



# GUIDELINES

## ASSESSING RDP ACHIEVEMENTS AND IMPACTS IN 2019

JUNE 2018



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The Evaluation Helpdesk is responsible for the evaluation function within the European Network for Rural Development (ENRD) by providing guidance on the evaluation of RDPs and policies falling under the remit and guidance of DG AGRI's Unit C.4 'Monitoring and evaluation' of the European Commission (EC). In order to improve the evaluation of EU rural development policy the Evaluation Helpdesk supports all evaluation stakeholders, in particular DG AGRI, national authorities, RDP managing authorities and evaluators, through the development and dissemination of appropriate methodologies and tools; the collection and exchange of good practices; capacity building, and communicating with network members on evaluation related topics.

Additional information about the activities of European Evaluation Helpdesk for Rural Development is available on the Internet through the Europa server (<http://enrd.ec.europa.eu>).

# GUIDELINES

## ASSESSING RDP ACHIEVEMENTS AND IMPACTS IN 2019

DRAFT, JUNE 2018



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Available in separate documents :

**Part III – Fiches for answering the Common Evaluation Questions no. 22 - 30**

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**LIST OF ACRONYMS**

AEI	Agricultural Entrepreneurial Income
AEI	Agri-Environmental Indicators
AFI	Agricultural Factor Income
AIR	Annual Implementation Report
ANC	Areas-facing Natural Constraints
ATT	Average Treatment Effects on Treated
AROPE	At Risk Of Poverty Or Social Exclusion
AWU	Annual Work Units
CAP	Common Agricultural Policy
CCI	Common Context Indicators
CEQ	Common Evaluation Questions
CLLD	Community-Led Local Development
CGE	Computable General Equilibrium
CMES	Common Monitoring and Evaluation System
CORINE	Coordination of information on the environment
DG AGRI	Directorate-General for Agriculture and Rural Development
DiD	Difference-in-Difference
DP	Data provider
EAA	Economic Account for Agriculture
EAP	Environment Action Programme
EARDF	European Agricultural Fund for Rural Development
EDGAR	Emissions Database for Global Atmospheric Research
EIP	European Innovation Partnership
SDAC	European Soil Data Centre
ESG	Evaluation Steering Group
ESI	European Structural and Investment
EU	European Union
Ev	Evaluator
FA	Focus Area
FADN	Farm Accountancy Data Network
FBI	Farmland Birds Index
FWU	Family Work Unit



GAEC	Good Agricultural and Environmental Conditions
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure On R&D
GES	Good Ecological Status
GHG	Greenhouse Gas
GIS	Geographic information system
GNB	Gross Nutrient Balance
GPSM	Generalised Propensity Score Method
GRIT	Generation of Regional Input–output Tables
HNV	High nature value (HNV) farming
I	Impact Indicator
IACS	Integrated Administration and Control System
ICT	Information & Communication Technologies
IL	Intervention Logic
IO	Input-Output Analysis
IPPC	Integrated Pollution Prevention and Control
IV	Instrumental Variables
JC	Judgement Criteria
JRC	Joint Research Center
LAU	Land Administrative Unit
LPIS	Land Parcel Identification System
LU	Livestock Unit
LUCAS	Land Use and Coverage Area Frame Survey
LULUCF	Land Use, Land Use Change and Forestry
M	Measure
MA	Managing Authority
MC	Monitoring Committee
MAPP	Method for Impact Assessment of Programmes and Project
MS	Member State
ND	Nitrates Directive
NGO	Non-Governmental Organization
NRN	National Rural Network
NUTS	Nomenclature of Units for Territorial Statistics
PA	Paying Agency
PSEQ	Programme Specific Evaluation Question

PSM	Propensity Score Matching
R	Result indicators
RBD	River Basin District
RDD	Regression Discontinuity Design
RDP	Rural Development Programme
RUSLE	Revised Universal Soil Loss Equation
SAPM	Survey on Agricultural Production Methods
SAM	Social Accounting Matrix
SEBI	Streamlining European Biodiversity Indicators
SFC	Shared Fund Management Common System
SOC	Soil Organic Carbon
SOM	Soil Organic Matter
SWOT	Strengths, Weaknesses, Opportunities, Threats
T	Target Indicator
TA	Technical Assistance
TBE	Theory-Based Evaluation
ToR	Terms of Reference
TFP	Total Factor Productivity
UAA	Utilised Agricultural Area
WD	Working Document
WDF	Water Framework Directive

## INTRODUCTION

### Importance of evaluation

The European Structural and Investment (ESI) Funds are important **public instruments** to support actions related to the key Union priorities, which are delivered through multi-annual programmes in the Member States and regions. Therefore, it is in the interest of policy makers and the general public to know whether the money is spent reasonably, whether it produces the expected results, and whether the interventions target the right beneficiaries to achieve the EU's policy objectives.

**Evaluation** is a tool to measure the policy's effectiveness, efficiency, results and impacts, ensure its accountability and transparency, and ultimately improve its design. Within the context of rural development, there are two evaluation milestones **during the programming period 2014-2020**: in 2017, when the stakeholder assesses the policy's results and in 2019, when both the policy's results and the impacts are measured. An ex post evaluation is carried out **after the programming period**.

### Purpose of the guidelines

The legal framework requires Member States to report in 2019 on the findings from the evaluation of RDP achievements towards the objectives of the programme and its contributions to the EU's strategy for smart, sustainable and inclusive growth in the Annual Implementation Reports (AIRs) submitted in 2019. The evaluation shall be done through the assessment of the programme's net contribution to changes in the CAP impact indicator values and through answering the evaluation questions.<sup>1</sup>

The present guidelines aim to:

- **Examine the challenges** in relation to the evaluation activities for the AIR in 2019;
- **Present practical approaches** to estimate the RDP net contributions to the common CAP impact indicators, and to assess the progress in achieving the EU level objectives;
- **Provide support for answering** the common evaluation questions no. 22 - 30 and for reporting on evaluation findings to the European Commission in the Annual Implementation Reports submitted in 2019.

### Structure and content of the guidelines

The **NON-BINDING Guidelines** *Assessing RDP achievements and impacts in 2019* cover the following:

- **PART I** (primarily for Managing Authorities) informs about the legal requirements. It outlines how to report in 2019 on the Common Evaluation Questions (CEQs) no. 22 to 30. It contains multiple references to other existing guidance.
- **PART II** (primarily for evaluators) offers methodological support for assessing the common impact indicators of Pillar II (sectoral, environmental and socio-economic impacts). This part explains the general CAP Pillar II intervention logic, provides recommendations concerning the use of additional evaluation elements, explains the data requirements, the units of assessment and guides the reader to choose the most appropriate evaluation approaches for netting out the RDP's contributions to the values of the CAP impact indicators. Furthermore, Part II also suggests approaches to assess RDP contributions towards achieving the EU 2020 strategy and innovation.
- **PART III** contains the fiches for answering the CEQs 22 – 30.

<sup>1</sup> Annex VII of Regulation (EU) No 808/2014

- **Part VI** contains the technical annex including more detailed information on the approaches to assess the CAP impact indicators and the glossary of terms.

# 1 WHAT NEEDS TO BE REPORTED ON EVALUATION IN THE AIR IN 2019? (PART I)

## 1.1 Main focus and legal framework of the evaluation in 2019

Beginning in June 2016, and each year until 2024<sup>2</sup>, the Member States submit to the European Commission an AIR. The AIR provides information regarding the implementation of the RDP, as well as information on the progress in implementing the evaluation plan<sup>3</sup>.

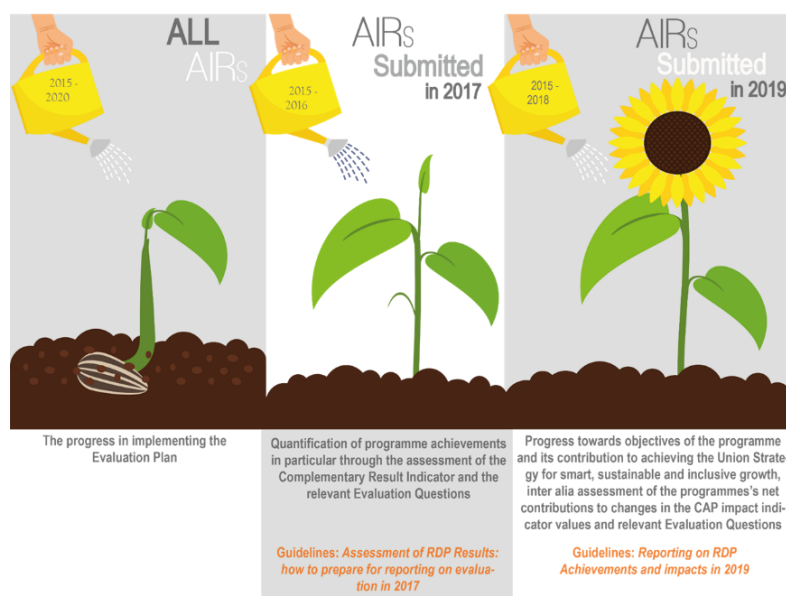
The **AIR in 2017** included the quantification of programme achievements (through the assessment of the result indicators, including complementary result indicators). Judgment criteria were used to interpret result indicators and to answer the common evaluation questions<sup>4</sup> no. 1 - 21. The guidelines *Assessment of RDP Results: how to prepare for reporting on evaluation in 2017*<sup>5</sup> provided support to accomplish this task and remain also relevant for the 2019 exercise<sup>6</sup>.

The **AIR in 2019** requires an update of the evaluation findings that were reported in 2017, and additionally it will include:

- the findings from the assessment of the RDP impacts, obtained through the calculation and interpretation of the net values of the CAP impact indicators,
- the RDP contributions towards the EU's strategy for smart, sustainable and inclusive growth, as well as towards the biodiversity strategy, and
- the answers to the common evaluation questions for RDPs 2014-2020 in relation to the EU level objectives (i.e. CEQ no. 22 – 30).

The following figure provides an overview of the main reporting requirements on evaluation in the Annual Implementation Reports across the programming period as stated in the legal framework<sup>7</sup> as well as the related guidance.

**Figure 1. Reporting on evaluation (in accordance with Annex VII of the Regulation (EU) no 808/2014)**



Source: European Evaluation Helpdesk for Rural Development (2018)

<sup>2</sup> Article 75 of Regulation (EU) No 1305/2013

<sup>3</sup> See guidelines 'Establishing and implementing the Evaluation Plan of 2014- 2020 RDPs'

<sup>4</sup> Commission implementation Regulation (EU) No 808/2014, Annex I, Point 9, and Annex VII, Point 7

<sup>5</sup> 'Assessment of RDP Results: how to prepare for reporting on evaluation in 2017'

<sup>6</sup> The Evaluation Helpdesk summarized the findings of the AIRs submitted in 2017 in the Summary Report Synthesis of the Evaluation Components of the 2017 Enhanced AIR: CHAPTER 7.

<sup>7</sup> Annex VII of Regulation (EU) no 808/2014

## The legal framework

The legal framework and the Common Monitoring and Evaluation System (CMES) provide the foundation for the evaluation of RDPs.

**The legal framework<sup>8</sup>** is the basis for the evaluation of RDP achievements and contributions to the EU's higher policy objectives.

The **general provisions** for evaluation are stipulated in the **Regulation (EU) No 1303/2013** and specify the role of evaluation in:

- improving the quality of the design and implementation of programmes, and
- in the assessment of programme's effectiveness, efficiency and impact<sup>9</sup>.

For this purpose, the Member States shall provide the **resources necessary for carrying out evaluations** and ensure that procedures are in place to **produce and collect the data necessary for evaluations**, including data related to common and, where appropriate, programme-specific indicators.

Evaluation shall be carried out in accordance with the **evaluation plan** and its findings shall be followed up in accordance with Fund specific rules. At least once during the programming period, an evaluation shall assess how the support from the ESI Funds has contributed to the objectives for each priority<sup>10</sup>.

**Regulation (EU) No 1306/2013** specifies the monitoring and evaluation requirements for the Common Agricultural Policy (CAP)<sup>11</sup>. It stipulates that the Commission shall ensure the performance of the CAP in achieving its **common objectives**. The combined impact of all CAP instruments is measured and assessed based on the information from the monitoring and evaluation activities conducted in the Member States. Common objectives shall be assessed through **common impact indicators**, while the underlying specific objectives shall be assessed by using **common result indicators**. The information collected shall be based on established sources of data, such as the Farm Accountancy Data Network (FADN) and Eurostat. The Commission shall take into account the data needs and synergies between potential data sources, in particular their use for statistical purposes when appropriate<sup>12</sup>.

**Regulation (EU) 1305/2013 establishes the Common Monitoring and Evaluation System**, its objectives<sup>13</sup> and the common indicators<sup>14</sup>. These indicators relate to the initial situation (context indicators) as well as to the financial execution, outputs, results and impacts of the programme. The common indicators shall be based on available data and linked to the structure and objectives of the rural development policy framework and shall allow the assessment of the progress, efficiency and effectiveness of policy implementation against the objectives and targets at Union, national and programme level.

The impacts of the rural development programme are assessed with the help of common (as well as additional and programme specific) impact indicators. The **assessment of the programme's impacts is under the responsibility of each Member State**.

<sup>8</sup> Article 67 – 79 of Regulation (EU) no 1305/2014, Article 110 of Regulation (E) No 1306/2013, Article 1(a) and Annex 1 of Regulation (EU) No 834/2014 , Article 14 and Annexes IV, V, VI and VII of Regulation (EU) No 808/2014

<sup>9</sup> Article 54 of Regulation (EU) No 1303/2013

<sup>10</sup> Article 56 of Regulation (EU) No 1303/2013

<sup>11</sup> Article 110 of Regulation (EU) No 1306/2013

<sup>12</sup> Article 110.3 and 110.4 of Regulation (EU) No 1306/2013

<sup>13</sup> Article 67 and 68 of Regulation (EU) No 1305/2013

<sup>14</sup> Article 69 of Regulation (EU) No 1305/2013

## The common evaluation elements

The **Common Monitoring and Evaluation System (CMES)** is part of the CAP Common Monitoring and Evaluation Framework (CMEF)<sup>15</sup> and includes several guidance documents on the use of common evaluation questions and indicators in the monitoring and evaluation of rural development policy. The Commission Implementing **Regulation (EU) No 808/2014**<sup>16</sup> describes the CMES in more detail and specifies its elements:

- an intervention logic showing the interactions between priorities, focus areas and measures;
- a set of common context, result and output indicators, including indicators to be used for the establishment of quantified targets in relation to rural development focus areas<sup>17</sup>;
- common evaluation questions<sup>18</sup>;
- data collection, storage and transmission;
- regular reporting on monitoring and evaluation activities<sup>19</sup>;
- the evaluation plan<sup>20</sup>;
- the ex ante and ex post evaluations and all other evaluation activities linked to the rural development programme, including those required to fulfil the increased requirements of the 2017 and 2019 Annual Implementation Reports<sup>21</sup>;
- support to enable all actors responsible for monitoring and evaluation to fulfil their obligations<sup>22</sup>.

The Commission also provides detailed **fiches** for each of the common indicators to be reported in the AIR in 2017 and 2019 and among those also for the 16 common CAP impact indicators<sup>23</sup>. **Each impact indicator fiche** contains a link to:

- its respective policy objective;
- the definition of the indicator;
- the unit of measurement;
- the methodology/formula for calculation;
- the data requirements and sources;
- the level and frequency of data collection;
- the information on data collection delays.

**13 out of 16 common CAP impact indicators** shall be used in the assessment of RDP impacts:

- I.01 Agricultural entrepreneurial income
- I.02 Agricultural factor income
- I.03 Total factor productivity in agriculture
- I.07 Emissions from agriculture
- I.08 Farmland bird index
- I.09 High nature value (HNV) farming
- I.10 Water abstraction in agriculture
- I.11 Water quality
- I.12 Soil organic matter in arable land

<sup>15</sup> Technical Handbook on the Monitoring and Evaluation Framework of the Common Agriculture Policy 2014 – 2020, DG Agri, 2015

<sup>16</sup> Article 14 of Regulation (EU) No 808/2014

<sup>17</sup> Annex IV of Regulation (EU) No 808/2014

<sup>18</sup> Annex V of Regulation (EU) No 808/2014

<sup>19</sup> Annex VII point 2 of Regulation (EU) No 808/2014,

<sup>20</sup> Annex I, Part I, point 9 of Regulation (EU) No 808/2014,

<sup>21</sup> Annex VII point 7 of Regulation (EU) No 808/2014,

<sup>22</sup> Annex VI of Regulation (EU) No 808/2014,

<sup>23</sup> CAP impact indicators for Pillar I and II

- I.13 Soil erosion by water
- I.14 Rural employment rate
- I.15 Degree of rural poverty
- I.16 Rural GDP per capita

## 1.2 How to report on the CEQs in 2019?

In 2019 the Member States will be required to report on their evaluation findings by answering all relevant common and programme specific evaluation questions in the respective sections of the Annual Implementation Report.

### What are the changes in relation to the previous reporting on evaluation?

As in the case of the CEQs answered in the AIR in 2017 (CEQ no. 1-21), also the answers to CEQs related to the EU level objectives (CEQ no. 22 – 30) have to be based on the evidence from the evaluation findings. Judgements on the success of the interventions are formulated with the help of judgment criteria and measured with common and additional impact indicators as well as with indicators linked to the EU strategy for smart, sustainable and inclusive growth. In addition, qualitative information can be collected to answer the evaluation questions in case of data scarcity.

### What are the general steps to answer the evaluation questions?

The following general steps are recommended for developing the answers to the CEQs no. 22 – 30:

- review the programme intervention logic linked with the respective common evaluation questions: CAP objectives/EU 2020 strategy objectives, rural development priority(ies), focus area(s) and measures;
- specify the success under the common evaluation questions with judgment criteria and link them to common (and additional) impact indicators to be used for answering the evaluation question;
- select quantitative and qualitative methods able to assess the net values<sup>24</sup> of the impact indicators.
- provide quantitative values for the result and impact indicators, as well as relevant qualitative findings for the purpose of answering the evaluation questions;
- answer the evaluation questions.

The above mentioned steps are similar to those suggested for the evaluation exercise in 2017. However, in 2019 some new challenges may appear, which are explained in detail in Part II of the Guidelines.

### Where to find guidance for the CEQs to be answered in 2019?

The present guidelines provide detailed information on how to answer the common evaluation questions linked to the EU level objectives (CEQ no. 22 – 30). Where necessary, the guidelines refer to other relevant guidance, as shown in Table 1.

The guidance for answering the common evaluation questions linked to the rural development focus areas, programme synergies, technical assistance and National Rural Networks (CEQ no. 1 – 21) can be found in:

- *Guidelines Assessment of RDP results: how to prepare for reporting on evaluation in 2017.* The document shows how to report on evaluations in the AIR in 2017 and beyond. The guidelines suggest possible evaluation approaches for assessing RDP results in 2017, which in relation to CEQ no. 1 – 21 remain valid also in 2019.

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<sup>24</sup> Technical Handbook on the Monitoring and Evaluation of the Common Agriculture Policy 2014-2020, European Commission, June 2017



- *Annex 11 - fiches for answering Common Evaluation Questions for Rural Development Programmes 2014-2020* provides technical support on how to answer the CEQ no. 1 – 21. It shows the intervention logic linked to each CEQ, describes useful evaluation elements and proposes assessment methods.

An overview of the most relevant documents for answering the CEQs in the AIR 2019 is provided here:

**Table 1. Guidance for answering the CEQs in the AIR in 2019**

CEQ no.	Document	Relevance for AIR in 2019
1 - 21	<a href="#"><u>Target indicator fiches for Pillar II (Priority I and II)</u></a>	Shows for each indicator the links to the respective priority and focus area, the definition and unit of measurement, the methodology for its calculation, data needs and sources, the frequency of collection and the means of transmission to the European Commission.
	<a href="#"><u>Complementary result indicators fiches for Pillar II</u></a>	Contains similar guidance for each of the complementary result indicators.
	<a href="#"><u>Guidelines Assessment of RDP results: how to prepare for reporting on evaluation in 2017 (separate Annex 11)</u></a>	Suggests how to report on evaluations in the AIR submitted in 2017, how to conduct the evaluation activities and based on what methods to answer to the CEQs no. 1 – 21.
	<a href="#"><u>Guidelines Evaluation of LEADER/CLLD</u></a>	Explains how to assess the primary and secondary contributions of LEADER/CLLD towards the rural development focus areas.
	<a href="#"><u>Guidelines Evaluation of innovation in RDPs 2014-2020</u></a>	Provides information on the assessment of innovation linked to the focus areas 1A and 1B and on supporting innovation via activities of national rural networks. Furthermore, it provides support for answering CEQs no. 1, 2 and 21 from the point of view of innovation.
22 - 30	<a href="#"><u>Impact indicators fiches</u></a>	Provides information on links of indicator with the CAP overall objectives, definition of indicators, unit of measurement, methodology/formula for calculation, data requirements, sources and frequency/delay of the collection and the location of data.
	<a href="#"><u>Latest Context indicators' data from Member States</u></a>	The European Commission provides an annual update of data (subject to availability) for common context indicators based on the data sent by Member States.
	<a href="#"><u>Guidelines Evaluation of innovation in RDPs 2014-2020</u></a>	Provides information on the assessment of the RDP contributions to the EU's 2020 headline target investing 3% of the EU's GDP in research and development and innovation and of the RDP contribution to innovation and on answering of CEQ no. 23 and 30.
	<a href="#"><u>Europe 2020 strategy information</u></a>	The Europe 2020 strategy is used as a reference framework for activities at EU and at national and regional levels. EU governments have set national targets to help

CEQ no.	Document	Relevance for AIR in 2019
		achieve the overall EU headline targets, and are reporting on them as part of their annual national reform programmes. The EU statistics office, Eurostat, regularly publishes comprehensive progress reports for the targets ( <a href="#">publication “Smarter, greener, more inclusive? Indicators to support the Europe 2020 strategy”</a> ) which monitors the progress towards the EU targets and goals defined under the three mutually reinforcing priorities of smart, sustainable and inclusive growth and show the situation in MS.
22, 23, 24, 25, 30	<a href="#">Europe 2020 strategy targets’ information by Member State</a>	Eurostat regularly updates the information on the national targets to meet the Europe 2020 strategy’s headline targets per MS.
	<a href="#">Context indicators fiches</a>	45 CAP common context indicators (divided into 3 groups – socio-economic, sectorial, and environmental) reflect relevant aspects of the general contextual trends in the economy, environment and society. These are likely to have an influence on the implementation, achievements and performance of the CAP. Indicator factsheets contain a description of definitions, methodology and data sources.
All CEQs	<a href="#">Working Paper Common evaluation questions for Rural Development Programmes 2014-2020</a>	Explains the purpose and use of common evaluation questions in the CMES. It describes the different types of evaluation questions and lists the judgment criteria and common and additional indicators for the common evaluation questions no 1 – 21.

