AEI) 20: Water abstraction, as defined in the COM

	(2006) 508 on "Development of agri-environmental indicators for monitoring the integration of environmental concerns into the CAP".
Data collection level	1) National (NUTS 0) and regional level (NUTS2) (Eurostat – Statistics on the structure of agricultural holdings - Survey on Agricultural production methods (SAPM) 2010). 2) National (OECD/Eurostat Joint Questionnaire) and regional level (NUTS2) (Eurostat – Voluntary Questionnaire to MSs, Water abstraction by NUTS 2 regions). (Quality of data at regional level is quite poor at the moment, but the situation should improve in the future).
Frequency	1) For the time being, data are available only for 2010 (Eurostat, Survey on Agricultural production methods). (Full set of data for 2010 will be available at the end of 2012). 2) Annual data available for the period 1970-2009 depending on availability for each MSs (In 2007, 2008, 2009 data are available for 19, 11, 10 MSs respectively, Eurostat/OECD Joint Questionnaire).
Delay	1) 2/3 years (Eurostat, Survey on Agricultural production methods) 2) In general, the times lag between the period covered by the data and publication amounts to 12-24 months (OECD/Estat Joint Questionnaire).
Comments /caveats	The indicator on water abstraction could be ideally calculated at NUTS 2 level (and River Basin level); an analysis at regional level is more appropriate to capture the effects and impacts of the CAP on the environment. The most appropriate source so far is the Survey on agricultural production methods (SAPM) and the future System of Farm Surveys post 2016 (Data are available for all MSs, the survey is specific for the agricultural sector, data are more complete both at regional and national level). However data from the SAPM are available only for 2010. The Commission proposal to maintain this information within the new System of Farm Surveys post 2016 is under discussion. Several Member States set up models for estimating the volume of water used in agriculture for the Survey on Agricultural Production Methods (to avoid burden to farmers who alternatively had to report directly the volume of water used). Therefore it would be also worthwhile to further study these models and verify whether they could be used annually to estimate the water abstraction for irrigation, on the basis of FSS data, annual crop statistics and meteorological data. The quality of information collected via the Eurostat/OECD Joint Questionnaire is expected to improve in the future. From this source, information on the share of water abstraction in agriculture (for irrigation purposes) as a percentage of the total gross water abstraction is also available; it would also allow comparing the use of water in different sectors. A questionnaire on water quantities (including water used for irrigation) at NUTS 2 level has also been established by Eurostat; the quality of data at the moment is quite poor but improvements are expected in the future.

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INDICATOR N° 11	
Indicator Name	**Water quality**
Related general objective(s)	**Sustainable management of natural resources and climate action**
Definition	The water quality indicator gives indication of the potential impact of agriculture on water quality due to pollution by nitrates and phosphates. Pollution by nitrates and phosphates is assessed through two main indicators each one composed of two sub-indicators: Indicator 1) **Gross Nutrient Balance** which consists of: 1.a) Gross Nitrogen Balance (GNB-N): Potential surplus of nitrogen on agricultural land (GNS). 1.b) Gross Phosphorus Balance (GNB-P): Potential surplus of phosphorus on agricultural land (GPS). The gross nutrient balances provide an estimate of the potential water pollution. They represent the total potential threat of nitrogen and phosphorus surplus or deficits of agricultural soils to the environment. When N and P are applied in excess, they can cause surface and groundwater (including drinking water) pollution and eutrophication. Indicator 2) **Nitrates in freshwater** which consists of: 2.a) Groundwater quality: % of monitoring sites in 3 water quality classes (High, Moderate and Poor); 2.b) Surface water quality: % of monitoring sites in 3 water quality classes (High, Moderate and Poor). The three water quality classes are defined as follows: High quality: concentration close to natural values or within the threshold indicated in the legislation for low-polluted water. Moderate quality: concentration above natural standard but still below hazardous level. Poor quality: concentration above hazardous level. The actual concentration classes are the following. Groundwater High ("<10" + ">=10 and <25")[1] Moderate (">=25 and <50") Poor (">=50"). Surface water

[1] Although the natural concentration of NO_3 in groundwater is below 10 mg/L, in the Nitrate Directive for water bodies that show concentrations below 25 mg/L the monitoring programme should be repeated every eight years instead of four, in this line this threshold can be taken into account to design high quality or low-polluted water bodies.