### 1.3 Getting ready for the AIR in 2019

To get prepared for the assessment of RDP achievements and impacts in 2019, the various evaluation stakeholders in the Member States may carry out several steps<sup>25</sup> which help to ensure that the evaluation findings will be of high quality and relevant for the policy makers.

A suggested checklist in Table 2 contains useful steps for the evaluation in 2019. It also includes some preparatory steps, which in case not yet realized, can still be done before starting the evaluation activities in 2019. The table indicates the responsibilities of the various actors that may be involved the evaluation activities at Member State level: Managing Authority (MA), Monitoring Committee (MC), Paying Agency (PA), an evaluation unit (EvU) – if existing, the evaluation steering group (ESG) – if existing, the evaluators (Ev), the data providers (DP), and other relevant evaluation stakeholders (O).

<sup>25</sup> More information on the evaluation cycle can be found in the guidelines [„Assessment of RDP results: how to prepare for reporting on evaluation in 2017“](#).

Table 2. Check-list of recommended steps for the evaluation in 2019

Phase	Step	Indicative Timing	Responsibility (x) and involvement (y) <sup>26</sup>								
			MA	PA	DP	EvU	ESG	Ev	MC	O	
Planning	Update the baseline values of common context indicators (in the RDP).	As soon as data are available	x				y				
	Plan evaluation activities, topics, studies, data collection arrangements linked to common impact indicators in the RDP Evaluation plan.	As from 2013	x				y				
	Develop/update internal evaluation planning (document) to further specify the evaluation topics and activities (including data arrangements for netting out the impact indicators, for collecting other evidence, and related studies).	As from 2013	x				y				
Preparing	Set up a voluntary evaluation steering group to steer the evaluation process (regular meetings).	Early in the prog. period	x	y	y	x	x				y
	Review the programme intervention logic (objectives, RD priorities and focus areas, measures).	Early in the prog. period and before each evaluation	x			x	y	y			
	Create a common understanding of the common evaluation questions, develop judgment criteria and link them with common (and additional) indicators. Ensure consistency when linking evaluation elements with the RDP intervention logic.	Early in the prog. period and before each evaluation	x			x	y	y			
	Develop programme specific evaluation questions, if needed. Equip them with judgment criteria and programme specific indicators. Ensure consistency when linking the evaluation elements with the RDP intervention logic.	Early in the prog. period and before each evaluation	x			x	y	y			
	Screen the existing data for the calculation of the common (and additional) indicators to collect the necessary evidence to answer the EU Strategy 2020 related CEQs. Identify possible data gaps in relation to the selected indicators.	Early in the prog. period and before the evaluation	x	y	y	x	x	y			y
	Discuss possible evaluation approaches to asses/net out the impact indicators in line with the existing data.	Early in the prog. period and before the evaluation	x			x	x	y			

<sup>26</sup> MA – Managing Authority, MC - Monitoring Committee PA – Paying agency, EvU – evaluation unit, ESG – evaluation steering group, Ev – evaluators, DP – data providers, O – others.

Phase	Step	Indicative Timing	Responsibility (x) and involvement (y) <sup>26</sup>							
			MA	PA	DP	EvU	ESG	Ev	MC	O
	Draft the terms of reference and tender the evaluation (as ongoing evaluation or single evaluation contracts for 2017 and 2019).	Early in the prog. period, or 2016 and 2018	x			y	y			
Structuring	Discuss the existing data sources and data gaps with evaluators. Agree on how to bridge the data gaps.	2016 and Q2 – Q3 2018	x	y	y	x	y	x		y
	Discuss with the evaluators the methodological approaches for the assessment of RDP impacts and for netting out the common (and additional) impact indicators.	2016 and Q2 – Q3 2018	x			x		x		
Observing	Collect data and information on beneficiaries as linked to the common (and additional) impact indicators and in line with the proposed methods.	From the beginning of the RDP till the end of 2018	y	x	y	y		x		y
	Collect data and information on non-beneficiaries as linked to the common (and additional) impact indicators and in line with the proposed methods.	From the beginning of the RDP till the end of 2018	x		y	y		x		y
	Ensure the quality of the data collected both from the operations database and from other sources (e.g. FADN, statistical office, environmental monitoring etc.).	Ongoing	x	x	x	x	y	x		
Analysing	Conduct the assessment and netting out of the impact indicators in line with the proposed evaluation approach and the selected evaluation methods.	Q1 2019				y		x		
	Ensure the quality of the analysis.	Q1 of 2019	y			x	y	x		
Judging	Interpret evaluation findings from the analysis, develop judgments on basis of the judgment criteria and answer the evaluation questions.	Q1 of 2019				y		x		
	Formulate conclusions linked to the judgements and formulate recommendations, if needed.	Q1 and 2 of 2019				y		x		
	Ensure the quality of judgments.	Q1 and 2 of 2019	y			x	y	x		
Reporting	Draft the evaluation report.	Q2 of 2019	x	y		x	y	x		
	Present the evaluation findings to the Monitoring Committee.	Q2 of 2019	x			y	y	x	y	
	Fill the SFC template of the AIR (including chapter 2 and 7) and submit it to the EC.	Q2 of 2019	x			x		y		

Part I – What needs to be reported on evaluation in the AIR in 2019?

Phase	Step	Indicative Timing	Responsibility (x) and involvement (y) <sup>26</sup>								
			MA	PA	DP	EvU	ESG	Ev	MC	O	
	Publish the AIR and evaluation reports (not only chapter 7 of the AIR) on the public web site.	Q2, Q3 and Q4 of 2019	x			x					
	Prepare the evaluation findings in other appropriate formats (e.g. citizens summary) for the different target groups.	Q3 and 4 of 2019	x			x	y	y			
	Communicate evaluation findings to the target groups.	Q3 and 4 of 2019	x			x	y	y	y	y	
<i>Following</i>	Address and follow-up the conclusions and recommendations from evaluation in order to improve the design and implementation of the rural development programme.	Q2 of 2019 onwards	x							y	y

## 2 APPROACHES FOR ASSESSING RDP IMPACTS IN 2019 (PART II)

### 2.1 Choosing appropriate evaluation approaches for the assessment of RDP impacts

The assessment and netting out the common CAP Pillar II impact indicators in 2019 is a challenging task and raises **several questions**:

- How to attribute changes observed in rural areas to the RDP interventions?
- Which evaluation approach shall be used to show this attribution?
- Which data from existing sources (e.g. monitoring, EU, national and regional databases) shall be used to inform the suggested evaluation approach?
- How to coordinate the various data providers?
- How to ensure the data quality and bridge the data gaps?

#### 2.1.1 How can logic models help to decide on appropriate evaluation approaches?

**Logic models** are decision trees that can assist stakeholders to design a (counterfactual) evaluation approach and to choose the most appropriate methods in correspondence with the available data and information.

They can guide the evaluator towards new approaches, a better planning of future data gathering, and to initiate a reflection process on methods that are less reliant on data availability (e.g. qualitative methods). Logic models also help the Managing Authorities to better plan and predict the evaluation outcomes within the given context (data, evaluation budget, timeline).

The logic models provide a step-by-step guidance on the design of the evaluation approaches to enable a better understanding of:

- **POSSIBILITIES:** what are available suitable combinations of data/indicators/methods to answers the evaluation questions and/or
- **REQUIREMENTS:** what data/indicators/methods/approaches are required to assess net-impacts and to answer the evaluation question
- **CONSEQUENCES:** what implications have the decisions at the different steps for the cost and effectiveness of the evaluation

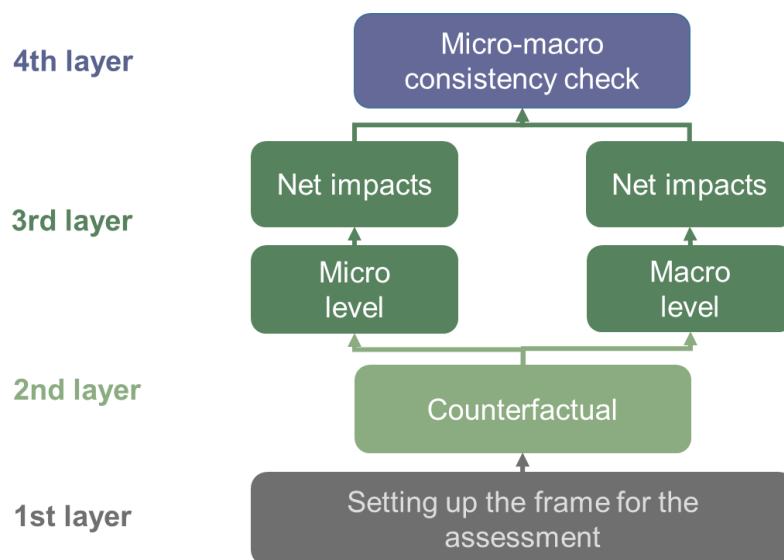
The logic models presented in the Guidelines follow the approach developed by [ENVIEVAL](#) - an EU collaborative project (Grant Agreement No. 312071) which has received funding from January 2013 to December 2015 from the European Union's Seventh Framework Programme for research, technological development and demonstration. ENVIEVAL developed and tested improved tools for the evaluation of environmental impacts of rural development measures and programmes in EU Member States.<sup>27</sup>

<sup>27</sup> Morkvenas Z, Navickas K, Gulbinas J, Jefanovas A, Schwarz G, Wolff A, Offermann F, Osterburg B, Aalders I, Miller D, Morrice J, Vlahos G, Smyrniotopoulou A, Artell J, Aakkula J, Toikkanen H, Povellato A, Longhitano D, Lasorella V, Balazs K, et al (2015) Methodological Handbook for the evaluation of environmental impacts of RDPs : Report D9.5, ENVIEVAL project (Grant Agreement No. 312071)]. Brussels: European Commission, 152 p

## The layers of the logic model

An overview of the **four layers of the logic model** is presented in Figure 2. It shows in the **1<sup>st</sup> layer** how the frame for the assessment is set up. This requires understanding the placement of the impacts in the intervention logic, the available indicators and the unit of assessment. The **2<sup>nd</sup> layer** identifies the options for the counterfactual, taking into consideration also the constraining factors. The **3<sup>rd</sup> layer** refines the options at the micro/macro-levels to assess the net impacts. The **4<sup>th</sup> layer** finally checks the consistency of the micro and macro level analysis with a view to validate the findings.

Figure 2. Simplified flowchart of the layers of the logic model



Source: European Evaluation Helpdesk for Rural Development (2018), adapted from ENVIEVAL (2015): *Methodological Handbook for the evaluation of environmental impacts of RDPs: Report D9.5*. Brussels: European Commission.

The layers of the logic models are used as a reference point for the description of the suggested evaluation approaches for the CAP impact indicators (see chapters 2.2 – 2.9).

### Setting up the frame for the assessment (1<sup>st</sup> layer)

**The assessment of a given impact** (sectoral, environmental, socio-economic) starts with setting up a consistent evaluation frame. It should provide clarity on the placement of the impact within the intervention logic and show the available indicators and units of analysis for its measurement.

The frame for the assessment can be prepared with the following steps:

**Step 1 Explaining the CMES intervention logic.** The intervention logic shows the hierarchy of policy objectives and brings in relation with the relevant evaluation questions, measures and focus areas, as well as with the related CMES output, result and impact indicators. The indicators are reviewed in the context of the available data.

**Step 2 Selecting additional (result or / and impact) indicators,** if needed, to complement the mandatory CMES indicators. The use of additional indicators shall be carefully considered, taking into account the costs, the availability of data in time, the suitability and added value for the assessment. Additional indicators can be helpful to quantify net results and impacts, if the data for common indicators is not sufficient or if gaps in common result and impact indicators need to be filled. Additional indicators may also include qualitative ones (e.g. degree of perceived change by

stakeholders based on a Likert scale) to complement the quantitative evidence or in the absence of any alternative quantifiable ones.

**The use of additional indicators is voluntary.** Additional indicators suggested in the present guidelines and others *can* be used if in a certain context they are considered helpful to answer the Evaluation Questions. In the first place an attempt must be done by the evaluators to quantify and use the common indicators.

**Step 3** *Defining the unit of analysis* (= the “smallest part of an organized system”) for the micro and macro level assessment (if applicable). For example, the unit of analysis at micro level could be parcels or farms whereas at macro level it could be catchment or regional units. With a defined unit of analysis, the indicator can measure the land management changes and environmental, sectoral or socio-economic changes caused by the RDP interventions.

### Setting up the counterfactual (2<sup>nd</sup> layer)

**Programme effects** can never be directly observed and therefore their assessment therefore requires the use of a counterfactual analysis.

The programme effect is the difference in value of the specific outcome (e.g. GVA, or labour productivity) for the same unit with the programme and without the programme. This definition is valid for any unit of assessment (e.g. person, farm, enterprise, area of land, community, village, region, programming area, country, etc.) and any outcome (expressed in terms of sectoral, environmental or socio-economic indicators) which can plausibly be related to the programme.

The 2<sup>nd</sup> layer helps the evaluator to identify the type(s) of counterfactuals that can be constructed with the available data. It takes into account several constraining factors (e.g. scarce data availability, short-term evaluation contracts, limited evaluation capacity) and helps to identify also viable second-best solutions (e.g. for the assessment of environmental impacts). A consistent process categorizing the possible methods to design a counterfactual is important, even if data is lacking.

In the logic model the counterfactual layer is applicable for both micro and macro level assessments and is linked with choosing the evaluation approach and methods. **It is up to the programme evaluator to decide at which level (e.g. micro, regional, macro) the analysis of programme effects is carried out.** This decision will depend on the available data and precede the choice of the unit for which data (economic, environmental or socio-economic) is collected.

For the micro-level, the units of analysis could be farms, communities, or regions, whereas for the macro level this could be the RDP territory. The respective data should be collected for the same unit category and include programme participants and non-participants.

**Multi-regional Member States may face data gaps in EU data-sources (e.g. Eurostat)** for the common CAP impact indicators at the regional level. Yet, regional data may be obtained from regional/national sources or be based on upscaled data from the micro-level.



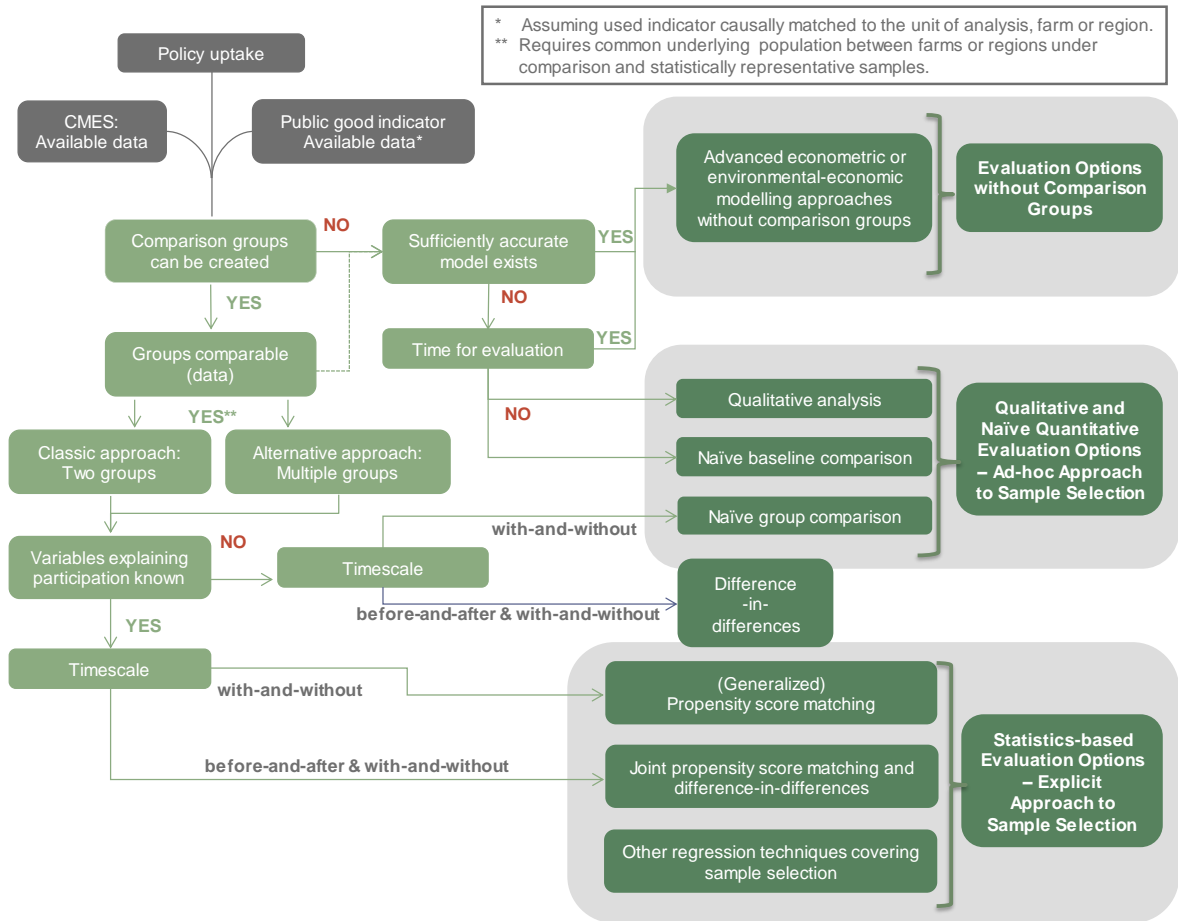


### QUICK GUIDE #1: How to apply the logic model to identify different options for setting up the counterfactual design and to decide on the evaluation approach?

The application of the steps in the decision tree in the counterfactual layer provides guidance on answering the following key questions in designing the counterfactual:

- What options are available to construct a counterfactual?
- Does the implementation and uptake of the measures allow constructing a control group?
- To what extent do I have data on other factors influencing the selected indicators?
- Do I have data for the selected indicators for different points in time (before and after) for participants and non-participants?
- Can I cost-effectively use robust statistics based methods to quantify the net-effects of the evaluated measures?

Figure 3: Logic model (general layer) for identifying options for setting up the counterfactual



Source: ENVIEVAL (2015), modified

The logic model starts with the description of the data sources (dark grey boxes), continues with the description of the setting up of the counterfactual (light green boxes) and finally shows the possible options for setting up the counterfactual (dark green boxes).

*Learn more about the use of logic models from the FP7 Research project ENVIEVAL and its “Methodological Handbook for the evaluation of environmental impacts of RDPs”*



## QUICK GUIDE #2: How to construct a control group at the micro level? (related to 2<sup>nd</sup> layer)

Ideally, the counterfactual analysis at micro-level should be based on comparisons between control groups of programme non-supported units (non- beneficiaries) and supported units (beneficiaries), which are as similar as possible (in observable and unobservable dimensions). If the two groups are statistically sufficiently similar (they have similar characteristics), then it can be assumed that any difference in outcomes is due to the programme. Generally speaking, counterfactual analysis allows for the establishment of causality – attributing observed changes in outcomes to the programme, while removing confounding factors.

The construction of appropriate control group is challenging task due to a strong self-selection to the programme and strict programme eligibility conditions. The supported units of the assessment, which received programme support can largely differ from non-supported units both in terms of their structural characteristics as well as economic/environmental/socio-economic performance.

The construction of an appropriate control group is as follows:

- **Step 1:** Find a sample of RDP supported units/beneficiaries (e.g. farms/farmers/non-farming enterprises/communities/areas/regions) in available databases (e.g. FADN) and use the RDP monitoring system as a reference point (e.g. Paying agency's database).
- **Step 2:** Select from all relevant units included in the database those which in the same period did not receive support from RDP measures ("non-beneficiaries").
- **Step 3:** Preselect from the group of non-beneficiaries those units which did NOT fulfil the programme eligibility conditions (e.g. due to high income, size, location, etc.) and drop them from the analysis.
- **Step 4:** Collect data for all units in both groups (beneficiaries vs. non-beneficiaries) on their major characteristics (variables) for the year 2013 (i.e. prior to the programme). Note that variables included in the analysis should affect both the selection of a unit as well as the indicators computed at a micro-level (common and additional impact indicators). One of the proposed variables (used as important control variable) can be: i) the level of support received by a given unit ("beneficiary" and "non-beneficiary" during the former programming period, i.e. in years 2007-2013, and ii) the level of support received by a given unit ("beneficiary" and "non-beneficiary") from other public sources, e.g. EU structural funds; Pillar I, in the analysed period etc.
- **Step 5:** Apply appropriate techniques (e.g. matching) which allow to identify from the sample of "non-beneficiaries" (see: steps 2-3) a suitable "control group" (some of the "non-beneficiaries" and/or "beneficiaries" will be dropped from the analysis due to a lack of adequate control units).
- **Step 6:** Check statistically the "similarity" of both groups prior to receiving support from the programme, e.g. by performing statistical tests on covariates included in the analysis (average values of units' characteristics in the group of "beneficiaries" should not significantly differ from respective characteristics in the "control group").

*Learn more about the design of control groups, matching etc. in [Guidelines for ex post evaluation of 2007-2013 RDPs!](#)*



### QUICK GUIDE #3: Trade-offs in the choice of evaluation methods

In evaluations the non-availability of data is often regarded as the main constraint that limits the choice of evaluation methods. Applying “naïve” evaluation techniques (without counterfactual) in such cases, however leads to significant weaknesses in the methodological rigour, credibility, robustness and validity. Stakeholders are therefore encouraged to consider well the trade-offs between the data demand and the potential bias in the results created by weaker methods. Evaluation methods which ensure a higher quality of results tend to be more data demanding.

**Comparison of methods** (Legend: +++++ = the highest score; + = the lowest score):

Method	Credibility/Rigor, Reliability, etc.	Ability to reduce selection- and other biases	Quality of evaluation	Data demand
Experimental approach	+++++	+++++	+++++	+++
Quasi-experimental approaches	++++	++++	++++	++++
Matching approaches (combined with DID)	++++	++++	++++	++++
RDD	+++	+++	+++	+++
IV method	++++	+++	+++	+++
DiD method	++	++	++	++
Comparisons with non-beneficiaries in a given period of time (naïve approach)	+	+	+	++
Before-after comparison of programme beneficiaries (naïve approach)	+	+	+	+
Qualitative approaches applied to estimation of programme results/impacts	++	++	++	+

*Learn more about criteria for choosing evaluation approaches in [Guidelines for Ex-post evaluation of 2007-2013 RDPs](#), Chapter 4.3.4.2.*

### Micro and macro level assessment and netting out of impacts (3<sup>rd</sup> layer)

The **micro or macro layer** is then followed in the logic model to refine the evaluation options. The workflow for the micro and macro layers leads the evaluator to methods which contribute to a consistent assessment of **net impacts at micro and macro levels**<sup>28</sup>. For each of the possible counterfactual designs, an individual micro-level logic model is created. In some evaluation designs the upscaling of the micro level findings is the basis for the macro-level assessment. In other evaluation designs the micro and macro-level assessment complements each other, which requires a consistency check.

**The quantitative evidence should be critically interpreted.** A qualitative assessment might be used to interpret the evaluation findings. Furthermore, the qualitative assessment also helps to complement the quantitative assessment with a view to: a), assess the representativeness of the available data, b) cross-validate the findings, c) capture different dimensions of the same phenomenon.

The application of the steps in the decision tree in the micro and macro layers helps to answer the following questions in designing the evaluation approach:

- Do I need to apply a specific environmental, sectoral (farm-economic) and socio-economic method to quantify indicator changes or can I directly use the indicator values with counterfactual methods?
- If yes, is the amount and characteristics of data appropriate to implement one of the methods available for environmental, sectoral or socio-economic impact evaluation?
- Do I need to collect new primary data through statistical sampling and how costly is this?
- Is there a need for specific processing tasks to improve the quality of the survey / monitoring data?
- What are the implications for the costs of the evaluation and its potential performance?
- If I cannot quantify indicator changes or if the cost of doing so is very high, what alternative (qualitative) methods are there to assess indicator changes? What is the cost of such methods and can I assume this cost?

<sup>28</sup> The steps to be taken in the net assessment of RDP impacts are further described in the [Guidelines for the ex post evaluation of 2007-2013 RDPs](#), namely in chapters 4.2.3 and 4.2.4



#### QUICK GUIDE #4: How to assess RDP net effects? (related to 3<sup>rd</sup> layer)

The assessment of the programme net effects while using the counterfactual consists of five principal steps:

**Step 1:** Estimate the RDP **direct effects** on supported units at the micro-level:

- a. Compute at the micro-level for the group of “beneficiaries” and the “control group” the average value of the common- or additional impact indicators prior to the support (e.g. in the year 2013) and after the support (e.g. in the years 2018 or 2019)
- b. Calculate specific policy indicators, e.g. Average Treatment Effects on Treated (ATT), using as outcome the relevant common- or additional impact indicators. Compute the RDP **net direct effects on the above mentioned indicators** by combining the calculated ATTs with the Difference in Differences method)
- c. Perform a sensitivity analysis of the obtained results

**Step 2:** Estimate the RDP indirect effects on supported units at the micro-level. Again, the observed change in the value of the indicators shall be divided in change due to the programme (total effect of primarily and secondarily contributions) and change caused by other factors. Programme indirect effects, e.g. substitution, displacement, multiplier, etc. of RDP should be computed and shown separately.

**Step 3:** Calculate the indirect effects on non-supported units at the micro-level. Here the observed change in the value of the indicators shall also be divided into two components: change due to the programme (total effect of primarily and secondarily contributions) and change caused by other factors. This stage refers to the expectation that the support obtained by beneficiaries of RDP measures may have “expected/unexpected” general equilibrium effects, e.g. negative effects on non-beneficiaries located in a close neighbourhood of programme beneficiaries.

At this stage of the evaluation, a preliminary qualitative assessment is essential because it can provide valuable insiders’ perspectives and lead to the formulation of important Programme Specific Evaluation Questions (PSEQs) focused on the programme’s performance, especially regarding its positive, negative, intended, and unintended effects on non-supported units. For a preliminary analysis of synergies or potential negative transverse effects, the evaluators may also use the qualitative assessment tool developed in previous guidelines.

**Step 4:** Aggregate the findings and calculate the RDP effects on the analysed impact indicators at macro/- programming area level; In this step the evaluator should calculate net direct effects of the RDP on the common- or additional CAP Pillar 2 impact indicators at the programming area level by applying extrapolation techniques, i.e. by multiplying average micro-results computed at a micro- level by a number of supported/non-supported units.

**Step 5:** Apply qualitative methods for checking and verifying the obtained results (triangulation).

*[Learn more about netting out of programme effects in Guidelines for ex post evaluation of 2007-2013 RDPs!](#)*

### Micro-macro consistency check and validation (4<sup>th</sup> layer)

**For the net impact assessment**, it is important to check if the evaluation findings which resulted from the micro and macro level assessment are consistent, in order to validate them.

In the case of a quantitative bottom up evaluation the consistency is warranted by the up-scaling of data from the micro to the macro level.

For programme *direct* effects on supported units, the net direct effects of the programme computed by using **result indicators** should in principle be consistent/show the same trend with the net effects of the programme calculated by using **common- or additional impact** indicators. However, depending on the size and direction of indirect effects, macro level results can in principle also show the opposite impact direction than micro level effects. But in those cases, the opposite directions of effects need to be explained through causal and / or quantified evidence of the indirect effects. Consistency checks of micro and macro level results require a good understanding of key factors impacting on the indicator.

For programme *indirect* effects on supported and non-supported farms, the micro-economic findings after their aggregation can only roughly approximate the scale of all possible indirect RDP effects (incl. those computed using sectoral models). The main reason is a difficulty to explicitly and separately model **all** potential indirect effects which supported and non-supported units could “at least theoretically” have been confronted with.

The bottom up evaluation based on the aggregation of different data sources with different metrics and terminology can cause ambiguity. An important challenge for the consistency of macro with micro level is the causality between the changes and impacts measured at farm or parcel level and the changes and impacts beyond farm boundary change (e.g. at NUTS3 and programme level). In this context it is important that the applied units of analysis and scales take into account at which scale and level the effects are likely to occur. Simply applying fixed administrative boundaries can distort the results. Some effort can be made to apply sampling methods in a consistent way at the field, farm and landscape scales to take into account the different taxa studied and the interactions among variables describing climate, topography, land use, socio-economic and soil conditions<sup>29</sup>. The ‘bottom-up approach’, with a study area at plot or field level, allows results to be obtained through the collection of data from site-specific surveys following experimental protocols, and to extrapolate them from the micro to the macro level with GIS, satellite images or spatial analysis<sup>30</sup>.

<sup>29</sup> For more information see: Batáry P, Báldi A, Kleijn D, Tschamtké T (2011) Landscape-moderated biodiversity effects of agri-environmental management: a meta-analysis. *Proceedings. Biological sciences / The Royal Society*, 278(1713): 1894–1902.

<sup>30</sup> For more information see: Rundlöf M, Edlund M, Smith HG (2009) Organic farming at local and landscape scales benefits plant diversity. *Ecography* 33(3): 514- 522



### QUICK GUIDE #5: How to make the best use of qualitative approaches?

**Qualitative approaches** can be applied with a threefold objective:

- a) **As an alternative to quantitative methods** when data is missing. Qualitative theory-based evaluation (TBE) can be used to show how and why the programme will work and is expected to lead to the intended outcomes<sup>31</sup>. TBE follows each step of the programme's intervention logic identifying causal links and mechanisms of change, leading to results and impacts. The various links in the intervention logic can be analysed using a variety of methods. In these guidelines we propose focus groups methods (notably the MAPP method) or stakeholder/expert interviews.
- b) **As a complement to counterfactual evaluation** (which assesses whether a programme has an impact) to identify how the impacts have been generated and why. N.B. TBE can neither examine the "net-impact" (i.e. the extent to which the change observed in the programme area can be attributed to the programme) nor disentangle the effects of the programme from the contribution of other factors.
- c) **As part of triangulation** for validating the findings of quantitative methods.

*Learn more about Theory Based Evaluation and its workflow, in 'Investment Support under Rural Development Policy', Final report, 12 November 2014 (see chapter 3.3.4)*

#### 2.1.2 Overview of recommended evaluation approaches for the assessment of CAP impact indicators










In the programming period 2014-2020 the assessment of RDP impacts will be conducted for the first time in 2019, at a time when data gaps may still be an issue for various RDPs. Therefore, the present guidelines suggest at least two different approaches to calculate each of the common CAP Pillar II impact indicators:

- **Approach A** is an example of an **optimal evaluation approach** that can be used in case of good data availability in 2019 and/or can be aimed for in the ex post evaluation. The approach is more advanced than Approach B and is also more robust.
- **Approach B** is an example of an **acceptable approach in 2019**, which is also applicable in the case of data gaps (e.g. caused by low programme uptake etc.) or if other factors hinder the application of a more advanced approach.





The table below provides an overview of the suggested examples of optimal and acceptable evaluation approaches **for both the micro and macro level assessment of the CAP pillar II impacts**. A more detailed description of these approaches can be found in the chapters 2.2 – 2.9 of the guidelines.

<sup>31</sup> For a detailed description of the TBE and its workflow, see chapter 3.3.4 in 'Investment Support under Rural Development Policy', Final report, 12 November 2014.

Table 3. Examples of recommended evaluation approaches for the assessment of CAP impact indicators

Code	Indicator	Approach A (Example of optimal approach)		Approach B (Example of acceptable approach in 2019)	
		Micro-level	Macro-level	Micro-level	Macro-level
<b>Sector-related impacts</b>					
I.01 	Agricultural entrepren. income	Combination of Propensity Score Matching methods with Difference in Differences Method (PSM-DID)	Bottom-up approaches upscaling micro level findings  Application of a sectoral model	Regression Discontinuity Design (RDD)	Bottom-up approaches upscaling micro level findings
I.02 	Agricultural factor income				
I.03 	Total factor productivity in agriculture				
<b>Environmental impacts</b>					
I.07 	Emissions from agriculture	Regression and matching techniques	GPSM using NUTS3 or other spatial data	None	Naïve Baseline Comparisons
I.08 	Farmland bird index	Propensity Score Matching (PSM) and Difference in Difference (DiD)	Propensity Score Matching (PSM) and Difference in Difference (DiD)  Spatial econometric models at bio- geographical areas	Statistical analysis of ad-hoc pairwise comparisons or multiple comparison groups using DID accompanied by qualitative assessments	Bottom-up approaches upscaling micro level findings accompanied by qualitative assessments
I.09 	High nature value (HNV) farming				
I.10 	Water abstraction in agriculture	Regression and matching techniques for I.10, I.11-1, and, depending on data availability for I.11-2 Simulation of a “Case Study” RBD or of its sub-unit for I.11-2 only	Generalized Propensity Scoring Matching (GPSM)  Spatial econometrics methods	Qualitative Methods	Naïve Group Comparisons supported by Qualitative Methods
I.11 	Water quality				
I.12 	Soil organic matter in arable land	SOM assessment based on 0-60 cm soil depth	None	SOM assessment based on simplified soil monitoring programmes	SOM assessment based on LUCAS database



Code	Indicator	Approach A (Example of optimal approach)		Approach B (Example of acceptable approach in 2019)	
		Micro-level	Macro-level	Micro-level	Macro-level
I.13 	Soil erosion by water	Statistics-based Evaluation Techniques	GPSM spatial econometrics supported by DiD	Naïve baseline or dynamic group comparisons	Quantitative naïve assessment between spatial units and a national average
Socio-economic impacts					
I.14 	Rural employment rate	None	Recursive- Dynamic CGE model  Propensity Score Matching (PSM) and Generalised Propensity Score Matching (GPS)	None	Input-Output Analysis (IO)
I.15 	Degree of rural poverty				
I.16 	Rural GDP per capita				

The **evaluation approaches** suggested in the Guidelines are examples out of a range of possible options. Each evaluator should carefully choose and adapt its approach to the specific situation in the RDP. The logic models presented in the Guidelines are a tool that leads the evaluator to identify possible evaluation options in a given real world context.



## SECTOR-RELATED IMPACTS

### *CAP impact indicators*

I.01



Agricultural entrepreneurial income

I.02



Agricultural factor income

I.03



Total factor productivity in agriculture

### *Related Evaluation Question*

CEQ27:

“To what extent has the RDP contributed to the CAP objective of fostering the competitiveness of agriculture?”

## 2.2 Sector related impact indicators (I.01, I.02, I.03)

### 2.2.1 Setting up the frame for the assessment

#### The intervention logic

##### CAP overall objective, common evaluation questions and common CAP impact indicators

The **Common CAP impact indicators I.01, I.02 and I.03** refer to the **CAP overall objective**: “Fostering the competitiveness of agriculture” and should be applied to answer **CEQ27**: “To what extent has the RDP contributed to the CAP objective of fostering the competitiveness of agriculture?”<sup>32</sup>.

##### Rural development priorities, focus areas and measures

**In general terms**, the RDP interventions may affect competitiveness of the agricultural sector in three different ways:

- *Firstly*, through a change of competitiveness of *supported farms* occurred as **direct** effect of measures implemented under **Priority 1**: Knowledge transfer and innovation (M01 - Knowledge transfer, M02 – advisory services, M16 - cooperation), **Priority 2**: Farm Viability and competitiveness (M04 – investments in physical assets and M06 – farm and business development) and to large extent also **Priority 3**: Promoting food chain organisation, including processing and marketing of agricultural products, animal welfare and risk management in agriculture (M03 – quality schemes, M05 – restoring agriculture potential, M09 – setting up of producers groups, M14 – animal welfare and M17 – risk management)
- *Secondly*, through a change of competitiveness of *supported farms* occurred as **indirect** effect of measures implemented under other RDP priorities: i.e. **Priority 4**. Restoring, preserving and enhancing ecosystems related to agriculture and forestry, **Priority 5**. Promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors as well as **Priority 6**: Promoting social inclusion, poverty reduction and economic development in rural areas, which might show secondary contributions<sup>33</sup> to the focus areas under the Priorities 2 and 3.
- *Thirdly*, through a change of competitiveness of RDP *non-supported farms* affected **indirectly** (positive or negative) by the RDP programme.

During the evaluation, first an assessment of direct- and indirect effects of measures implemented under Priorities 1, 2 and 3 on competitiveness of supported farms shall be undertaken.

Measures primarily contributing to Priority 2 are supposed to have direct and almost immediate impacts on food production viability (competitiveness of the farming sector). This should be well captured by the indicators I.01, I.02 and I.03. Farm income (I.01) corresponds to the ultimate objective of undertaking in agriculture while total factor productivity index (I.03) captures efficient use of factors which refer to the long-term competitiveness of the sector and the use of resources. Indicator I.02 stands in between: it relates to labour productivity and to generated resources by the business for rewarding labour input. Priority 1 and the respective measures M01 and M02 have a direct effect on the indicators I.01, I.02 and I.03 by influencing the farmers’ capacity to adopt modern technologies and to participate in complex schemes. Furthermore, farmers are encouraged by M16 (cooperation)

<sup>32</sup> [Working Paper Common evaluation questions for RDP 2014-2020](#)

<sup>33</sup> Secondary contributions of measures to focus areas under which they have not been programmed may be taken into consideration in the assessment of RDP results. They might be quantified when calculating values of result indicators, or assessed qualitatively. In general, the quantification of secondary contributions is not legally required, but considered as good practice. See in guidelines „[Assessment of RDP Results](#)” (chapters 5., 6.1.1.)

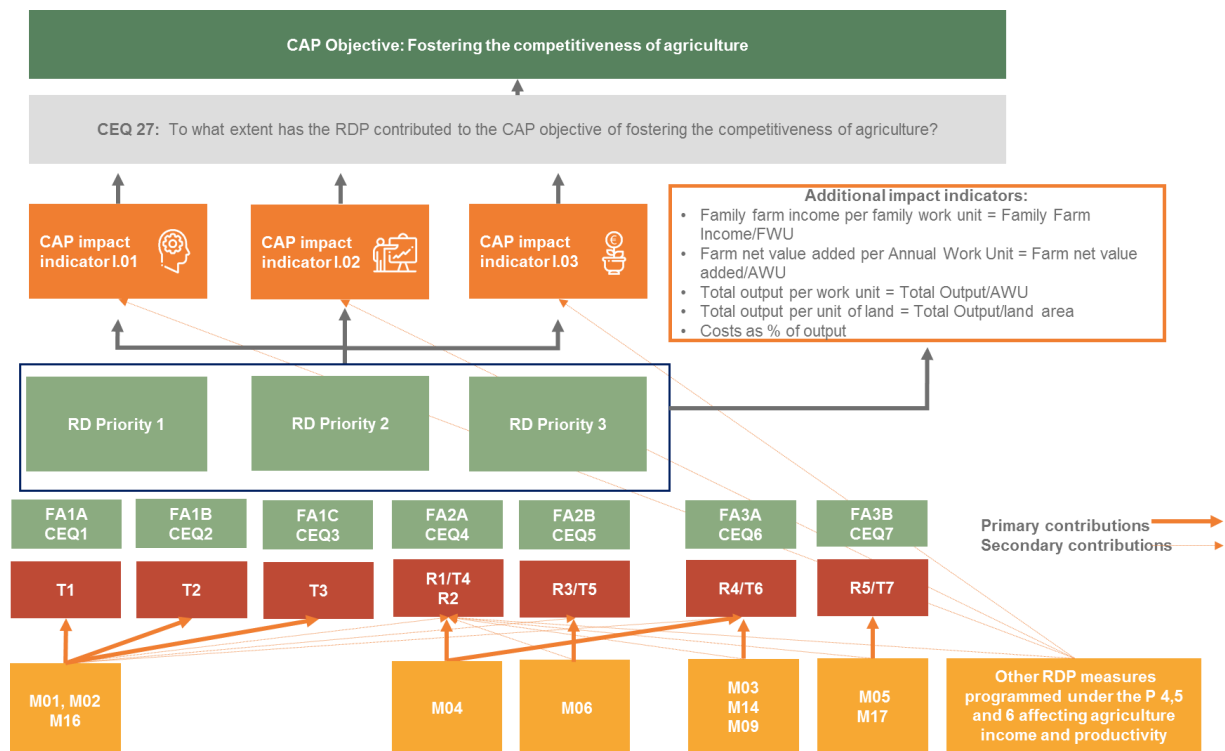
to establish and/or to take part in collaborative projects and collective actions improving their position in the market and enhancing their abilities to address complex competitiveness issues. Priority 3 and the corresponding measures M03 and M05 aim at improving the farmers income by utilising new market opportunities and by encouraging them to take risk prevention measures respectively.

#### Related result indicators

Among the relevant **result** indicators to be taken into consideration there are labour productivity (complementary result indicator R2), gross farm income in supported farms (additional result indicator), family farm income in supported farms (additional result indicator) and other additional result indicators<sup>34</sup> contributing to the various **partial** measures of competitiveness of supported farms<sup>35</sup>. In general, one can expect a *positive correlation* between the net changes in these indicators and the net changes of impact indicators (I.01, I.02 and I.03) calculated for *supported farms at micro-level*.

**An example of the general CAP Pillar II intervention logic** linked to the CAP impact indicators I.01, I.02 and I.03 is presented in the figure below (N.B. An editable version of this intervention logic picture, to be adapted by stakeholders to the situation in their RDP is provided in a separate document.).

Figure 4. CAP intervention logic and impact indicators I.01, I.02 and I.03 (example)



Source: European Evaluation Helpdesk for Rural Development (2018)

<sup>34</sup> Additional result indicators are explained in the guidelines „Assessment of RDP Results“, chapter 5.2.1

<sup>35</sup> More information on additional result indicators can be found in Annex 11 of guidelines [Assessment of RDP Results: how to prepare for reporting on evaluation in 2017](#)

## Additional indicators

For the assessment of the RDP impacts on the competitiveness of the agricultural sector the **use and netting out of the common CAP impact indicators I.01, I.02 and I.03 is mandatory**.