	High ("<0.8" + ">=0.8 and <2.0")[2] Moderate (">=2.0 and <3.6" + ">=3.6 and >5.6") Poor (">=5.6 and <11.3" + ">=11.3") The following indicators already exist: - Agro-environmental indicator (AEI) 27.1 Water quality – Nitrates in freshwater: nitrate pollution is indicated by current values and trends in nitrate concentrations in groundwater and rivers (at river district level/water body and not at MSs level). - CSI 020 Nutrients in freshwater (European Environment Agency). Concentrations of nitrate in rivers and groundwater. The indicator can be used to illustrate geographical variations in current nutrient concentrations and temporal trends. - Agro-environmental indicators (AEI 15) Gross Nitrogen Balance: Potential surplus of nitrogen on agricultural land; - Agro-environmental indicators (AEI 16) Risk of pollution by phosphorus (Gross Phosphorus Balance): Potential surplus of phosphorus on agricultural land.
Unit of measurement	1) **Gross Nutrient Balance** 1.a) Gross Nitrogen Balance (GNB-N): kg N/ ha/ year; 1.b) Gross Phosphorus Balance (GNB-P): kg P/ ha/ year. 2) **Nitrates in freshwater** 2.a) Groundwater quality: % of monitoring sites; 2.b) Surface water quality: % of monitoring sites. **N.B**. The concentration of nitrate is expressed as mg/L of nitrates (NO_3-mg/L) for groundwater and mg/L of nitrogen (N-mg/L) for rivers.
Data source	1) **Gross Nutrient Balance**: - Eurostat, Agri-environmental indicators (AEIs) 2) **Nitrates in freshwater** - European Environmental Agency (EEA) – Nutrients in freshwater: Data voluntarily reported by MSs (EEA Member Countries) via the WISE/SOE (State of Environment) data flow annually. - DG Environment, Nitrate Directive: data on nitrate concentration are reported by MSs to the Commission within the Nitrate Directive (Council Directive 91/676/EEC) reporting requirements, every 4 years.
References/location of the data	1) **Gross Nutrient Balance**: - Eurostat, Agro-environmental indicators, Pressure and Risks, Table *Gross*

[2] The natural concentration of nitrates in freshwater is about 1 mg/L, still concentration over 10 mg/L (2 mg-N/L) are those at which eutrophication and other negative effects on aquatic ecosystems appear, therefore this limit could be taken into account to design high quality or low-polluted water bodies.

	Nutrient Balance (aei_pr_gnb and aei_pr_gpb); http://epp.eurostat.ec.europa.eu/portal/page/portal/agri_environmental_indicators/data/database 2) **Nitrates in freshwater** - EEA website : Waterbase_rivers, Waterbase_groundwaters, CSI020 , http://www.eea.europa.eu/data-and-maps/indicators/nutrients-in-freshwater; - DG ENV (on request) – Nitrate Directive: Unit B1 (no publicly available). References - European Environment Agency (EEA): WISE-SoE Water Information System for Europe – State of Environment - Agro-environmental indicator (AEI) 27.1 and 27.2 Water quality, nitrate and pesticides pollution, as defined in the COM (2006) 508 on "Development of agri-environmental indicators for monitoring the integration of environmental concerns into the CAP" - Council Directive 91/676/EEC concerning the protection of waters against pollution by nitrates from agricultural sources.
Data collection level	1) **Gross Nutrient Balance**: national (in the future, data should also be available at regional level (NUTS 2)). Eurostat and the JRC are working on a pilot project with 5 countries to regionalise GNB data. First results should be available after 2015. 2) **Nitrates in freshwater** - data from European Environment Agency: national and river basin level/water body - data from the Nitrate Directive reporting system (DG environment): national and river basin level .
Frequency	1) **Gross Nutrient Balance**: data are currently available for the period 2001-2008. Next reporting in 2013 and every 2 years in the future. 2) **Nitrates in freshwater** - data from European Environment Agency: annual; - data from DG Environment, Nitrate Directive: every 4 years according to the reporting requirements. (Last reporting in 2012: data cover the period 2008-2011. Next reporting in 2016 which will cover the period 2012-2015).
Delay	1) **Gross Nutrient Balance:** not defined; 2) **Nitrates in freshwater** - data from European Environment Agency: data available 1 ½ year later; - data from DG Environment, Nitrate Directive: the analysis of data is done by the Commission according to the art. 11 of the Directive as soon as the assessment is completed and depending on the reporting date by MS (e.g. 2008-2011 data are reported by MSs at the end of 2012 and the Commission reports by mid-2013)
Comments/caveats	The AEI 15 on Gross Nutrient Balance is at the moment considered the most appropriate indicator to assess the CAP's impact on water quality,