**The use of additional indicators is optional.** The competitiveness of the agricultural sector is a broad and multidimensional concept and the common CAP impact indicators cover only part of it. It is therefore advisable to supplement the calculations of RDP net effects on the competitiveness of the agricultural sector by computations using common- and additional result indicators reflecting various aspects of competitiveness of supported and comparable non-supported farms measured at the micro-level.<sup>36</sup>

**Some examples of relevant additional indicators** (incl. their unit of measurement, potential use, data sources and frequency of collection) are shown in the Technical Annex (see chapter 4.1):

- Family farm income per family work unit
- Farm net value added per Annual Work Unit
- Total output per work unit
- Total output per unit of land
- Costs as % of output
- Subsidies as % of farm net income
- Yields of major agric. products and various productivities

## Unit of analysis

At the **micro level** the unit of analysis is a **farm** which received support and its counterpart - farm(s) which did not get such support.

At the **macro level** the unit of analysis is the **agricultural sector** within the RDP territory. In order to be able to up-scale the results (the effects on indicators) obtained at the micro level, it is very important to state the relationship between the number and the characteristics of the farms in the sample used for the analysis at the micro level, all supported farms, the number and characteristics of non-supported farms affected by the RDP, and the characteristics of the whole farming sector.

If **FADN or another sample of farms** is used, it is necessary to have information on how the sample relates to the whole population. In addition, the evaluator needs to understand which segment of the supported farms is included in the FADN sample<sup>37</sup>. Taking into consideration the delays in the provision of FADN data (2 years of delay) the evaluators may also use data from national data sources, farm annual accounts or use surveys to collect data.

The **baseline data** for the chosen assessment unit is ideally data collected in 2013 or close to this year.

**The indicators I.01, I.02 and I.03 calculated at the sector level** from the Economic Accounts for Agriculture cannot be completely associated with the interventions of the RDPs analysed in the short running time of the EU programming period. Calculations of these indicators are currently available only at the macro-level for each MS and for several calendar years. Clearly, a change in these indicators in time (e.g. starting from 2014) represents a gross effect caused by a number of factors, including the influence of other exogenous (i.e. RDP independent) factors. Given the above, this aggregated data has only limited utility for the analysis of the net impact of the RDP

<sup>36</sup> See Annex 11 of guidelines: Assessment of RDP results

<sup>37</sup> In case of delays of FADN data, individual farm book keeping data or surveys covering the most recent years (e.g. 2017-2018) could be helpful. In the worst case, the scope of analysis should be limited to the period covered by the available FADN data (e.g. 2013-2017).

(2014-2020) on the competitiveness of the agricultural sector. In the best case, it can show the economic context before and during the implementation period of the RDP.

## 2.2.2 Choosing evaluation approaches (logic model)

**The range of methodologies that can be applied to assess the sector-related impacts is rather wide<sup>38</sup>.** Yet choosing a particular method in a given RDP context is not always easy, as the results may be sensitive to the context, assumptions and methods applied. This can be particularly difficult if programmes are “small” and have a limited budget or number of operations.

The first critical question is if the evaluator has **access to data on supported and non-supported farms** and if the information in these datasets allows the comparison of these groups. If data which explains participation in the measure (group of measures, or RDP in total) or at least the fulfilment of the eligibility criteria is absent the two proposed approaches cannot be applied.

In such a situation, the evaluator will probably use naïve comparisons or qualitative assessments based on expert and stakeholder opinions. Yet, even by using some aggregate (e.g. sector level) context indicators the interpretation of RDP impacts based on a pure qualitative approach remains problematic. The evaluator might also use the “difference in differences” (DID) method if data for the situation before and after the intervention is available. However, due to problems in eliminating / reducing the selection bias this approach can NOT be recommended as a stand-alone option.

**The use of advanced quantitative evaluation methodologies** for assessing sector-related impacts can be recommended for most of the programmes. They require time series of cross-sectional units or panel- micro-economic farm data.

Since the extent to which RDP measures affect the impact indicators cannot be directly observed, the separation of these effects from the observable changes in the respective indicators I.01, I.02 and I.03 between the years 2013 (i.e. prior to RDP support) and 2018 or 2017 has to be carried out. The most recent year for which data is available should be used in this context.

In order to apply the recommended methodology to calculate the net value of the impact indicators (I.01, I.02, and I.03) an abundant database is required. Clearly, the most appropriate database is the FADN or “in general” records on bookkeeping farms, including data on farms supported from RDPs (2014-2020) and non-supported farms.

As in the FADN dataset the variables I.01, I.02, and I.03, as defined in the fiches prepared by DG-AGRI<sup>39</sup>, are not explicitly available, **all these indicators should first be calculated at the micro-level**. For the computation of the indicators I.01, I.02, and I.03 at the micro-level their values are referred to as: Agricultural entrepreneurial income: micro (AEIm), Agricultural factor income: micro (AFIm), and Total factor productivity: micro (TFPm).

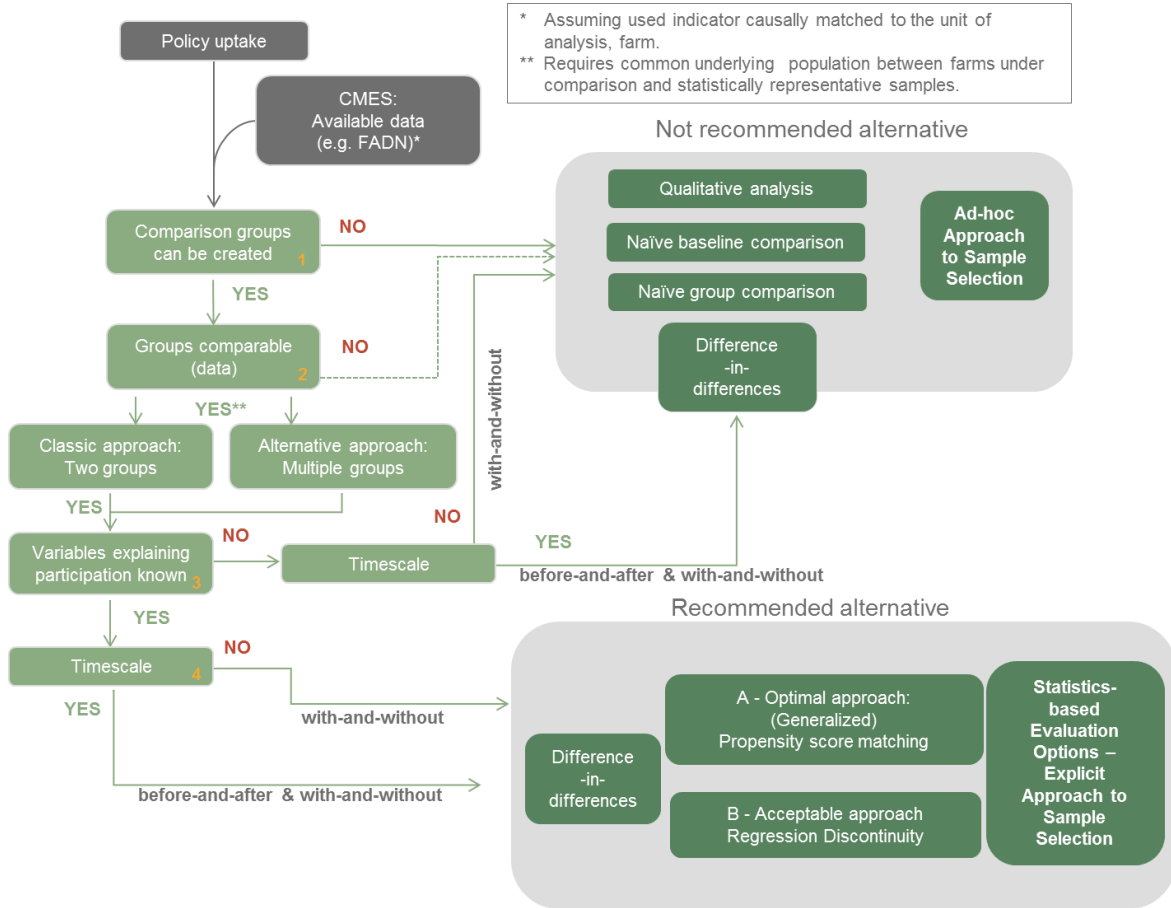
In order to assess the RDP impacts and to calculate the abovementioned indicators the evaluators should use the most recent year for which data is available, i.e. in case of FADN this will be most likely the year 2017. Additionally, **specific surveys** can be carried out to arrive to a more updated economic situation of farms (supported and non-supported).

<sup>38</sup> [Guidelines for ex post evaluation of RDP 2007-2013](#)

<sup>39</sup> See: EC, [Impact Indicator fiches](#)

The logic model in the figure below illustrates various of the possible recommended and less recommended evaluation approaches for the assessment of the sector related common CAP impact indicators (I.01, I.02, I.03). The decision which method is applied for the assessment of RDP impacts depends from the specific situation in the RDP and lies with the stakeholders in the Member States.

Figure 5. Logic model for choosing the evaluation approaches for I.01, I.02 and I.03



Source: European Evaluation Helpdesk for Rural Development (2018), based on ENVIEVAL (2015)

As the existing FADN databases provide sufficient data for most of the RDPs, the following approaches<sup>40</sup> can be proposed for the assessment of impacts at micro/macro levels:

**Table 4. Overview of assessment approaches for I.01, I.02 and I.03**

Evaluation approach	Micro level	Macro level
<b>Approach A</b> – regarded as optimal	Combination of Propensity Score Matching methods with Difference in Differences Method (PSM-DID)	Bottom-up approaches upscaling micro level findings  Application of a sectoral model
<b>Approach B</b> – regarded as acceptable in 2019	Regression Discontinuity Design (RDD).	Bottom-up approaches upscaling micro level findings

Both approaches recommended for the assessment of the impact indicators I.01, I.02 and 1.03 assume a two-stage process:

- In the first stage the changes of the indicators due to the policy intervention will be assessed at the micro level. The unit of the analysis is the farm.
- In the second stage the estimated effects from the micro level are upscaled to the sector level (referred to as macro level).

<sup>40</sup> The suggested approaches reflect the latest internationally applicable evaluation standards. They are recommended by the World Bank (e.g. Handbook on Impact Evaluation- Quantitative Methods and Practices, 2010; Impact Evaluation in Practice, 2011; etc.); Asian Development Bank (A Review of Recent Developments in Impact Evaluation, 2011); the Inter-American Development Bank (Impact Evaluation Methods for Social Programmes, 1999), and by other international organisations. Further methodologies have been described in: Chapter: 4.3.3 Key approaches to evaluation; Ex-post evaluation guidelines.



### 2.2.3 Approach A – PSM-DID matching techniques

The PSM-DID <sup>41</sup> matching technique, is currently one of the most advanced and effective tools applied in programme evaluation, especially if combined with DID method. It is a powerful quasi-experimental approach which can be used to find appropriate controls using counterfactuals and estimate the programme effects in a relatively straightforward manner by using FADN data. This approach is a highly applicable estimator when the outcome data on supported and non-supported units is available both in the “before” and “after” period. A decisive advantage of the PSM-DID estimator (conditional DID estimator), compared to a conventional DID estimator, is that this method allows for better control of the selection bias. Conventional DID methods fail if the group of supported units and the control group are on different development trajectories. Applying a conditional DID estimator (PSM-DID) to measure the effects of a given RDP may improve the evaluation findings compared to a situation where a standard PSM, that uses post-intervention data only, is applied.



#### QUICK GUIDE #6: How to apply a PSM-DID matching techniques for the assessment of sectoral impacts (I.01, I.02, I.03)?

##### Selection of counterfactual option and micro-level method

Steps (1 – 4 in figure 5) for this stage are described in chapter 2.1 in the box: “How to construct a control group at the micro level (related to 2<sup>nd</sup> layer).

##### Net impact assessment at micro-level

**Step 1:** Estimate the RDP direct effects on supported units at micro-level:

- a. Compute at the micro-level for the group of “beneficiaries” and “control group” the average value of the common- or additional impact indicators prior to the support (e.g. in the year 2013) and after the support (e.g. in the years 2018 or 2019)
- b. Calculate specific policy indicators, e.g. Average Treatment Effects on Treated (ATT). Compute the RDP net direct effects on the above indicators by combining the calculated ATTs with the Difference in Differences (DID) method)
- c. Perform a sensitivity analysis of obtained results

**Step 2:** Estimate the RDP indirect effects on supported units at the micro-level.

**Step 3:** Calculate the indirect effects on non-supported units at the micro-level.

**Step 4:** Aggregate the findings and calculate the RDP effects on the analysed impact indicators at macro/- programming area level;

**Step 5:** Apply qualitative methods for checking and verifying the obtained results (triangulation).

The **macro level analysis** (at the level of MA/regions) which is the ultimate objective of the impact evaluation in 2019 is done as upscaling of the already obtained micro level effects.

*Learn more about this evaluation approach in the Technical Annex (chapter 4.1).*

<sup>41</sup> Detailed description of this method can be also found in the guidelines „[Ex post evaluation of 2007-2013 RDPs](#)“, chapter 4.2

## 2.2.4 Approach B – Regression Discontinuity Design

The RDD<sup>42</sup> can be used to assess the effects of programmes or measures that have a continuous eligibility index with a clearly defined cut-off score determining which farms, enterprises, holdings or communities are eligible and which are not. The main idea behind this design is that units in the target population just below the cut-off (not receiving the intervention) are good comparisons to those just above the cut-off (exposed to the intervention). Thus, in this setting, the analyst can evaluate the impact of an intervention by comparing the average outcomes for the recipients just above the cut-off with non-recipients just below it. Under certain comparability conditions, the assignment near the cut-off can be seen almost as random. The RDD method assumes that individual units around the eligibility cut-off point (on both sides) are similar; thus the selection bias should be minimal. As the comparison of supported and non-supported units is done only on the base of one variable/criterion by applying this method very little can be said about the effect of the programme on units located far away from the cut-off point and the method does **not** take into consideration other observable characteristics which can also be important to explain a selection bias.



### QUICK GUIDE #7: How to apply the Regression Discontinuity Design for the assessment of sector related impacts (I.01, I.02, I.03)?

**Step 1:** Make sure that treatment is assigned exclusively on the basis of a cut-off value of the eligibility criteria.

**Step 2:** Begin with a graphical presentation to get evidence of a discontinuity (or “jump”) in the indicator at the cut-off point (see Figure 1 in Annex 4.1.3)

**Step 3:** Choose an appropriate functional form of the relationship between the indicator and rating (eligibility criteria) and estimate the treatment effect (discontinuity at the cut-point/global approach or local randomisation with local linear/polynomial regression)

**Step 4:** Assess the internal validity of RDD Impact Estimates

**Step 5:** Assess the precision of the estimates obtained from an RD design.

**Step 6:** Apply qualitative methods for checking and verifying the obtained results (triangulation).

The macro level analysis (at the level of MA/regions) which is the ultimate objective of the impact evaluation in 2019 is done as up-scaling of the already obtained micro level effects.

*Learn more about this evaluation approach in the Technical Annex (chapter 4.1).*

<sup>42</sup> Practical examples of the application of RDD can be found in the World Bank Handbook on Impact Evaluation and other studies: Khandker, S., R. Koowal, G. B., Samad, A., H., (2010) Handbook on Impact Evaluation; Quantitative Methods and Practices, World Bank 52099. Imbens, G. M., and T. Lemieux. 2008. “Regression Discontinuity Designs: A Guide to Practice.” *Journal of Econometrics*, 142, pp. 615-635; Lalive, R., (2008). How do extended benefits affect unemployment duration? A regression discontinuity approach. *Journal of Econometrics*, 142 (2): 785-806.; Buddelmeyer, Hielke, and Emmanuel Skoufi as. 2004. “An Evaluation of the Performance of Regression Discontinuity Design on PROGRESA.” World Bank Policy Research Working Paper 3386, IZA Discussion Paper 827, World Bank, Washington, DC.; Lemieux, Thomas, and Kevin Milligan. 2005. “Incentive Effect of Social Assistance: A Regression Discontinuity Approach.” NBER Working Paper 10541, National Bureau of Economic Research, Cambridge, MA.;

## 2.2.5 Dos and don'ts



### Dos

- Use farm book-keeping data in order to calculate an equivalent of I.01, I.02 and I.03 indicators (or additional indicators) at the micro-farm level in case of delays in FADN.
- Estimate first the net direct effects and second the net indirect effects of the RDP on the three sectoral impact indicators. Use micro-data (separately on supported and non-supported farms) and aggregate them to the macro-level.




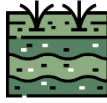



### Don'ts

- Calculate net effects of the RDP by using as outcome the sectoral impact indicators calculated by Eurostat at the Member State level.
- Present the effects calculated by RDD as valid for the whole population.



## ENVIRONMENTAL IMPACTS

### CAP impact indicators

<p><b>I.07</b></p>  <p><b>Emissions from agriculture</b></p>	<p><b>I.11</b></p>  <p><b>Water quality</b></p>
<p><b>I.08</b></p>  <p><b>Farmland bird index</b></p>	<p><b>I.12</b></p>  <p><b>Soil organic matter in arable land</b></p>
<p><b>I.09</b></p>  <p><b>High nature value (HNV) farming</b></p>	<p><b>I.13</b></p>  <p><b>Soil erosion by water</b></p>
<p><b>I.10</b></p>  <p><b>Water abstraction in agriculture</b></p>	

### Related Evaluation Questions

<b>CEQ 26:</b>	“To what extent has the RDP contributed to improving the environment and to achieving the EU Biodiversity strategy target of halting the loss of biodiversity and the degradation of ecosystem services, and to restore them?”
<b>CEQ 28:</b>	“To what extent has the RDP contributed to the CAP objective of ensuring sustainable management of natural resources and climate action?””

## ENVIRONMENTAL IMPACT INDICATORS – GENERAL ASPECTS

### Main challenges in the assessment of environmental impact indicators

**Estimating and netting out the environmental effects** of the RDP is a challenging exercise for many reasons. The data availability is often scarce and establishing the counterfactual is difficult. Capturing and upscaling environmental effects is methodologically very demanding.

Some important challenges, that are common to most environmental indicators, are presented below.

#### Data availability for different environmental indicators:

- **Lack of updated estimations at national or regional levels** (e.g., Soil organic matter, Gross Nutrient Balance - GNB). This insufficiency has many sources. For example, nation-wide, large-scale surveys such as the Survey on Agricultural Production Methods (SAPM) were carried out only once. In addition, efforts to provide regional estimates of national environmental indicators, e.g. for GNB, have not been completed, yet. The evaluator should search data availability among various sources reporting on the same indicator or among various additional but very similar (proxy) indicators on a case-by-case basis.
- **The unit of analysis is not always the farm holding**, which is usually the unit of RDP support, but a functional unit responsive to the changes of a particular indicator (e.g. the parcel or the wider landscape scale for soil organic matter and HNV correspondingly, the quadrants of the Common Birds Monitoring Programme for the Farm Birds Index, a water monitoring station for water quality, etc). In these cases, it may be very difficult to find, within the sampled units of analysis, an adequate number of RDP supported and non-supported holdings.
- **Samples are very sparse and fragmented** (e.g. the soil sampling points of the LUCAS Soil survey<sup>43</sup>) or data does not exist at the level of the unit of analysis (e.g. GNB, water abstraction, soil organic matter, soil erosion, etc.).
- **Data at the unit of analysis covering the periods before, during and after the implementation is difficult to obtain.** This is because environmental data especially at the farm level, such as water abstraction, nutrients use, content of organic matter etc., are not regularly recorded as it is the case with farm production and financial data. Other environmental data such as soil erosion change so slowly that is impossible to measure an evident change on the field within the RDP's period.

#### Establishment of counterfactual for assessing the environmental effects is challenging

- The **heterogeneity of the biophysical environment** should be considered when designing the counterfactual. Many environmental processes are specific to the site and farm characteristics. For example, the effect of cover crops on soil erosion is very different between farm holdings with the same management and economic characteristics but different soil types, slopes or even exposures. Environmental heterogeneity can be controlled by making use of various geo-physical and bio-physical maps or monitoring information. One common problem is that such maps come at different spatial resolutions and should be harmonized through up scaling or down scaling to a single resolution. Even scale harmonization, however, does not ensure content harmonization which often remains an issue.

#### RDP effects on environment are difficult to capture

- **Some environmental impacts develop very slowly** and, unless there are very abrupt and uncontrolled changes, do not produce observable and evident changes within the time of an RDP. For example, soil erosion or soil organic matter enrichment are very slow processes unless there are abrupt land use changes brought by, for example, extensive

<sup>43</sup> LUCAS data are collected in 3 years intervals, for now the data from 2012 and 2015 are available. [The LUCAS survey of 2018](#) has started in March 2018. [LUCAS will collect more types of data in 2018](#) and some results will be released in 2019.

forest fires or other extensive land use and land cover changes. In such cases the evaluator should not expect to find quantitatively significant impacts. However, the evaluation exercise is very important because it can reveal if deadweight<sup>44</sup> is significant (i.e. when non-supported farm holdings have adopted similar practices as supported holdings), and if the right areas were targeted. If deadweight is significant this may be due to RDP's early supported holdings acting as paradigm that demonstrated and diffused environmentally positive practice to non-supported holdings.

- **Some environmental impacts depend heavily on weather conditions or on population dynamics**, e.g. water abstraction or the Farm Bird Index. In these cases, the evaluator should take an average over a period that is long enough to smooth out seasonal variations, variations due to population dynamics or other cyclical effects.
- **Indirect effects such as swapping and knock on effects may be difficult to measure and quantify.** Swapping is the situation where a mitigation measure introduced to combat an environmental issue results in the increase of another environmental issue. For example, riparian buffer zones and constructed wetlands designed to reduce water pollution by nitrates result in waterlogged soils which leads to an increase in emissions of greenhouse gases such as nitrous oxide and methane and “swap” one form of pollution to another. Knock on effects occur when a mitigation measure introduced to combat an issue results in undesirable effects elsewhere. For example, cover crops, buffer zones and measures that reduce sedimentation affect the physical formation and evolution of lagoons and thus, their capacity to sustain biodiversity.

Scaling up micro estimates to the macro level should be carried out cautiously

- **Many “environmental issues” are concentrated in certain areas and are not dispersed over the RDP’s territory.** Examples include water pollution and water abstraction, soil erosion and soil degradation, threats to biodiversity, and others. An RDP presumably focuses its efforts on areas at risk and sometimes targets specific agricultural holding within these areas. As such, supported and matching non-supported holdings have specific characteristics and this results in a sample of “beneficiaries” and “non-beneficiaries” (see chapter 2.1) that may not be representative of the holdings in the RDP’s territory. Thus, the micro-macro level consistency check should be very careful and interpreted accordingly.

### Workable solutions to challenges

*There are many ways to meet the challenges of estimating environmental indicators and the net effects of the RDP on them.* Data availability issues may be handled by searching alternative data sources and considering ways to increase the quantity and quality of the existing data. When the lack of appropriate data appears to be an impenetrable problem, alternative and less robust methods may provide still valuable answers. Handling environmental heterogeneity in establishing the counterfactual can be facilitated by using geo-physical and bio-physical maps and other existing information. The breadth and importance of direct and indirect RDP effects can be traced from a well-designed qualitative scoping exercise at the start of the evaluation. Scaling up micro estimates to the macro level can be made safer by using statistical sampling techniques.

### Important questions prior to the assessment of environmental impacts

Before starting the evaluation<sup>45</sup>, several questions can be asked to clarify the data availability and to review alternative methods, depending on existing data and supplementary material such as maps.

Questions for the scope for increasing the *quantity/quality of the data and setting up the counterfactual*:

<sup>44</sup> Further information can be found also in the [Guidelines for Ex-post evaluation of 2007-2013 RDPs. Chapter 4.2.3](#)

<sup>45</sup> See also chapter 1.2, table 2 of the guidelines.

- Why the amount and characteristics of the data are not appropriate to implement a robust evaluation approach? Is this related to low quality data, to small amount of data or is this due to very small uptake rates that cannot support a statistical analysis?
- What options are available to construct a counterfactual for evaluating environmental impacts?
- Are there data for different points in time for supported and non-supported holdings? Can specific data processing tasks such as retrieving and treating more information from application files or submitted environmental plans, improve the quality of the monitoring data?
- Can local academic and research institutions or national surveys provide additional data? Can the evaluator include specific farm surveys or specific monitoring sampling carried out by third parties? Is the representativeness of the samplings checked?
- Which are the implications of collecting data (new or additional) on the cost of the evaluation and its potential performance?

Questions to assist the evaluator in the review of *alternative methods* include:

- Can ad-hoc approaches based on simple group comparisons between RDP supported and non-supported holdings reduce the issue of sample selection? For example, pairwise or multiple comparisons differentiated by known factors and observables can reduce the selection bias by using the Difference-in-Difference (DiD) approach.
- Can characteristic “thematic studies” or “case studies” be extrapolated to the RDP level?
- Can GIS overlay approaches be used, at the micro or macro level assisted by information from IACS/LPIS or other georeferenced infrastructure?
- Can spatial econometric models at the regional or bio-geographical level incorporate counterfactuals analysis?
- Is there access to a comprehensive database of environmental data along with land cover, land use and farm management data?
- Can qualitative approaches provide any insights to the RDP effects and complement the assessment for effects that are very difficult to isolate and measure?

### Using qualitative methods

**Qualitative methods are useful** when the evaluator cannot set up comparison groups for a counterfactual analysis and/or when a sufficiently accurate statistical method or quantitative simulation model does not exist or is difficult to apply. For this purpose, an adapted *Method for Impact Assessment of Programmes and Projects* (MAPP) is also suggested in order to assess the CAP common impact indicators linked to the environment.

**MAPP is an innovative focus group method** and has been used in recent years in rural development evaluations. It has proved more robust than traditional qualitative methods<sup>46</sup>. It is particularly useful for evaluating environmental impacts because its original design covered mainly such impacts in the absence of consistent data for a quantitative assessment.

MAPP is suggested for three purposes:

- a) To assess net changes in environmental indicators;
- b) To highlight and assess possible indirect effects on supported and non-supported holdings in relation to the different indicators (emissions, biodiversity, water, soil erosion, etc.);
- c) To assess the causal links between the relevant RDP measures and the effects on the environment.

The method will be more cost-effective if all environmental impact indicators are covered in each focus group, rather than in separate focus groups.

<sup>46</sup> A detailed description can be found in the [Guidelines for Ex-post evaluation of RDPs 2000-2006](#) and [Study on Investment Support under rural development policy \(Metis/WIFO/Aeidl 2014\)](#). Evaluators who have applied the MAPP in rural development evaluations have found it to be more robust than other qualitative methods.



### QUICK GUIDE #8: How to apply the MAPP in the assessment of environmental impacts (I.07, I.08, I.09, I.10, I.11, I.12, I.13)?

The *Method for Impact Assessment of Programmes and Projects* should follow 6 steps.

**Step 1:** Select the regions. MAPP is best conducted at local or regional level. Ideally, the whole RDP territory should be covered with various focus groups. If it is not possible to conduct several focus groups, then a limited number of regions are selected, based on criteria that makes them representative of the RDP territory (e.g. share of expenditure of measures related to the environmental indicators).

**Step 2:** Select the RDP measures. The measures depicted in the intervention logic of each environmental indicator.

**Step 3:** Select the indicators to be assessed. The indicators for MAPP should be the CAP common impact indicators and relevant additional indicators.

**Step 4:** Select the participants. Participants should include representatives of beneficiaries and non-beneficiaries of the measures associated with each environmental indicator. Non-beneficiaries may include relevant stakeholders and experts, who can provide information that can be used for deducing general trends prevailing over non-assisted farm holdings. They can also provide an indication of deadweight losses. For instance:

- For I.07, representatives of livestock farmers (beneficiaries and non-beneficiaries), livestock experts and GHG ammonia emission experts;
- For I.08 and I.09, representatives of agriculture and livestock holdings (beneficiaries and non-beneficiaries), biodiversity experts and high nature value experts.
- For I.10 and I.11 irrigation water authorities, electricity consumption authorities, fertilizer distributors, agronomists and other specialists.
- For I.12, beneficiaries and non-beneficiary farmers and extension officers.
- For I.13, representatives of beneficiaries and non-beneficiaries, soil experts and agronomists.
- For all indicators, advisors and training organisations/authorities can give important insight into the role of measures that have mainly secondary effects on environmental indicators, such as M01, M02 and M16. In addition, possible innovation and cooperation stakeholders/partners for possible leverage effects and transverse effects of M16.

**Step 5:** Select the MAPP tools. From the range of MAPP tools, the relevant ones here are: a) the trend analysis tool, where detailed development trends are evaluated over the same time period according to a number of pre-defined indicators (the ones selected in Step 3); b) the influence matrix, which helps to evaluate the influence of all interventions (RDP measures as well as other interventions in the area, to net out the RDP effects) on each indicator; and c) the impact profile, which summarises the scale of the impact on each indicator from different measures/interventions and explains the main influences.

**Step 6:** Report on MAPP results. The results of the MAPP will be threefold: a) an estimated range for the net impact figure or trend for each indicator over the programme/evaluated period (e.g. estimated net increase by x%), b) an analysis of the main factors that influence these figures or trends; c) estimates of any indirect effects on supported and non-supported holdings.

*Learn more about the MAPP in the Study on Investment Support under rural development policy!*



## 2.3 Emissions from agriculture (I.07)

### 2.3.1 Setting up the frame for the assessment

Reduction of Green House Gas (GHG) emissions by 20% than 1990 levels is a EU2020 headline target that has been already surpassed<sup>47</sup>. The EU's climate and energy policy framework for 2030 sets itself a target of reducing emissions to 40% below 1990 levels. In 2014, 10% of the total GHG emission in the EU came from the agricultural sector and especially the livestock sector that accounts for more than half of the agricultural sector emissions. Land use, land use change and forestry (LULUCF) are activities which alter the exchange of carbon dioxide (CO<sub>2</sub>) between the terrestrial biosphere system and the atmosphere. Currently, LULUCF is recorded in the EU but is excluded from the EU's climate and energy package.

### Intervention logic

#### CAP overall objective, common evaluation questions and common CAP impact indicators

Taking into consideration the **general CAP Pillar II intervention logic**, the efforts to reduce emissions are also one of the primary **CAP overall objectives** stated as “Ensuring the sustainable management of natural resources, and climate action”. The issue of emissions from agriculture is addressed by the common evaluation questions related to the Union level objectives, specifically by CEQ no. 24 and 28. Since reducing GHG and ammonia emissions needs innovative solutions, the findings are also relevant for answering the CEQ no. 30. **The impact indicator** for measuring “emissions from agriculture” I.07 is the main common CAP indicator to answer this CEQ and also CEQ no. 28. The indicator corresponds to the Eurostat's agri-environmental indicator AEI19<sup>48</sup> on “Climate change – driving forces” and AEI18<sup>49</sup> on “Ammonia emissions” as well as to the context indicator no. 45. The indicator fiche of I.07 makes an explicit reference to the following two sub-indicators:

- I.07-1 GHG emissions from agriculture measuring:
  - I.07-1.1 Aggregated annual emissions of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) from agriculture and,
  - I.07-1.2 Aggregated annual emissions and removals of carbon dioxide (CO<sub>2</sub>), and emissions of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) from agricultural land uses (grassland and cropland), as reported under the LULUCF sector
- I.07-2 Ammonia emissions from agriculture<sup>50</sup>

Impact indicator I.11 on water quality is directly related to I.07-2 for obvious reasons. The two soil indicators I.12 and I.13 are linked to emissions from agriculture not only because they affect land use but also because they affect the soil's sequestration capacity. In dealing with emissions from agriculture we will not consider the emissions from energy because these are accounted for under the “Energy” sector. Furthermore, RDPs support activities to produce renewable energy in agriculture and forestry and thus contribute to the substitution of fossils by clean sources.

#### Rural development priorities, focus areas and measures

The CAP overall objective is achieved with operations linked to **Priority 5** and especially **Focus Area 5D** (FA 5D). Since livestock is usually the major agricultural contributor to GHG, any operations that

<sup>47</sup> See headline target indicator [http://ec.europa.eu/eurostat/cache/Euro\\_2020/E2020\\_EN.htm](http://ec.europa.eu/eurostat/cache/Euro_2020/E2020_EN.htm)

<sup>48</sup> The Agri-Environmental Indicator (AEI) indicator “Climate change - driving forces” has replaced AEI “greenhouse gas emissions” which has been archived. AEI 19 is accessible at: [http://ec.europa.eu/eurostat/statistics-explained/index.php/Climate\\_change\\_-\\_driving\\_forces#Agricultural\\_emissions](http://ec.europa.eu/eurostat/statistics-explained/index.php/Climate_change_-_driving_forces#Agricultural_emissions)

<sup>49</sup> AEI 18 is accessible at: [http://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental\\_indicator\\_-\\_ammonia\\_emissions](http://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental_indicator_-_ammonia_emissions)

<sup>50</sup> Detailed methodology and data needs for calculating ammonia emissions are included in Eurostat's 2011 manual on “Farm data needed for agri-environmental reporting”, sections 4.2-4.5, pages 29-35. The manual is accessible at: <http://ec.europa.eu/eurostat/documents/3888793/5849721/KS-RA-11-005-EN.PDF>

alter significantly the size and composition of livestock will have impacts on GHG emissions. In order to achieve the objectives of reducing emissions from agriculture the most relevant measures linked to Priority 5 and its FA 5D are *investments in the livestock sector* (targeting both emissions from enteric fermentation and manure management are M04.4) and measures to reduce the on-field-use of nitrogen and ammonia fertilizers and manure through M10.1, M12.1, M12.2, M12.3 and M11. Furthermore, also measures to manage residues or support cover crops through M10.1 and M12 should be considered. The primary contribution of M10, M11 and M12 is actively supported by the secondary contributions of M01 and M02.1. This is due to the fact that the provision of vocational training and of skills acquisition in environmental issues as well as the provision of advisory services in environmental matters will make a farm holding decision maker more efficient in maximizing the provided assistance through M10, M11 or M12 measures. M16.5 offers innovative and pioneering opportunities for reducing emissions from agriculture<sup>51</sup>. CEQ no. 14 is also relevant as it helps to assess the RDP results in reducing the GHG emissions.

In addition, the support to forests and wooded areas for biodiversity objectives has an impact on LULUCF. For this reason, **Priority 4** and its **Focus Area 4A** (FA 4A) and particularly the measures M13 and M15.1 are included in the intervention logic diagram of figure 6 as having a potential contribution. As M13 (Areas facing Natural Constraints - ANC) is linked to areas maintained by recipients, and also to livestock. If the terms and conditions under which the support is provided are significantly altered, this may affect the level of GHG emissions from agriculture. Measures intended to preserve and expand forests, and wooded areas, such as M15.1, have an implication on the impact indicator.

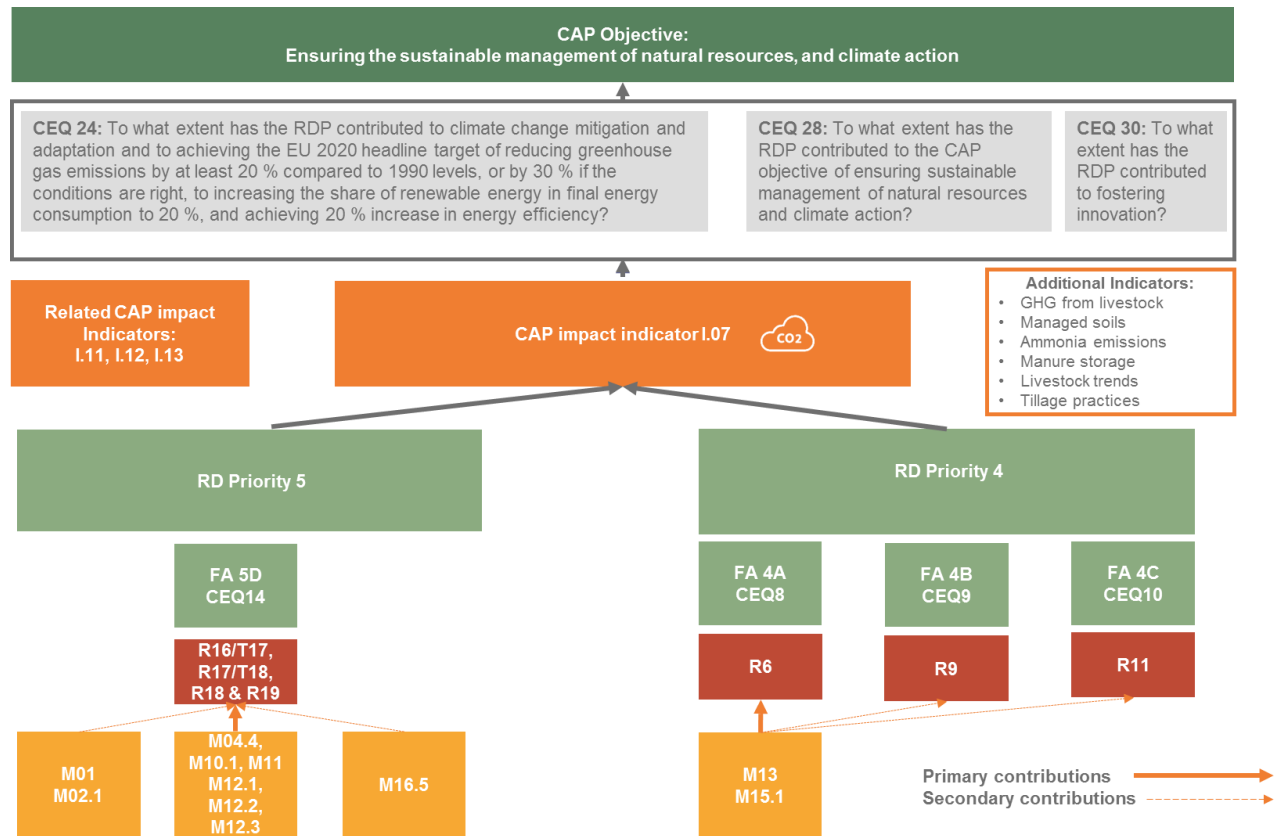
#### Related result indicators

The **result/target indicators** directly linked to FA5D and to reducing emissions are R16/T17 and R17/T18, as well as the **complementary result indicators** R18 and R19. Concerning the support to forestry through M15.1 the respective results/ target indicators include R6/T8, R9/T11 and R11/T15.

**An example of the general CAP Pillar II intervention logic** linked to the CAP impact indicator I.07 is presented in the figure below. (N.B. An editable version of this intervention logic picture, to be adapted by stakeholders to the situation in their RDP is provided in a separate document.).

<sup>51</sup> See EIP-AGRI fact sheet available at: [https://ec.europa.eu/eip/agriculture/sites/agri-eip/files/eip-agri\\_factsheet\\_reducing\\_livestock\\_emissions\\_2017\\_en.pdf](https://ec.europa.eu/eip/agriculture/sites/agri-eip/files/eip-agri_factsheet_reducing_livestock_emissions_2017_en.pdf) . The toolkit for “increasing profitability and cutting carbon emissions” and the carbon calculator is available at: <https://ec.europa.eu/eip/agriculture/en/news/inspirational-ideas-increasing-farm-profitability-while-cutting-carbon-emissions-toolkit>. A series of landscape wide and farm specific GHG calculators for agriculture and forestry is discussed in the FAO’s “Review of GHG Calculators in Agriculture and Forestry Sectors” accessible at: [http://www.fao.org/fileadmin/templates/ex\\_act/pdf/ADEME/Review\\_existingGHGtool\\_VF\\_UK4.pdf](http://www.fao.org/fileadmin/templates/ex_act/pdf/ADEME/Review_existingGHGtool_VF_UK4.pdf)

Figure 6. CAP intervention logic and impact indicator I.07 (example)



Source: European Evaluation Helpdesk for Rural Development (2018)

### Additional indicators

For the assessment of the RDP impacts on the emissions from agriculture the **use and netting out of the common CAP impact indicator I.07 is mandatory**. The use of additional indicators is **optional** and may be considered if they can support the evaluator in putting GHG emissions and ammonia emissions from agriculture into a wider perspective and deepen the understanding of RDP impacts in this area. **Some examples of relevant additional indicators** (incl. their unit of measurement, potential use, data sources and frequency of collection) are shown in the Technical Annex (see chapter 4.2):

- GHG from livestock
- GHG from managed soils
- Ammonia emissions
- Manure storage
- Livestock trends
- Tillage practices

### Unit of analysis

**Indicator I.07** is monitored at the national or regional level depending on the available data.

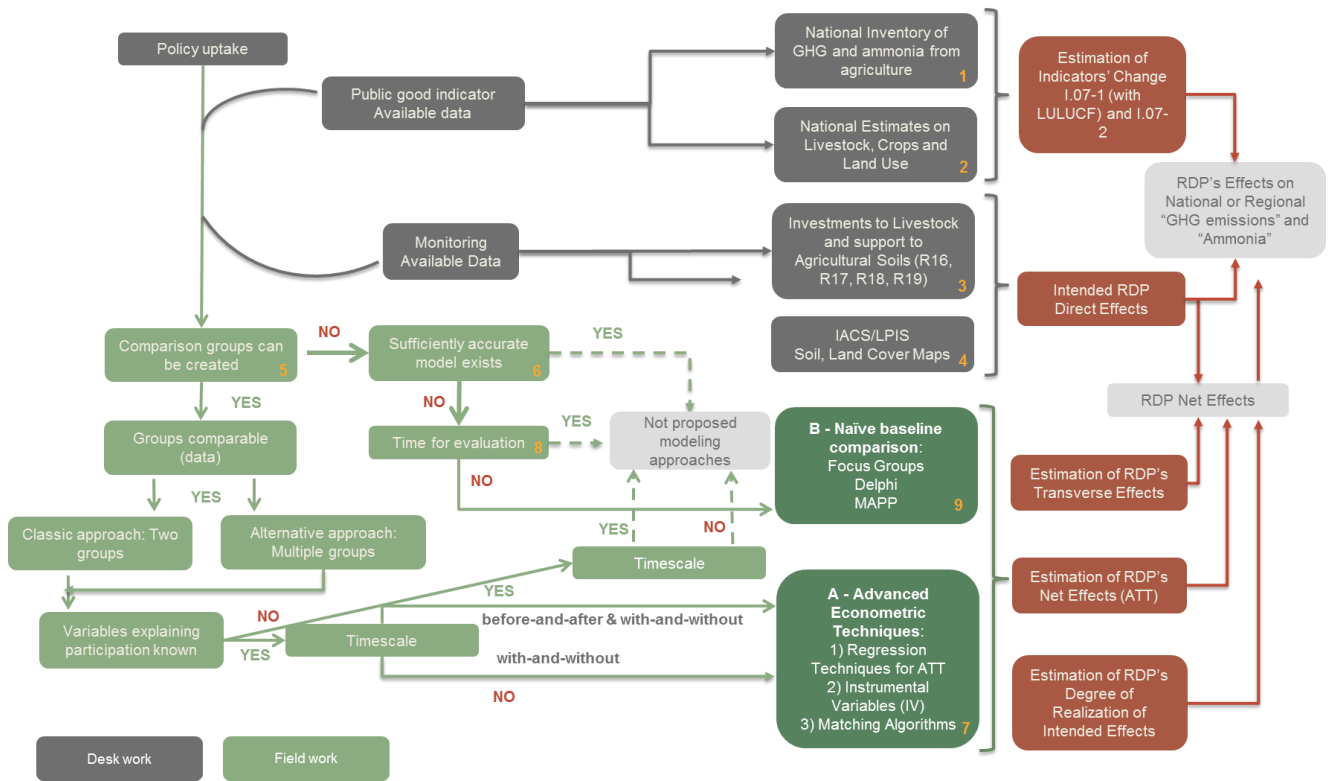
At the **micro-level** the most appropriate unit of assessment of the RDP net impacts is the **agricultural holding**. Firstly, because the agricultural holding is the main beneficiary of almost all measures used to accomplish the RDPs targets. Secondly, because the results from the analyses at the agricultural holding level can be used to derive net effects coefficients in order to upscale results to the national or regional level or to apply directly on the RDP's gross effects.