	since it is more directly linked with agriculture. It must be noted, however, that this 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. For the interpretation of Nitrates in fresh water, it should be kept in mind that it is hardly feasible to distinguish the contribution of agriculture or the role of a policy to this status compared to other influencing factors, even though it is acknowledged that agriculture is a main contributor. For this reason the preferred option is to use data for Gross Nutrient Balance (4-year average) in combination with data for nitrates in freshwater by water quality classes. On the one hand, figures for nitrates in freshwater would give a comprehensive overview of the actual state of water bodies, allowing comparison over time. On the other hand, data for Gross Nutrient Balance would provide an indication of the impact of agriculture on those figures and give information about potential pollution by phosphates Since data for both indicators are only available at national level and since annual national balances can mask important regional or monthly variations, other sources at Member State level should be explored. Data on pesticides are currently less robust than those for nitrates, thus the originally proposed component on Pesticides in freshwater has been dropped from the indicators for water quality.

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INDICATOR N° 12	
Indicator Name	**Soil organic matter in arable land**
Related general objective(s)	**Sustainable management of natural resources and climate action**
Definition	The indicator measures **the organic carbon content in arable soils**. Soil organic carbon, the major component of soil organic matter, is extremely important in all soil processes. Organic material in the soil is essentially derived from residual plant and animal material, synthesised by microbes and decomposed under the influence of temperature, moisture and ambient soil conditions. The annual rate of loss of organic matter 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: natural factors (climate, soil parent material, land cover and/or vegetation and topography), and human-induced factors (land use, management and degradation). (Joint Research Center, European Soil Portal). The indicator is expressed as an estimate of the total Soil Organic Carbon (SOC) stocks in topsoil of EU Member States. Also the mean SOC concentration per Member State is calculated, though solely for orientation purposes since it has very limited scientific meaning given the high variability of SOC concentration in different areas. The following indicators on soil quality also exist: - Agro-environmental indicator (AEI 26) Soil Quality Index (JRC). The indicator provides an account of the ability of soil to provide agri-environmental services through its capacities to perform its functions and respond to external influences. In the agri-environmental context, soil quality describes: -The capacity of soil to biomass production -The input-need to attain optimal productivity -The soil-response to climatic variability -Carbon storage; filtering; buffering capacity The AEI on Soil quality index is elaborated by the Joint Research Centre (EC) and is based on modelling, estimations from different sources and parameters. It cannot be measured directly and therefore a model is provided to indicate its status across the EU. It is composed by 4 sub-indicators: Productivity index, Fertilizer response rate, Production stability index, Soil environmental services index.
Unit of measurement	**Total Soil Organic Carbon (SOC) in arable land:** megatonnes (Mt); **Mean SOC concentration in arable land**: g/kg.
Data source	Map of Topsoil Organic Carbon Content (2003). This map was calculated from the European Soil Database hosted by the Joint Research Centre by combining refined pedo-transfer rules with spatial thematic

	data layers of land cover and temperature. It gives an estimate of organic carbon content in the topsoil layer (0-30 cm). The map is regularly updated depending on the availability of new data. The next version will be dated 2009 and will be based on the 2009 LUCAS soil survey results. Depending on the regular repetition of the LUCAS soil survey a regular update can be envisaged. Eurostat – Lucas Survey - Soil Component. The Land Use/Land Cover Area Frame Survey (LUCAS) is a field survey programme to monitor changes in the management and nature of the land surface of the European Union. It can be used for the collection of soil samples and their subsequent analysis to produce updated and harmonised maps of relevant soil parameters, including topsoil organic carbon (0-30 cm). In 2009 ca 22,000 soil samples were collected in 25 Member States (EU-27 except Bulgaria and Romania) and in 2012 ca 2,000 soil samples in Bulgaria and Romania. Other sources: Potential sources available at national level (studies, surveys, reports), models and estimation (e.g. AEIs indicator).
References /location of the data	The Map of Topsoil Organic Carbon Content (2003) is available on the European Soil Datacentre hosted by the Joint Research Centre (http://eusoils.jrc.ec.europa.eu/ESDB_Archive/octop/octop_data.html) LUCAS data, except soil data, are available from Eurostat (http://epp.eurostat.ec.europa.eu/portal/page/portal/lucas/introduction) LUCAS soil data are hosted at the European Soil Data Centre managed by the Joint Research Centre (http://eusoils.jrc.ec.europa.eu) and should be available in the first part of 2013. National studies, surveys, reports
Data collection level	National (NUTS 0).
Frequency	It depends on the future of the LUCAS survey which is in principle carried out every three years. If this frequency is maintained in future, it could be envisaged that every second or third LUCAS survey (i.e. every six-nine years) a soil module could be added to determine changes compared to the 2009-2012 baseline.
Delay	It depends on the future of the LUCAS Survey. Based on LUCAS 2009 experience, the expected delay between soil sampling and the publication of the results is about two years.
Comments /caveats	Future of the LUCAS survey: the survey, or certain components of it, might be repeated as a monitoring exercise in the future. There is an on-going discussion on the future of the LUCAS survey. In principle it should be repeated every 3 years but considering resources constraints and the fact that for example changes in soil are not relevant in the short period, the current proposal is to set up soil module in the LUCAS survey every 9/10 years. Eurostat is at the moment planning to define a long term plan for the survey also on the basis of users' needs.

	The indicator on soil quality (as it is proposed now: organic carbon content in soils), should be ideally complemented by a measurement/parameter of soil biodiversity. The Agri-environmental indicator (AEI) 26 - Soil quality Indicator, elaborated by the Joint Research Centre of the European Commission is not directly measurable since is based on modelling and estimations are based on different sources and parameters. It will not be updated regularly.

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INDICATOR N° 13	
Indicator Name	**Soil erosion by water**
Related general objective(s)	**Sustainable management of natural resources and climate action**
Definition	The indicator is defined as: a) **Estimated rate of soil loss by water erosion**; The indicator estimates soil loss by water erosion in Europe in t/ha /year for cells of 1km x 1km for EU 27; b) **Estimated agricultural area or share of estimated agricultural areas affected by a certain rate of soil erosion by water**. The indicator represents estimated soil erosion levels for NUTS 3 areas that range from very low values (< 0.5 t/ha/year) to very high values (> 50 t/ha/year) for the EU-27. It gives indications of the agricultural areas affected by a certain rate of soil erosion. Both indicators are the outputs of a modelling exercise; they have been produced by the JRC on the basis of an empirical computer model (RUSLE model) which was developed to evaluate soil erosion rates by water at regional scale. The model provides estimates of possible erosion rates and estimates sediment delivery, on the basis of accepted scientific knowledge, technical judgement and input datasets. The model considers seven main factors controlling soil erosion: the rainfall erosivity, the erodibility of the soil, the slope steepness and the slope length of the land, the land cover, the stoniness and the human practices designed to control erosion. Only soil erosion resulting from rainsplash, overland flow (also known as sheetwash) and rill formation are considered. These are some of the most effective processes to detach and remove soil by water. In most situations, erosion by concentrated flow is the main agent of erosion by water. Estimated data on soil erosion are published following a qualitative assessment, showing that the model output matches general erosion patterns across Europe. However also quantitative validation is foreseen to be completed. Therefore at the moment data have to be taken with caution. No harmonized measure of soil erosion rates exists for the European continent. The total area of agricultural land has been defined on the basis of Corine Land Cover (CLC) 2006 classes and includes the area of arable and permanent crops, pastures and permanent grasslands. <u>The following indicators already exist:</u> - Agro-environmental indicator (AEI) 21 Soil Erosion, developed by the JRC; a) and b) above are the supporting and main indicator of the AEI 21, respectively. - Soil erosion datasets of 9 European Union Countries have been collected through the EIONET-SOIL network during 2010.
Unit of measurement	a) t/ha /year b) ha, %