At the **macro level** the unit of analysis can be the **NUTS3-level** or units of lower spatial disaggregation for which data on GHG emissions exist or can be easily calculated. The **baseline data** for the chosen assessment unit are ideally data collected in 2013 or close to this year.

**2.3.2 Choosing evaluation approaches (logic model)**

The logic model in the figure below illustrates various of the possible evaluation approaches for the assessment of the common CAP impact indicator GHG emission from Agriculture (I.07) and provides options also for “small” RDPs (e.g. qualitative analysis, naïve baseline comparisons etc.). The decision which method is applied for the assessment of RDP impacts depends from the specific situation in the RDP and lies with the stakeholders in the Member States.

**Figure 7. Logic model for choosing the evaluation approaches for I.07**



Source: European Evaluation Helpdesk for Rural Development (2018), based on ENVIEVAL 2015.

Based on the application of the logic model above the guidelines recommend the following evaluation approaches that are described in more detail in the following chapter and in the Technical Annex.

**Table 5. Examples of assessment approaches for I.07**

Evaluation approach	Micro level	Macro level
<b>Approach A –</b> Example of optimal approach	<b>Regression and matching techniques</b>	GPSM using NUTS3 or other spatial data
<b>Approach B –</b> Example of acceptable approach in 2019	None	Naïve Baseline Comparisons

### 2.3.3 Approach A - Regression and matching techniques

Regression and matching techniques compare at the micro level the RDP supported and RDP non-supported agricultural holdings. At the macro level they compare RDP supported and RDP non-supported areas or areas presenting a different intensity of support. Because data on supported and non-supported holdings is rather difficult to obtain, the evaluator may collect such data by setting up a farm holding survey with a counterfactual. The analysis of the data is accomplished by using regression and matching methods which will depend on the type of the existing or collected data. The methodology allows the evaluator to measure the direct effect on supported holdings, the indirect effect on supported and non-supported holdings, to estimate the deadweight and to scale up the results to the RDP level. This approach does however not take account of the general equilibrium effects which, almost certainly, are negligible in the case of GHG emission reductions. The suggested econometric techniques attempt to address the selectivity issue depending on the quality and the quantity of the data that exist or the data that can be collected specifically for this evaluation.



#### **QUICK GUIDE #9: How to apply Regression and matching techniques for the assessment of Emissions from Agriculture (I.07) at the micro-level?**

##### **Selection of counterfactual option and micro-level method**

**Step 1:** Recognize the institutional framework within which GHG emissions from agriculture are measured and reported to the EU (1 – 4 in figure 7).

**Step 2:** Calculate I.07 indicators if they are not readily available from Eurostat (case of regional RDPs).

**Step 3:** Retrieve Result Indicators R16, R17, R18, R19 that will reveal the size of the supported agricultural holding population and the variety of measures used within the RDP's intervention logic.

**Step 4:** Decide if the number of supported agricultural holdings (from step 3 above) is sufficient for carrying out a survey, i.e. if there is scope for establishing comparison groups (5 and 6 in figure 7).

**Step 5:** Set up a survey on supported and non-supported agriculture holdings (5 and 6 in figure 7).

**Step 6:** Design a questionnaire that will capture GHG and ammonia emissions and GHG and ammonia emission changes on the holding.

##### **Net impact assessment at a micro-level**

**Step 7:** Apply a method for analysing the data (7 in figure 7).

**Step 8:** Estimate the Average Treatment Effect on the Treated (ATT) and compute the RDP's net direct effect on reductions of GHG and ammonia emissions (7 in figure 7).

**Step 9:** Estimate indirect effects on supported and non-supported agricultural holdings due to GHG emission and ammonia reduction measures (7 in figure 7).

**Step 10:** Aggregate the results and estimate the effects of the RDP at the macro level (7 in figure 7).

**Step 11:** Verify the quantitative findings through qualitative methods.

*Learn more about this evaluation approach in the Technical Annex (chapter 4.2.).*

*The steps for the Approach A at the macro-level are described in the chapter 2.1, in the boxes “How to construct the control group at the micro level” and “How to assess net effects”.*

#### 2.3.4 Approach B - Naïve Baseline Comparison

**A Naïve Baseline Comparison** conducted at the macro level is suggested only in case the evaluator does not have sufficient time to collect the required micro level data or if the number of supported farm holdings is too small for a survey. The approach therefore includes qualitative methods such as focus groups, a Delphi panel or the MAPP.

The steps for Approach B at the macro-level, namely for using the MAPP, are described in the introduction chapter for environmental indicators, in the section “Using qualitative methods”.

*Detailed information on the application of the recommended evaluation approaches for the common CAP impact indicator I.07 can be found in the Technical Annex, chapter 4.2.*

#### 2.3.5 Dos and don'ts



**Dos**

- Contact the focal point (any other relevant stakeholder) for reporting national GHG and ammonia emissions of your country and ask for the latest available figures for the I.07 and/or additional indicators even if they are unpublished. Establish a time series that includes the RDP's time frame.
- Ask whether a regional unpublished dataset exists and if the methodology (equations) can be mechanically applied to regional data in case of regional RDP.
- Before starting to build the database explore whether you can develop synergies with other evaluations that may have the same approach, e.g., evaluation of water quantity, water quality and especially GNB, soil quality and soil erosion.
- Review your IACS/LPIS database, existing farm holding sampling frames either specifically addressing emissions (at least manure handling and fertilization), and existing GIS maps and to locate data gaps and get a first-hand idea of the blend of measures used to reduce agricultural emissions.
- Clarify the criteria (eligibility and location) that would categorize a farm holding to the control group.

**Don'ts**

- Regionalize I.07 using another methodology (tier) than that used by the national inventory report.

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versity and HNV farming and the RDP contributions to the achievement of the overall **CAP objective** of 'Sustainable management of natural resources and climate action'.

CAP overall objective, common evaluation questions and common CAP impact indicators

The first step in developing and designing an evaluation approach is the definition of the frame (or boundaries) of the evaluation based on a validation of the review of the RDP intervention logic carried

out for the AIR 2017. The CAP Pillar II general intervention logic as linked to the two **common CAP impact indicators** Farmland Bird Index (FBI) and High Nature Value (HNV) Farming, and the above CAP overall objective is presented in the figure 8 below.

The quantification of the net-effects of both impact indicators provides the main evidence basis to answer the **CEQ no. 28** “To what extent has the RDP contributed to the CAP objective of ensuring sustainable management of natural resources and climate action?” (linked to the above mentioned CAP overall objectives, the **CEQ no. 26** “To what extent has the RDP contributed to improving the environment and to achieving the EU Biodiversity strategy target of halting the loss of biodiversity and the degradation of ecosystem services, and to restore them?”, as well to **CEQ no. 30** “To what extent has the RDP contributed to fostering innovation?”. In this section the focus is on the common CAP impact indicator - Farmland birds index (FBI). Linkages with another common CAP impact indicator – High nature value farming (HNV) are acknowledged as well.

**The FBI indicator is a composite index** that measures the rate of change in the relative abundance of common bird species at selected sites: trends of index of population of farmland birds (base year 2000 = 100). Population trends are derived from the counts of individual bird species at census sites and modelled as such through time.

#### Rural development priorities, focus areas and measures

In the rural development policy intervention logic the biodiversity issues are addressed in RD **Priority 4** “Restoring, preserving and enhancing ecosystems related to agriculture and forestry” and especially in the **focus area 4A** (FA 4A), “Restoring and preserving biodiversity, including in Natura 2000 areas and high nature value farming, and the state of European landscapes”.

**Central measures** programmed under FA 4A are for example M10 “Agri-environment-climate”, M12 “Natura 2000 and Water Framework Directive (‘WFD’) payments”, M11 “Organic Farming” and M15 “Forest-environmental and climate services and forest conservation”. Examples of other measures with possible primary and secondary contributions include M01 “Knowledge transfer and information actions”, M02 “Advisory services, farm management and farm relief services”, and M16 “Cooperation”. However, the exact combination of measures which need to be considered in the evaluation approach depend on the measure programming in the respective RDP with respect to primary and secondary contributions as well as already in previous evaluations identified unexpected or unintended effects.

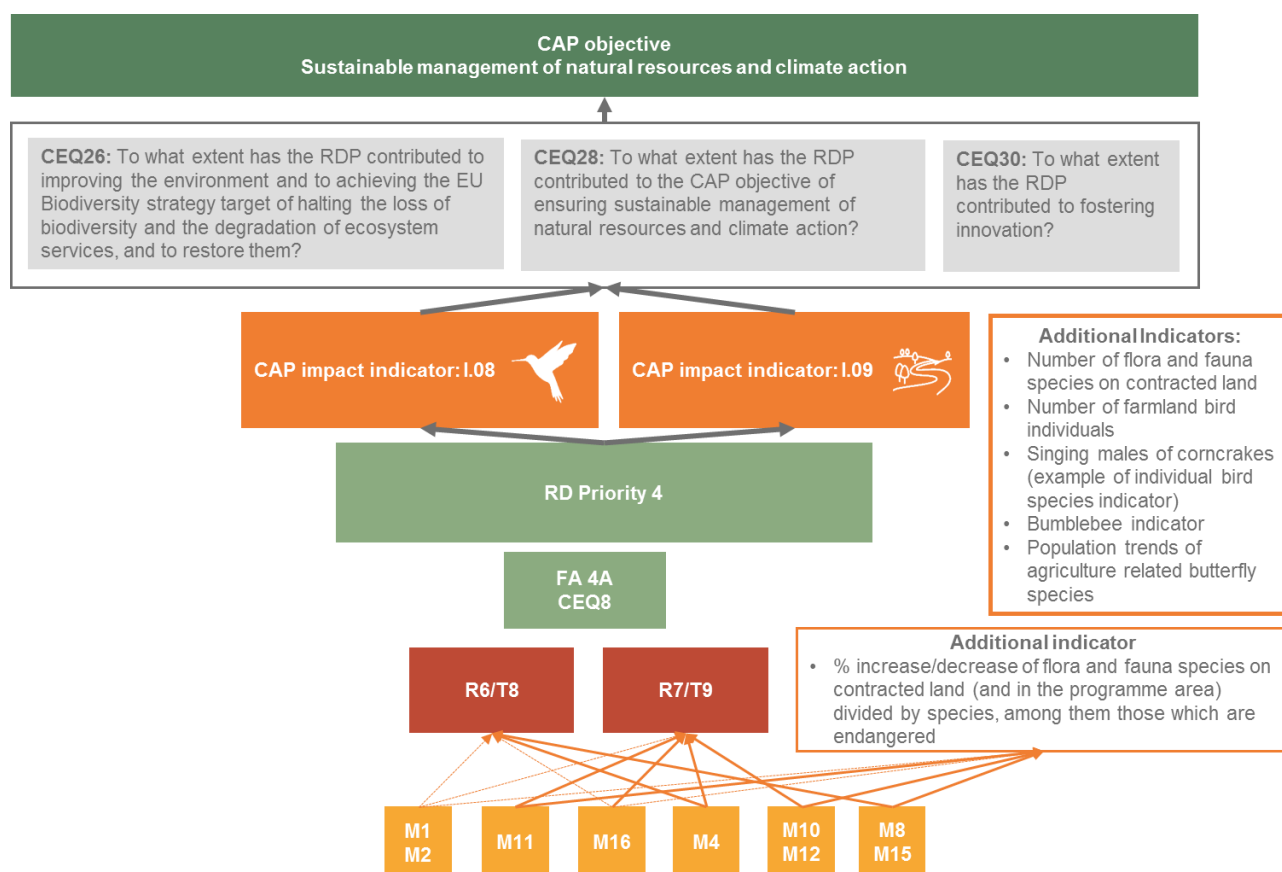
#### Relevant result indicators

Relevant common result/target indicators calculate the percentage of agricultural land (R7/T9) and forests and other wooded areas (R6/T8) under management contracts supporting biodiversity and/or landscapes.

**An example of the general CAP Pillar II intervention logic** linked to the CAP impact indicators I.08 (FBI) and I.09 (HNV Farming) is presented in the figure below. (N.B. An editable version of this intervention logic picture, to be adapted by stakeholders to the situation in their RDP is provided in a separate document.)



Figure 8. CAP intervention logic and impact indicators I.08 and I.09 (example)



Source: European Evaluation Helpdesk for Rural Development (2018)

### Additional indicators

For the assessment of the RDP impacts on biodiversity the **use and netting out of the common CAP impact indicator I.08 is mandatory**.

**The use of additional indicators is voluntary** and may be considered if the data available for the common impact indicators does not allow a robust evaluation of biodiversity. It is crucial that biodiversity monitoring data for non-participants are available in order to allow the consideration of unintended effects on the environment as well as indirect effects such as deadweight effects<sup>52</sup> at micro level and substitution effects at macro level. The key questions to be answered are:

- Can I use the FBI to cost-effectively assess the net-impacts of the RDP on biodiversity on farmland and forestry? Do I have sufficient data (survey points) for participants and non-participants to use the indicator at the micro level?
- Which other biodiversity indicator can I use to generate robust evidence at micro level supporting impact assessments with or without the FBI? Do I have sufficient data to use the selected indicator?

**Some examples of relevant additional indicators** (incl. their unit of measurement, potential use, data sources and frequency of collection) are shown in the Technical Annex (see chapter 4.3):

- Population trends of agriculture related butterfly species
- Number of flora and fauna species on contracted land
- Number of farmland bird individuals
- Singing males of corncrakes (example of individual bird species indicator)

<sup>52</sup> Guidelines for the ex post evaluation of RDPs 2007-2013, chapter 4.2.3

- Bumblebee indicator
- Population trends of agriculture related butterfly species

### Unit of analysis

At micro level the functional units need to be designed to serve the responsiveness to micro-level impacts, comparability to macro-level results and the potential for further development of a micro-level biodiversity survey / monitoring.

The responsiveness to **micro-level** impacts depends on behavioural characteristics of the different monitored species. For example, species that disperse widely **parcel and wider landscape scale** can be suitable. But for less dispersive species, it is more important to apply **parcel scale**, as populations will respond directly to localized land management. The basic survey spots of the Common Birds Monitoring Programme at the **field/plot scale level** can be selected as functional units at micro level.

For the **macro-level**, the quadrats (2.5km x 2.5km) of the data collection Common Birds Monitoring Programme can be selected as functional units for the Farmland Bird Index, which can then be calculated by bio-geographical areas (different agricultural habitats) or regional level on the basis of geo-referenced data.

During the design of the appropriate functional units, several attributes need to be taken into consideration. Functional units need to be responsive enough for the changes of the particular indicator (e.g. FBI, number of farmland bird species), while at the same time being valid for the evaluation level (macro, micro). Besides having clear links to the FBI indicator and the level of evaluation, the design of the functional units must be carried out based on the uptake data of the key policy measures (e.g. spatial coverage of the contracted parcels).

The **baseline data** for the chosen assessment unit are ideally data collected in 2013 or close to this year.

#### 2.4.2 Choosing evaluation approaches (logic model)

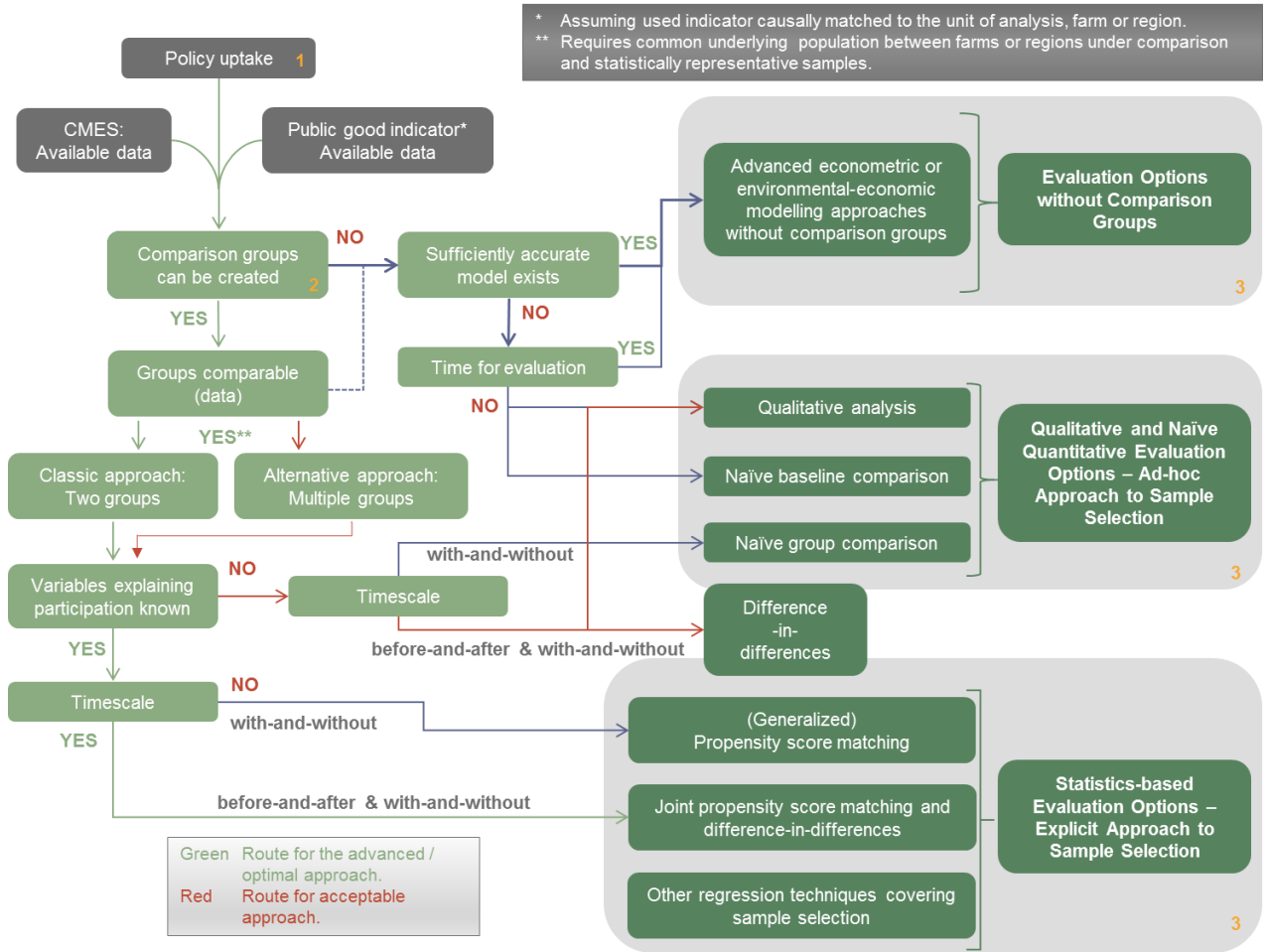
The logic model illustrates various possible evaluation approaches for the assessment common CAP impact indicators on Farmland bird index (I.08) and HNV farmland (I.9). The decision which method is applied for the assessment of RDP impacts depends from the specific situation in the RDP and lies with the stakeholders in the Member States.

The data availability concerning the factors explaining participation is a key driver for the choice and cost-effective application of the evaluation approach informing the following two key questions to consider:

- Can I robustly use statistics based methods to quantify biodiversity net-effects of the evaluated measure(s)?
- Or do I need to consider alternative (ad-hoc) options to consider sample selection issues?

The figure below provides the guidance in decisions which evaluation approach can be applied as linked to the ability to construct (or not) the control groups dependently on the situation with data availability.

Figure 9. Logic model for choosing the evaluation approaches for I.08 and I.09



Source: European Evaluation Helpdesk for Rural Development (2018), based on ENVIEVAL (2015) and Morkvenas et al.(2016)

**Based on the application of the logic model** the guidelines suggest optimal and acceptable evaluation approaches for the micro-and macro-level assessment of the CAP impact indicator I.08. The approaches are described below as well as in the Technical Annex, chapter 4.3.

**Table 6. Overview of assessment approaches for I.08**

Evaluation approach	Micro level	Macro level
<p><b>Approach A –</b> Example of optimal approach</p>	<p>Statistics-based evaluation option with an explicit approach to sample selection: <b>Propensity Score Matching (PSM) and Difference in Difference (DiD)</b></p>	<p>Statistics-based evaluation option with an explicit approach to sample selection: <b>Propensity Score Matching (PSM) and Difference in Difference (DiD)</b></p> <p>Evaluation option without comparison group: <b>Spatial econometric models</b> at bio-geographical areas (different agricultural habitats) or regional level</p>
<p><b>Approach B –</b> Example of acceptable approach in 2019</p>	<p>Statistical analysis of <b>ad-hoc pairwise comparisons</b> or multiple comparison groups using <b>DID</b></p>	<p>Bottom-up approaches <b>upscaling micro level results</b></p>

### 2.4.3 Approach A – PSM and DID matching techniques

The use of advanced statistics based evaluation approaches, is suggested to be used in the assessment of RDP effects on biodiversity. This requires sufficient data from participating and non-participating parcels / farms, factors explaining participation in the relevant measures, and annual data sets covering the period before and during implementation. The methods include propensity score matching (PSM) and difference-in-differences (DiD) estimation at micro and macro level or spatial econometrics at macro level. This would be the ideal option explicitly capturing sample selection issues in the evaluation design allowing the quantification of net-impacts. This also assumes that all data from different sources (e.g. biodiversity monitoring data and IACS data) are spatially and temporally synchronized with the unit of analysis and the programme period.