Data source	Joint Research Centre: Agro-environmental indicator (AEI) 21 factsheet and data on demand. (Input data sources used for the model: European Soil Database, Corine Land Cover 2006, E-OBS Grided Climate data); Potential sources available at national level (studies, surveys, reports) can be explored and used.
References/location of the data	Joint Research Centre: Agro-environmental indicator (AEI) 21 factsheet and data on demand. Data should be also soon available in Eurostat, Agro-environment statistics, tables *agri-environmental indicators* (aei), http://epp.eurostat.ec.europa.eu/portal/page/portal/agri_environmental_indicators/data/database Data are also published in the Report "Rural Development in the European Union - Statistical and economic information – 2012", elaborated by DG AGRI, http://ec.europa.eu/agriculture/statistics/rural-development/2012/index_en.htm - *Indicator O22- Areas at risk of soil erosion.* References - AEI 21 Agri-environmental Soil erosion (JRC), as defined in the COM (2006) 508 on "Development of agri-environmental indicators for monitoring the integration of environmental concerns into the CAP"; - European Commission: Thematic Strategy for Soil Protection: COM(2006) 231. - National studies, surveys, reports
Data collection level	National (NUTS 0) and regional (NUTS2-3) level (based on 1 km cell – model output). (The rates of soil loss by water erosion (t/ha/year) at Member States level represent national average values and therefore may mask higher erosion rates in many areas even for those countries that have a low mean)
Frequency	Data are at the moment available for 2000 and 2006. The model will be updated only when new data are available and not on regular basis. (The differences between 2000 and 2006 are primarily due to changes in land cover as indicated by Corine Land Cover data for both dates. The time interval of 6 years is limited; therefore any conclusion must be made with caution. To understand better the real trend, an analysis over a time period of at least 15-20 years would be necessary (e.g. comparing the current situation to the 1990s.)) (Updates of the indicator would be possible as improved datasets of input factors such as Rainfall erosivity or Management practices are becoming available).
Delay	Not defined.
Comments/caveats	**There is a strong need to develop / explore alternative data sources with a view to improving the indicator**. The soil erosion indicator could be improved (e.g. depending on data availability) to better measure the link between agriculture and soil erosion. As it is now, the indicator can only give indication of the erosion of soil in particular contexts. The

	estimated erosion rates cannot be directly linked to agricultural practices and therefore the indicator does not reflect and capture the effects of policy measures to prevent erosion by agriculture. Moreover the indicator gives only estimations and it is not directly measurable since is based on modelling and estimations from different sources and parameters. It will not be updated regularly (depending on availability of resources). In 2010, the European Soil Data Centre (ESDAC) invited the Primary Contact Points (PCPs) of EIONET to contribute to a data collection campaign of EIONET-SOIL in order to develop the European datasets for soil erosion and Soil Organic Carbon (SOC). There was no legal obligation for the EIONET member countries to participate and PCPs and NRCs for soil contributed on a voluntary basis. 18 EIONET countries did not reply or declared that they do not own the requested soil data and/or refused to deliver data due to legal issues or other restrictions Due to this fact some discrepancies could appear between the data collected at Member State level and those presented by the JRC. The Member States that detect such a discrepancy are strongly recommended to submit their data through EIONET in order to allow the update and improvement of the model. The list of EIONET contact points for SOIL is available at the following URL: http://eusoils.jrc.ec.europa.eu/library/data/eionet/PrimaryPoints.cfm The indicator only covers soil erosion by water. However, it is among the objectives of DG JRC and DG ENV to develop a wind erosion indicator which could complete the information currently available.

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INDICATOR N° 14	
Indicator Name	**Rural employment rate**
Related general objective(s)	**Balanced territorial development**
Definition	**Employed persons aged 15-64 and 20-64[3] as a share of the total population of the same age groups in thinly populated areas (used as proxy for rural areas)**: Employed persons are all persons aged 15/20 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 family workers. Population covers persons aged 15/20 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. **Source:** Labour Force Survey (LFS). LFS data is disseminated by Eurostat at different geographical levels: Country, NUTS 1 and 2 and, recently, aggregated at MS level by urban/rural typology (data not yet available for all MS/years and for the EU) and by degree of urbanisation (MS and EU aggregates available for all years). **Methodology**: It is proposed to calculate the rural employment rate at national level using LFS data aggregated by degree of urbanisation. This degree of urbanisation classifies the territory (local administrative units) in thinly-populated areas, intermediate density areas and densely-populated areas. The rural employment rate of each MS would then correspond to the employment rate of thinly-populated areas; this rate could 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, if needed for a better analysis. LFS data at regional level, i.e. aggregated at NUTS level 2, is not disseminated by Eurostat. DG AGRI could contact Eurostat to discuss the future availability of this information for use in the RD programmes.
Unit of measurement	%
Data source	**Eurostat** series from the Labour Force Survey, aggregated by degree of urbanisation at MS level: - Population by sex, age, degree of urbanisation of residence and labour status (1 000) [lfsa_pgauws]
References/location of the data	
Data collection level	Labour Force Survey (LFS) data is collected at local level (LAU2), with a sample defined to be significant at NUTS 2 level and at national level. Currently, a breakdown by degree of urbanisation is only published at national level by Eurostat.