Steps for the application of PSM/DiD are described in the chapter 2.1 in the box called “How to construct a control group (related to 2<sup>nd</sup> layer)” and in the box called “How to assess RDP net effects? (related to 3<sup>rd</sup> layer)”.

### 2.4.4 Approach B - Ad-hoc pairwise comparisons or multiple comparison groups using DID

The complexity and site-specific nature of assessing biodiversity effects of RDP measures often limits the application of advanced - and data intensive - statistics based evaluation approaches. In cases where the above assumption does not hold, thorough checks of available (and initially not known) data sources have been carried out and additional empirical data collection can't be done meaningfully within the given budget and timeframe, the evaluator needs to consider in the assessment at micro-level switching to less data demanding approaches using alternative and less robust approaches to sample selection. Such ad-hoc approaches to sample selection would be based on naïve group comparisons. Nevertheless, the design of ad-hoc approaches to sample selection should not apply simple average aggregated comparisons of participants and non-participants. Also ad-hoc approaches can through careful design of pairwise comparisons and multiple comparison

groups differentiated by known factors and observables such as spatial neighbourhood, proximity to protected areas or sub-groups of participants at least reduce biases in the evaluation results, using the DiD approach. Scaling up the findings from micro-level evaluation can be the solution for macro-level assessment.

#### 2.4.5 Dos and Don'ts



##### Dos

- Select additional indicators providing additional evidence on biodiversity impacts of the RDP
- Carefully review available biodiversity monitoring data and contact relevant monitoring organisations
- Differentiate ad-hoc approaches through careful design of pairwise comparisons and multiple comparison groups by known factors and observables such as spatial neighbourhood, proximity to protected areas or sub-groups of participants and at least reduce biases in the evaluation results, using the DiD approach.
- Select an evaluation approach which is consistent with the quantity and quality of available data for participants and non-participants.

##### Don'ts

- Rely only on data of the farmland bird index in case of insufficient sampling points in the RDP region,
- Apply simple average aggregated comparisons of participants and non-participants in case of using ad-hoc group comparisons

## 2.5 High Nature Value farming (I.09)

### 2.5.1 Setting up the frame for the assessment

#### Intervention logic

Evaluations of the impacts of RDPs on HNV farming aim at assessing the contributions of the RDPs to the overarching CAP objective of ‘Sustainable management of natural resources and climate action’. The intervention logic for HNV farming is shown in Figure 8, in chapter 2.4.1 and includes the same CEQs as for biodiversity.

The impact indicator I.09 HNV farming is defined as the percentage of Utilised Agricultural Area farmed to generate High Nature Value (HNV)<sup>53</sup>. HNV farming is a composite indicator that is typically characterised by a combination of low intensity land use, the presence of semi-natural and unfarmed features and a diversity of land cover and land uses, supporting the presence of high-level biodiversity of wildlife species and habitats. The basic components of the composite indicator are represented by: 1) high proportion of semi-natural vegetation; 2) mosaic of low-intensity agriculture; 3) supporting wild species and habitat of conservation concern.

HNV farming by definition supports biodiversity and can be identified by its environmentally-sound farming practices. Combining the assessment of I.09 HNV farming with the FBI (I.08) facilitates the assessment of changes in the condition of HNV farming examining changes in the composition of bird communities on HNV farmland.

Priorities, result indicators and examples of relevant measures for HNV farming respond to the ones shown for biodiversity in chapter 2.4.1.

#### Additional indicators

For the assessment of the RDP impacts on HNV farmland the **use and netting out of the common CAP impact indicator I.09 is mandatory**.

**The use of additional indicators is voluntary.** Consideration needs to be given to what extent the data available for the common indicators enable a robust evaluation of impacts on HNV farming. In many cases, data availability for the different types of HNV will not be sufficiently exhaustive, e.g. in terms of land use intensity, condition of semi-natural land cover, the range of species covered, geographical coverage or ecological diversity, and is not updated with sufficient regularity<sup>54</sup>. Additional indicators may be represented from information on Natura 2000, different biodiversity monitoring programmes and land cover survey data. Overlaying it on different data layers can help to understand the distribution of HNV farmland<sup>55</sup>.

Particular attention is needed concerning the extent to which biodiversity monitoring data are available for non-participants to enable subsequent consideration of unintended effects on the environment as well as indirect effects such as deadweight effects at micro level and substitution effects at macro level. Key questions to be answered are:

- Can I use the HNV farming indicator to cost-effectively assess net-impacts of the RDP on HNV farming? Do I have sufficient data for participants and non-participants reflecting the different types of HNV to use the indicator at micro and macro levels?

<sup>53</sup> [Guidance Document the Application of the High Nature Value Impact Indicator 2007-2013, High Nature Value farming throughout EU-27 and its financial support under the CAP](#), EEA, March 2014, WD: [PRACTICES TO IDENTIFY, MONITOR AND ASSESS HNV FARMING IN RDPS 2014-2020](#)

<sup>54</sup> For more information see: Bastrup-Birk A. (2014) Developing a forest naturalness indicator for Europe Concept and methodology for a high nature value (HNV) forest indicator. Technical Report No 13, EEA, Luxembourg.

<sup>55</sup> For more information see: Paracchini M, Petersen J-E, Hoogeveen Y, Bamps C, Burfield I, van Swaay C et al. (2009) Identification of High Nature Value Farmland at the EU27 Level on the Basis of Land Cover and Biodiversity Data. Joint Research Centre, Ispra (IT).

- Which additional indicators can I use to generate robust evidence supporting impact assessments? Do I have sufficient data to use the selected indicator(s)?

**Some examples of relevant additional indicators** (incl. their unit of measurement, potential use, data sources and frequency of collection) are shown in the Technical Annex (see chapter 4.3):

- Population trends of agriculture related butterfly species
- Number of flora and fauna species on contracted land
- Number of farmland bird individuals
- Singing males of corncrakes (example of individual bird species indicator)
- Bumblebee indicator
- Population trends of agriculture related butterfly species

### Unit of analysis

The aim of the evaluation is to contribute to robust evidence of the impact of RDPs on HNV farming. The identification of the functional unit (FU) is important to set the boundaries of the system at the micro (agriculture holding) level and at the macro (regional) level. HNV farming may exist at different scales from single parcel to an entire landscape, while HNV farming system refers to land cover and associated farming practices of the system as a whole, either it is at level of agriculture holding or at landscape level.

At micro level the functional units need to be designed to serve the responsiveness to micro-level impacts, comparability to macro-level results and the potential for further development of a micro-level HNV survey / monitoring. **At micro level the agriculture holding level is the functional unit, while at macro level cadastral maps can be used.** The different HNV criteria (indicators) can then be combined in a scoring system at farm or geographical area level.

The **baseline data** for the chosen assessment unit are ideally data collected in 2013 or close to this year.

#### 2.5.2 Choosing evaluation approaches (logic model)

The logic model shown in figure 9 in chapter 2.4.1 illustrates various of the possible evaluation approaches for the assessment HNV farming (1.09). The decision which method is applied for the assessment of RDP impacts depends from the specific situation in the RDP and lies with the stakeholders in the Member States.

The data availability concerning the factors explaining participation is a key driver for the choice of the evaluation approach informing the following two key questions to consider:

- Can I robustly use statistics based methods to quantify HNV impacts of the evaluated measure(s)?
- Or do I need to consider alternative (ad-hoc) options to consider sample selection issues?

**Based on the application of the logic model** the guidelines suggest optimal and acceptable evaluation approaches for the micro-and macro-level assessment of the CAP impact indicator I.09. The approaches are described below as well as in the Technical Annex, chapter 4.3.

**Table 7. Examples of assessment approaches for I.09**

Evaluation approach	Micro level	Macro level
<p><b>Approach A –</b> Example of optimal approach</p>	<p>Statistics-based evaluation option with an explicit approach to sample selection: <b>Propensity Score Matching (PSM) and Difference in Difference (DiD)</b></p>	<p>Evaluation option without comparison group: <b>Spatial econometric models</b> at territorial level</p>
<p><b>Approach B –</b> Example of acceptable approach in 2019</p>	<p>Statistical analysis of <b>ad-hoc pairwise comparisons</b> or multiple comparison groups using <b>DID</b></p>	<p><b>Spatial analysis</b> at territorial level based on up-scaled micro level data <b>Naïve counterfactual approach</b> and <b>qualitative assessment</b></p>

### 2.5.3 Approach A – PSM and DiD matching techniques

The same approach as for the biodiversity common impact indicator is suggested. A description of the approach and its steps can be found in chapter 2.4.1.

### 2.5.4 Approach B - Ad-hoc pairwise comparisons or multiple comparison groups using DID

The same approach as for biodiversity common impact indicator is suggested. Similarly to biodiversity also in case of HNV indicator if there is the lack of monitoring data the application of advanced - and data intensive - statistics based evaluation approaches is limited. In case when combining or integrating HNV monitoring data with IACS/LPIS data is not possible and additional empirical data collection can't be done meaningfully within the given budget and timeframe, the evaluator needs to consider switching to less data demanding approaches using alternative and less robust approaches to sample selection. Such **ad-hoc approaches to sample selection** would be based on naïve group comparisons as in case of biodiversity impact indicator. Also ad-hoc approaches can through careful design of pairwise comparisons and multiple comparison groups differentiated by known factors and observables. For example, spatial neighbourhood of control groups of non-HNV farming is an important factor due to the high variability of the characteristics of HNV farmland. For macro-level assessment the special analysis at territorial level on up-scaled micro-level data is suggested or naïve counterfactual approach and qualitative methods are suggested.

Steps in the application of Approach B, can be found in chapter 2.4.1

### 2.5.5 Dos and don'ts

See the Dos and Don'ts for the common CAP impact indicator I.08 in chapter 2.4.5.



## 2.6 Water abstraction in agriculture (I.10) and water quality (I.11)

### 2.6.1 Setting up the frame for the assessment

#### Intervention logic

The European Commission responded to challenges of water scarcity and droughts with the “Blueprint to Safeguard Europe's Water Resources” aiming to ensure that a sufficient quantity of good quality water is available for people's needs, the economy and the environment<sup>56</sup>. The protection and restoration of water quality across the European Union (EU) and its Member States (MSs) is a paramount policy objective of the 7<sup>th</sup> Environment Action Programme (EAP) that guides European environment policy to 2020<sup>57</sup>. Protection and restoration of water quality is a direct or indirect legal obligation in many EU Directives including the [Water Framework Directive](#) (WFD), the [Nitrates Directive](#), the [Directive on Integrated Pollution Prevention and Control](#) (IPPC), the [Habitats and Birds Directives](#), the [Directive on Bathing Water](#), the [Directive on Sewage Sludge](#) and the [Directive on Urban Waste Water Treatment](#).

#### CAP overall objective, common evaluation questions and common CAP impact indicators

The **overall CAP objective**<sup>58</sup> on “Ensuring the sustainable management of natural resources, and climate action” highlights the need for the integrated and sustainable management of water resources. The **common CAP indicators** which aim to measure water management in agriculture are water abstraction and water quality. The rationale behind targeting these issues with RDP measures is to manage water as a constrained natural resource which is important for people and the nature as well as an input to the agricultural production.

The issues of water quantity and quality are addressed in **CEQ no. 26** and **CEQ no. 28**. Efforts to regulate and rationalize water abstraction in agriculture and protect water from agricultural pollutants are directly linked to some of the most innovative and integrated agricultural technologies and activities (e.g. precision agriculture, localized irrigation technologies, Integrated Pest Management etc.). The European Innovation Partnership (EIP) on Water is one of five EIPs and supports the development of innovative solutions to address major European and global water challenges<sup>59</sup>. As such, water abstraction also is related to CEQ no. 30.

The relevant **common CAP impact indicator** is I.10 - Water abstraction in agriculture. It is defined as “the volume of water which is applied to soils for irrigation purposes”<sup>60</sup>. This definition excludes water used in forestry, the livestock sector and water used during food production or other on farm activities. Most importantly, it excludes water lost in water storage and distribution networks. This impact indicator corresponds to Eurostat's agri-environmental indicators AEI7<sup>61</sup> and AEI21 and to the CAP common context indicator C.39<sup>62</sup>.

The indicator I.10 is closely related to the **common CAP impact indicators** I.11 “Water quality” and I.13 “Soil erosion by water”. Water quality is related to water abstraction with irrigated fields accepting, in general, more nutrients than their rain feed counterparts. Similarly, rationalization of irrigation reduces erosion and sediment transport especially on sloppy terrain.

<sup>56</sup> The Blueprint at: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012DC0673&from=EN>

<sup>57</sup> 7th EAP at: <http://ec.europa.eu/environment/action-programme/>

<sup>58</sup> Article 4 of Regulation (EU) no 1305/2013

<sup>59</sup> The EIP Water provides news and a list of innovative water related projects at its website: <https://www.eip-water.eu/>

<sup>60</sup> Definition at the impact indicator's fiche, found at: <https://ec.europa.eu/agriculture/sites/agriculture/files/cap-indicators/impact/2016-impact-indicators-fiches.pdf>

<sup>61</sup> AEI 7 can be accessed at: [http://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental\\_indicator\\_-\\_irrigation](http://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental_indicator_-_irrigation), AEI 20 can be accessed at: [http://ec.europa.eu/eurostat/statistics-explained/index.php/Archive:Agri-environmental\\_indicator\\_-\\_water\\_abstraction](http://ec.europa.eu/eurostat/statistics-explained/index.php/Archive:Agri-environmental_indicator_-_water_abstraction)

<sup>62</sup> Context Indicator 39 can be accessed at: <https://ec.europa.eu/agriculture/sites/agriculture/files/cap-indicators/context/2017/2017-context-indicators-fiches.pdf>

The fiche of I.11<sup>63</sup> makes explicit reference to two sub-indicators:

- I.11-1 Gross Nutrient Balance (GNB) that is measured by:
  - Gross Nitrogen Balance (GNB-N), or the potential surplus of nitrogen on agricultural land (Gross Nitrogen Surplus), and
  - Gross Phosphorus Balance (GNB-P), or the potential surplus of phosphorus on agricultural land (Gross Phosphorus Surplus).
- I.11-2 Nitrates in freshwater that is measured by:
  - Groundwater quality as the percentage of monitoring sites in 3 water quality classes, and
  - Surface water quality as the percentage of monitoring sites in 3 water quality classes.

GNB-N and GNB-P are measured by kg of N or P/ ha/ year ( $\text{Kg ha}^{-1} \text{ yr}^{-1}$ ). Measurements are expressed as a 4-year average to smooth yearly variations. Data on GNB (4-year average) should be used in combination with data for nitrates in freshwater.

#### Rural development priorities, focus areas and measures

Further down in the policy intervention logic these issues are addressed through the rural development **priority 4** and especially its **Focus Area 4B** (FA 4B)<sup>64</sup>, and through **priority 5** and especially its **Focus Area 5A** (FA 5A). CEQs no. 26 and no. 28, are closely related to CEQ no. 11 linked with FA 5A and with CEQ no. 9 linked with FA 4B.

The main **measures** for implementing FA 4B are M10.1, M12.1, M12.3 and M11 supported by M04.4, M01, M02.1 and M16.5. The central measures for implementing FA 5A are M04.4 and M10.1 supported by M01, M02.1, and M16.5.

#### Related result indicators

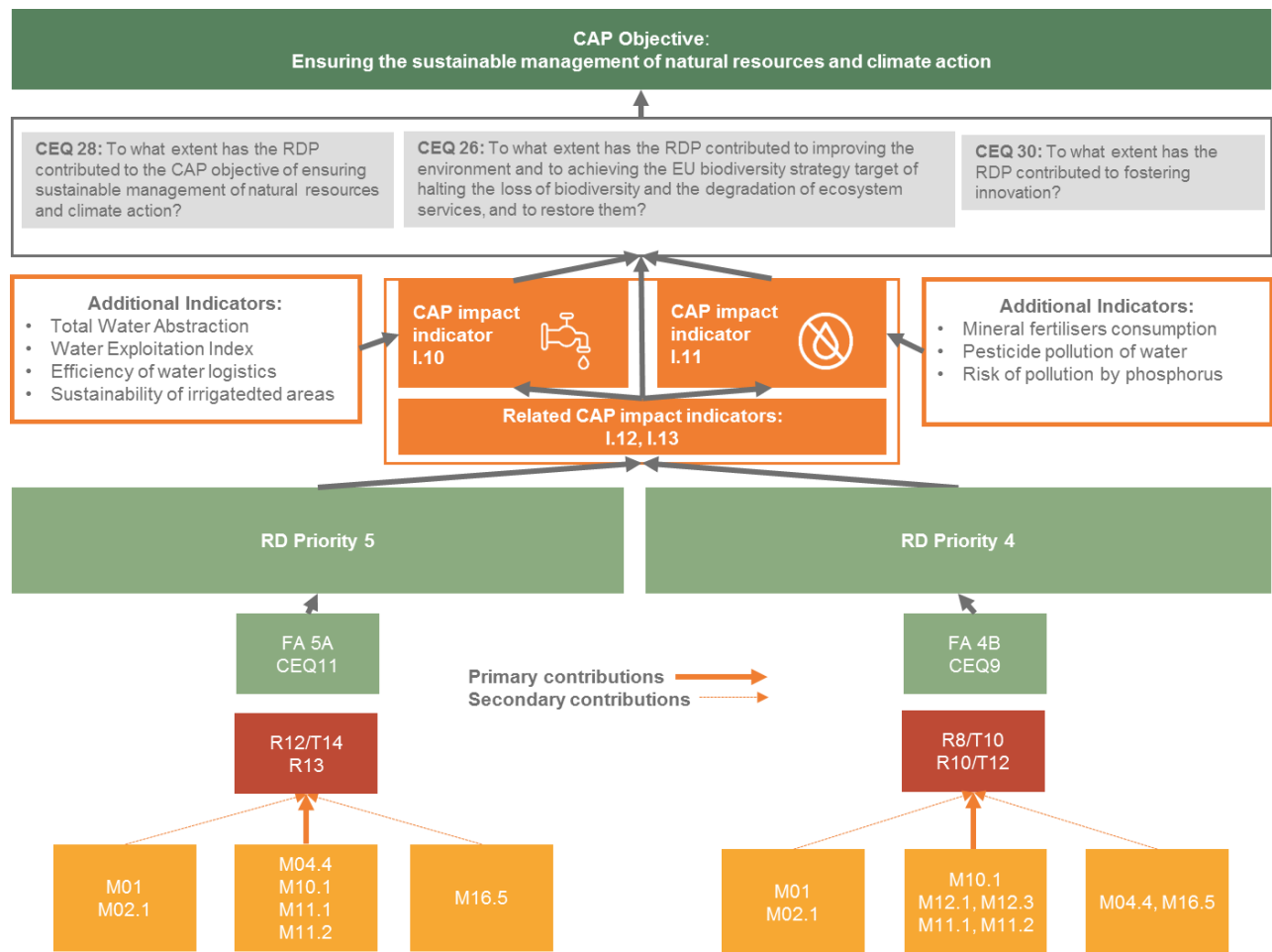
The result/target indicators directly linked to I.10 include R12/T14, R8/T10 and the complementary indicator R13. Additionally, in some RDPs with relevant actions, result indicators may measure “Water savings due to infrastructure improvements” or “Percentage of land made able to receive irrigation through sustainable technologies”. The result/target indicator directly linked to I.11 is R8/T10. The associated result/target indicator also includes R10/T12 because deterioration of water quality may be associated to soil degradation.

**An example of the general CAP Pillar II intervention logic** linked to the CAP impact indicators I.10 (Water abstraction) and I.11 (Water quality) is presented in the figure below. (N.B. An editable version of this intervention logic picture, to be adapted by stakeholders to the situation in their RDP is provided in a separate document.)

<sup>63</sup> <https://ec.europa.eu/agriculture/sites/agriculture/files/cap-indicators/impact/2016-impact-indicators-fiches.pdf>

<sup>64</sup> The focus is on “Ecological flows - Eflows” to secure river, lake and lagoon water threshold levels at: <https://circabc.europa.eu/sd/a/4063d635-957b-4b6f-bfd4-b51b0acb2570/Guidance%20No%2031%20-%20Ecological%20flows%20%28final%20version%29.pdf>

Figure 10. CAP intervention logic and impact indicators I.10, I.11 (example)



Source: European Evaluation Helpdesk for Rural Development (2018)

### Additional indicators

For the assessment of the RDP impacts on water abstraction in agriculture and water quality the **use and netting out of the common CAP impact indicators I.10 and I.11 is mandatory**.

**The use of additional indicators is optional.** Evaluators may consider their use to put the assessment of water abstraction and water quality into a wider frame and perspective.

**Some examples of relevant additional indicators** (incl. their unit of measurement, potential use, data sources and frequency of collection) are shown in the Technical Annex (see chapter 4.4):

- Water abstraction in agriculture (total)
- The Water Exploitation Index (WEI) and the Regional Water Exploitation Projection
- Efficiency of the water logistics network
- Sustainably irrigable areas
- Mineral fertilizer consumption
- Pesticide pollution of water
- Risk of pollution by phosphorus

**Unit of analysis**

At the micro-level the **agricultural holding** is the most appropriate unit of analysis to net out RDP effects. This is because water and fertilizer application on various plots and cultivations is the outcome of the agricultural holding's decision making that minimizes costs and allocates resources to maximize profits. The choice of the unit of analysis depends on the existence of appropriate monitoring networks and their associated databases<sup>65</sup>. For the indicator related to nitrates in ground and freshwater (I.11-2), the **watershed** or River Basin District (RBD) and its sub-units or, in special cases, the **monitoring station level** can serve as the unit of analysis at micro-level.