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

Frequency	For the LFS: annually, in the second half of the year. For the aggregates by degree of urbanisation: depending on the availability of the new data.
Delay	For the LFS: previous year (i.e. in the second half of 2012, latest available data in the LFS is 2011).
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"). Different territorial typologies are explained in chapter 14 of the Eurostat regional yearbook 2012 (see: http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-HA-12-001-14/EN/KS-HA-12-001-14-EN.PDF) and in this article prepared by DG REGIO: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Regional_typologies_overview.

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INDICATOR N° 15	
Indicator Name	**Degree of rural poverty**
Related general objective(s)	**Balanced territorial development**
Definition	**Share of population at risk of poverty or social exclusion in thinly populated areas (used as proxy for rural areas)**. 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. See detailed calculation method here (page 93): http://epp.eurostat.ec.europa.eu/portal/page/portal/income_social_inclusion_living_conditions/documents/tab/Tab/Working_paper_on_EU_SILC_datasets.pdf The degree of rural poverty (share of population at risk of poverty) can be compared to the overall EU-27/28 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-27/28 (choice to be made according to the policy objective).
Unit of measurement	%
Data source	EUROSTAT, EU-SILC (European Union Statistics on Income and Living Conditions)
References/location of the data	EUROSTAT Indicator name: *People at-risk-of poverty or social exclusion by degree of urbanization* http://epp.eurostat.ec.europa.eu/portal/page/portal/income_social_inclusion_living_conditions/data/database Table: People at risk of poverty or social exclusion by degree of urbanisation [ilc_peps13], Unit – percentage of total population, DEG_URB - Thinly populated area (less than 100 inhabitants/km^2)
Data collection level	Data is available at Member State level. The indicator should be established at Member State level.
Frequency	Annual
Delay	1-2 year but there is no release calendar
Comments/ caveats	The indicator is available at degree of urbanisation (not by typology of the rural areas): 1. Densely populated area (at least 500 inhabitants/km^2) 2. Intermediate urbanized area (between 100 and 499 inhabitants/km^2) 3. Thinly populated area (less than 100 inhabitants/km^2). To calculate the indicator, it can be assumed that thinly populated areas roughly correspond to rural areas. Although the use of the degree of urbanisation has been selected as the most appropriate for the indicator "degree of rural poverty", 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"). Different territorial typologies are explained in chapter 14 of the Eurostat regional yearbook 2012 (see: http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-HA-12-001-14/EN/KS-HA-12-001-14-EN.PDF) and in this article prepared by DG REGIO: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Regional_typologies_overview.

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INDICATOR N° 16	
Indicator Name	**Rural GDP per capita**
Related general objective(s)	**Balanced territorial development**
Definition	**GDP per capita in predominantly rural regions, in PPS**[4] The PPS per inhabitant in rural areas can be compared to the PPS per inhabitant at national level (without distinction by type of region) or to other aggregations (EU-15, EU-12). Table urt_e3gdp in the Eurostat database provides national aggregates of relevant data by urban/rural typology (for a description of the typology, see http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Urban-rural_typology; the typology is applied at the level of NUTS 3). In particular, the following indicators are calculated by Eurostat: • PPS per inhabitant in rural, intermediate and urban areas • PPS per inhabitant in percent of the EU average for rural, intermediate and urban areas.
Unit of measurement	PPS (for the simple reporting of absolute values) % (for comparison of values from rural areas to those of other areas or to the EU average)
Data source	Eurostat Table urt_e3gdp For national averages (without distinction by type of region): table nama_gdp_c
References/location of the data	Eurostat Table urt_e3gdp For national averages (without distinction by type of region): table nama_gdp_c
Data collection level	national
Frequency	annual
Delay	3 years (in 2012, data from 2009 are the most recent available)
Comments/caveats	As an average, this indicator does not measure the distribution of income in a 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.
Policy relevance /	Under the objective of balanced territorial development, the CAP aims to

[4] 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.

interpretation	reduce the gap in standard of living between rural and other areas in the EU. GDP per capita, corrected for purchasing power, can be used to compare the aggregate standard of living between different geographical entities. Related info: Note on standard of living and economic growth in rural areas and their main determinants by type of regions; November 2010 (http://ec.europa.eu/agriculture/analysis/markets/gdp-rural-areas-2010_en.pdf)