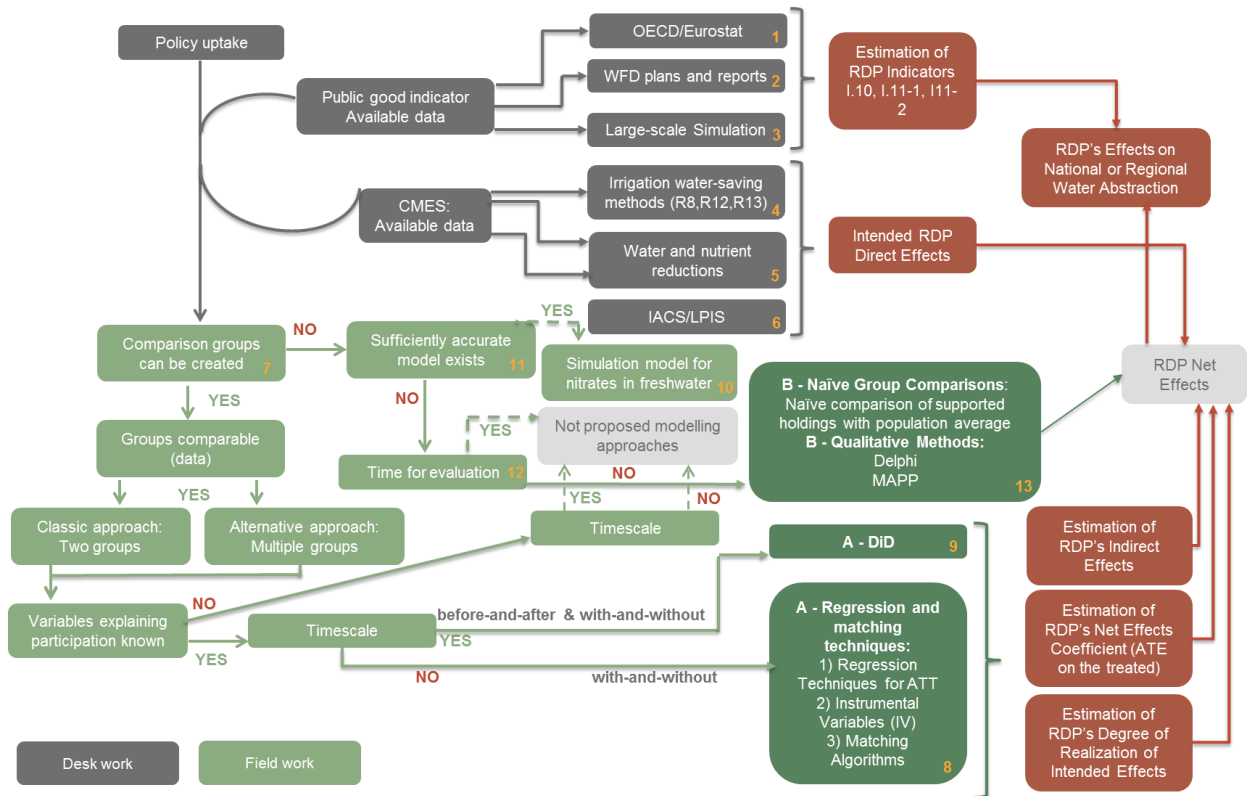
At the **macro-level** and depending on the available data the spatial units such as **NUTS3** or the **RBD** can serve as the unit of analysis.

The **baseline data** for the chosen assessment unit are ideally data collected in 2013 or close to this year.

**2.6.2 Choosing evaluation approaches (logic model)**

The logic model illustrates various possible evaluation approaches for the assessment common CAP impact indicators I.10 and I.11. The decision which method is applied for the assessment of RDP impacts depends from the specific situation in the RDP and lies with the stakeholders in the Member States.

**Figure 11. Logic model for choosing the evaluation approaches for I.10 and I.11**



Source: European Evaluation Helpdesk for Rural Development (2018) based on Envieval

<sup>65</sup> In Italy, the unit of analysis for GNB is a cadastral sheet, a polygon that is an average of 100 hectares.

Based on the application of the logic model the guidelines suggest optimal and acceptable evaluation approaches for the micro-and macro-level assessment of the CAP impact indicators I.10 and I.11. The approaches are described below as well as in the Technical Annex, chapter 4.4.

**Table 8. Overview of assessment approaches for I.10-I.11**

Evaluation approach	Micro level	Macro level
<p><b>Approach A –</b> Example of optimal approach</p>	<p>Regression and matching techniques for I.10, I.11-1, and, depending on data availability for I.11-2</p> <p>Simulation of a “Case Study” RBD or of its sub-unit for I.11-2 only</p>	<p>Generalized Propensity Scoring Matching (GPSM)</p> <p>Spatial econometrics methods</p>
<p><b>Approach B –</b> Example of acceptable approach in 2019</p>	<p>Qualitative methods</p>	<p>Naive Group Comparisons supported by Qualitative Methods</p>

### 2.6.3 Approach A – Regression and matching techniques

Regression and matching techniques are **optimal evaluation approaches** that delineate the RDP’s net effects on water abstraction for irrigation (I.10) and GNB (I.11-1) with precision and accuracy. Data for setting up the counterfactual can be drawn from a survey of agricultural holdings or existing farm holding data. Depending on the data quality and quantity, three approaches to net out the RDP’s effects are suggested. For nitrates (I.11-2), there may be cases where monitoring stations are solely related to either supported or non-supported holdings. In this case the same micro approach (regression and matching techniques) as for water abstraction (I.10) and GNB (I.11-1) applies. However, the standard micro approach for nitrates relies on the simulation of a “case study”. A macro approach also is suggested for all common water related indicators, though it is rather data demanding.



### **QUICK GUIDE #10: How to carry out a micro assessment of Water Abstraction (I.10), GNB (I.11-1) and Nitrates in Freshwater (I.11-2) using micro data at the agricultural holding level?**

#### **Selection of counterfactual option and micro-level method**

**Step 1:** Obtain data for indicators I.10, I.11-1 and I.11-2 from national sources or produce an estimate of these indicators in case it does not exist (1, 2 and 3 of figure 11).

**Step 2:** Retrieve data on common result Indicators R8, R12 and R13 (See the section “explaining intervention logic”) and all available monitoring data, (4, 5 and 6 of figure 11).

**Step 3:** Decide if the number of supported agricultural holdings (from step 2 above) is sufficient for carrying out a proper evaluation.

**Step 4:** Set up the counterfactuals in the following procedure:

- a) Create comparison groups and conduct the operations (7 - 8 of figure 11).
- b) Decide on the group or sub-groups of supported holdings (from step 2 above) and the control group.
- c) Decide on the spatial coverage of the survey as informed by step 2 above. Decide on sample sizes.

For Nutrients in Freshwater (I.11-2) examine if the WFD monitoring stations or other national monitoring networks address areas that are populated solely by supported or solely by non-supported holdings and examine their biophysical and agricultural heterogeneity. .

**Step 5:** Design a questionnaire that will capture changes in water abstraction for irrigation (and for other uses) and changes in nutrients use.

#### **Net impact assessment at a micro-level**

**Step 6:** Apply a method for analysing the data. Regression and matching techniques are suggested depending on data quantity (sample size) and data quality:

- a) Simple regression on water abstraction and GNB change with carefully chosen control variables that will reduce (but never eliminate) selection bias.
- b) Instrumental Variables (IV) analysis deals better with selectivity but is more demanding econometrically and requires the use of good instruments.
- c) Construct a matching counterfactual from the sample of non-supported farm holdings with a matching algorithm. This procedure eliminates selection bias but requires larger sample sizes.

**Step 7:** Apply DiD in case the survey has been conducted before the start of the programme or before and after data on water abstraction and GNB exist (9 of figure 11).

**Step 8:** Estimate the Average Treatment Effect on the Treated (ATT) and compute the RDP’s net direct effect coefficient for water abstraction and GNB.

**Step 9:** Assess indirect programme effects.

**Step 10:** Aggregate the results and estimate the effects of the RDP at the macro level.

**Step 11:** Verify the above results with the qualitative information.

*Learn more about this evaluation approach in the Technical Annex (chapter 4.4).*



### QUICK GUIDE #11: How to conduct a micro assessment of Nitrates in Freshwater (I.11-2) through a simulation “case study”?

- Step 1:** Choose a “case study” area and a “simulation” model
- Step 2:** Calibrate the simulation model with contemporary information on soils, climate and weather, land cover, land use, water and hydrography, water abstraction by economic activities
- Step 3:** Observe the calibration results which are the outcome of the prevailing water abstraction and fertilizer application rates at the time when the model will be calibrated
- Step 4:** Simulate the results before the operation of the RDP
- Step 5:** Observe net impact assessment as the comparison between the situation “before” and “after” having taken into account all changes.
- Step 6** (optional): Test if the applied agri-environmental measures are “climate change proof” by simulating the baseline on different weather and hydrological data according to climate change projections

*Learn more about this evaluation approach in the Technical Annex (chapter 4.4)*

For the macro level assessment four different approaches are described in Annex 4.4.

#### 2.6.4 Approach B - Naïve Group Comparisons supported by qualitative methods

Naïve Group Comparisons supported by Qualitative Methods are suggested as acceptable for the assessment of I.10 and I.11 in 2019. It is to be regarded as a “quick fix” in case there is neither time to set up a proper survey or to utilize existing monitoring networks with a counterfactual and to estimate the RDP’s net effects through a sound, statistical methodology.



### QUICK GUIDE #12: How conduct Naïve Group Comparisons supported by qualitative methods for the assessment of I.10 and I.11?

Steps in the application of the approach B are as follows:

- Step 1:** Construct the average of the change in the impact indicator for supported holdings.
- Step 2:** Set up the “counterfactual” which is the corresponding average of the NUTS2 area or other wider area in which supported holdings are located.
- Step 3:** Estimate a “net” effect by comparing the average of the “participants” from step 1 above to the counterfactual from step 2 above.
- Step 4:** Apply naïve DiD if from monitoring data the evaluator can calculate a before (application forms) and after water abstraction level or nutrient field deposition level.

*Learn more about this evaluation approach in the Technical Annex (chapter 4.4).*

Detailed information on the application of the recommended evaluation approaches for the common CAP impact indicators I.10 and I.11 can be found in the Technical Annex, chapter 4.4.

## 2.6.5 Dos and don'ts

**Dos**

- Understand well the institutional nexus underlying irrigation water abstraction and the changes induced by the WFD and RDP's ex-ante conditionalities.
- Contact all institutions that calculate or estimate regional and national water abstraction and water quality figures reported in Eurostat or the WFD. Especially the WFD focal points.
- Ask for the latest available figures and/or additional indicators even if they are unpublished. Establish a time series that includes the RDP's time frame.
- Locate institutional users of irrigation water simulation models or of N and P budget models (distributed or farm specific) that are already in operation and calibrated.
- Explore whether you can develop synergies with other evaluations that may have the same approach, e.g., evaluation of soil erosion and/or soil organic matter before starting to build the database.
- Review your monitoring database and application records to locate data gaps.
- Coordinate the possible application of a simulation model with the GNB field survey.
- Prepare and pre-process as much data as possible for supported holdings from applications and agri-environment plans.
- Search for existing farm holding sampling frames either specifically addressing water abstraction (e.g SAPM) or water quality (WFD monitoring stations) or more general sampling frames (e.g., FADN, IACS Payment Authorities, etc.).
- Search for existing GIS maps with irrigated plots and soil types or georeferenced IACS
- Clarify the criteria (eligibility and locational) that would categorize a farm holding to the group of supported holdings.
- Decide on your sample size, questionnaire structure and good control variables (observables) as early as possible

**Don'ts**

- Mix data sources when producing a time series for the I.10 or other indicators in order to ensure consistency and coherence.
- Construct a sampling frame from scratch with the support of FADN, water registered users, local cooperatives when sampling frames for non-supported agricultural holdings are missing, etc. Sampling non-supported farm holdings is essential to your work.



## 2.7 Soil organic matter in arable land (I.12)

### 2.7.1 Setting up the frame for the assessment

#### Intervention logic

Soil organic matter (SOM) in the arable land changes very slowly<sup>66,67</sup>. Sometimes it takes decades before significant changes occur and become noticeable in practice. Although in many cases it is unlikely that SOM will significantly change within the programming period, it is worth keep monitoring and evaluating this change because the SOM is one of the most important and most comprehensive indicators of arable land's soil fertility. SOM contributes to a soil's physical (structure, aeration, and water retention), biological (biomass, biodiversity, nutrient mineralisation, disease suppression) and chemical (nutrient supply) properties. In short, the SOM informs on the fertility of the arable land and it is therefore important to learn how the RDP interventions can affect it.

#### CAP overall objective, common evaluation questions and common CAP impact indicators

In the general CAP Pillar II intervention logic the assessment of RDP effects on soil organic matters in arable land is linked to the **CAP overall objective** "Sustainable management of natural resources and climate action". This objective is linked to **CEQ no 28**: „To what extent has the RDP contributed to the CAP objective of ensuring sustainable management of natural resources and climate action?“.

The information on the conservation of SOM in arable land is relevant to answer CEQ no. 28 as well as two other CEQs:

- **CEQ no. 26** "To what extent has the RDP contributed to improving the environment and to achieving the EU biodiversity strategy target of halting the loss of biodiversity and the degradation of ecosystem services, and to restore them?".
- **CEQ no. 30** "To what extent has the RDP contributed to fostering innovation?".

The **common CAP impact indicator** I.12 "Soil organic matter in arable land" is relevant for measuring SOM in arable land (figure 12). Although the title of the indicator refers to SOM, it is important to note that it should be reported in terms of SOC and not in terms of SOM value<sup>68</sup>:

- Total Soil Organic Carbon (SOC) stocks in arable land topsoil (0-20 cm), which is reported in mega tonnes (Mt);
- Mean SOC concentration in arable land, which is reported in g/kg soil. This is reported solely for orientation purposes since the value has very limited scientific meaning given the high variability of SOC concentration in different areas.

The Impact Indicator I.12 "Soil organic matter in arable land" is basically the same as the Context Indicator 41 "Soil organic matter in arable land". The Context Indicator is expected to provide the total estimate of SOC content in arable land and should be reported in mega tonnes (Mt) of SOC. The indicator on SOM in arable land is not included among the 28 agri-environmental indicators listed by Eurostat, which the EU intends to monitor in order to integrate environmental concerns into the CAP<sup>69</sup>.

<sup>66</sup> Gobin, A., Campling, P., Janssen, L., Desmet, N., van Delden, H., Hurkens, J., Lavelle, P., Berman, S., 2011. *Soil organic matter management across the EU – best practices, constraints and trade-offs*, Final Report for the European Commission's DG Environment, September 2011.

<sup>67</sup> Magdoff, F. and van Es, H., 2009. *Building Soils for Better Crops*, 3rd Edition. Sustainable Agriculture Research and Education (SARE) program, Brentwood.

<sup>68</sup> See at: [https://ec.europa.eu/agriculture/sites/agriculture/files/cap-indicators/impact/2015-05-06-impact-indicators\\_en.pdf](https://ec.europa.eu/agriculture/sites/agriculture/files/cap-indicators/impact/2015-05-06-impact-indicators_en.pdf)

<sup>69</sup> Agri-environmental indicators, available at: <http://ec.europa.eu/eurostat/web/agri-environmental-indicators/indicators>

**SOM in arable land is closely linked to the Eurostat’s Indicator 26 “Soil quality”.** This is a composite indicator comprising four sub-indicators of similar weight which have relevance either for the agricultural and/or environmental performance of soil<sup>70</sup>. The fourth of these sub-indicators is the “soil environmental services index”. It measures the carbon storage (next to three other soil environmental services: filtering, transforming, and soil biodiversity). Soil organic carbon storage expresses the “organic carbon content of soils relative to the theoretical maximum amount they can hold”.

Another common CAP impact indicator related to the indicator I.12 “Soil organic matters in arable land” is indicator I.13 “Soil erosion by water” (see figure 12).

### Rural development priorities, focus areas and measures

The RDP addresses the conservation of SOM under the **Priorities 4 and 5** (figure 12):

- Priority 4 “Restoring, preserving and enhancing ecosystems related to agriculture and forestry” and its **Focus Area 4C** (FA 4C) on “Preventing soil erosion and improving soil management”. The related result and target indicators are R11 and T12: “Percentage of agricultural land under management contracts to improve soil management and/or prevent soil erosion”. The information on soil erosion is relevant for answering the CEQ no. 15 “To what extent have RDP interventions supported carbon conservation and sequestration<sup>71</sup> in agriculture and forestry?”, since soil erosion directly influences carbon conservation and sequestration.
- Priority 5: “Promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors” and its **Focus Area 5E** (FA 5E) on “Fostering carbon conservation and sequestration in agriculture and forestry”. The related result and target indicators are R20 and T19: “Percentage of agricultural and forest land under management contracts contributing to carbon sequestration or conservation”. These are relevant for answering the CEQ no. 15 (see above) since they also deal with carbon sequestration and conservation.

The RDP **measures** that primarily contribute to the preservation of SOM are M10.1 “Agri-environment-climate-commitments” and M11 “Organic Farming”. Secondary contributions can be expected from M01 “Knowledge transfer and information actions”; M02 “Advisory services, farm management and farm relief services”; M04 “Investments in physical assets”; and M16.5 “Cooperation – Environment and Climate Change”.

### Related result indicators

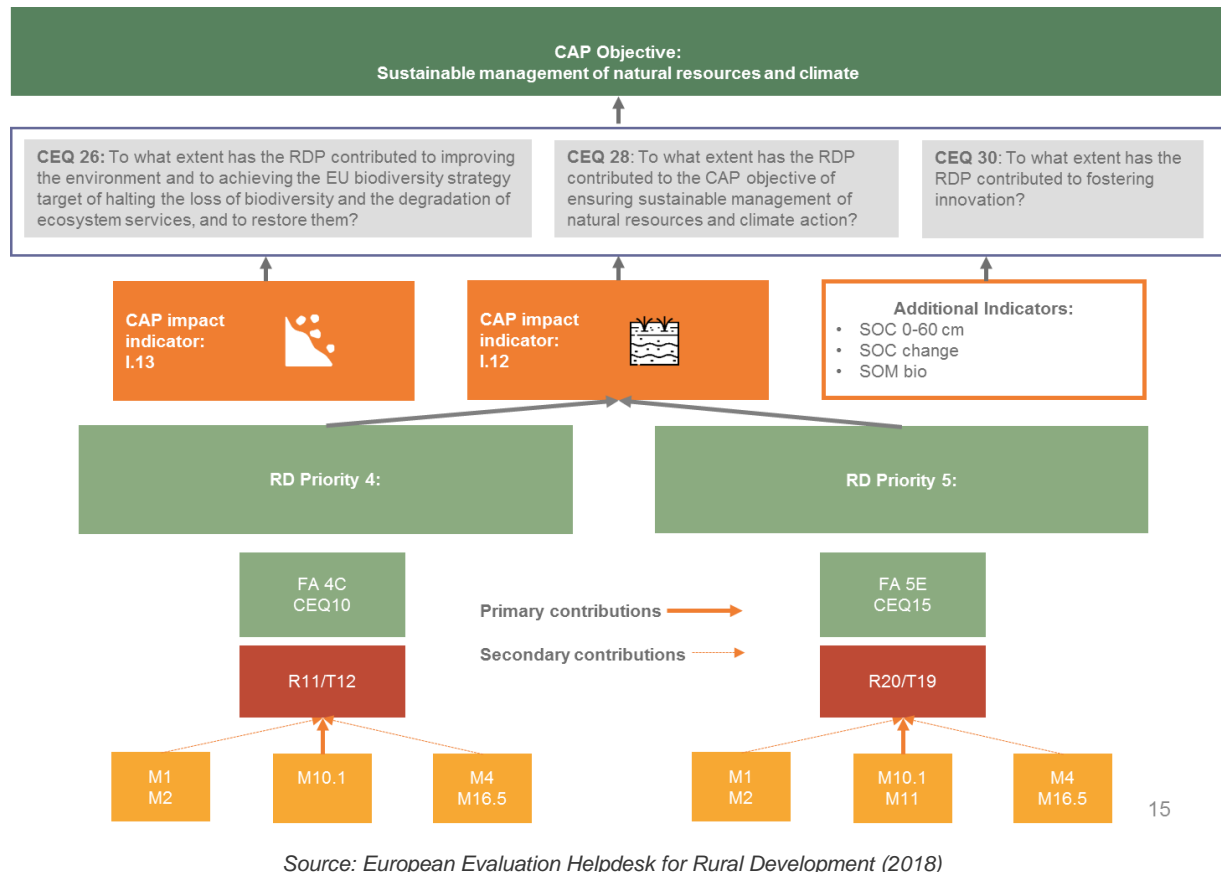
The relevant common result/target indicators calculate the percentage of agricultural land (R10/T12) under management contracts supporting the prevention of soil erosion and moreover also the percentage of agriculture (and forest) land (R20/T19) under management contracts contributing to carbon sequestration or conservation, which are closely linked with the content of the soil organic matters in arable land.

**An example of the general CAP Pillar II intervention logic** linked to the CAP impact indicator I.12 (soil organic matters in arable land) is presented in the figure below. (N.B. An editable version of this intervention logic picture, to be adapted by stakeholders to the situation in their RDP is provided in a separate document.)

<sup>70</sup> Archive:Agri-environmental indicator - soil quality, available at: [http://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agri-environmental\\_indicator\\_-\\_soil\\_quality&oldid=354704](http://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agri-environmental_indicator_-_soil_quality&oldid=354704)

<sup>71</sup> SOM contains about 58 per cent soil organic carbon (SOC). Because of this, most EC policy documents refer to (sequestration of) soil organic carbon, rather than to SOM.

Figure 12. CAP intervention logic and impact indicator I.12 (example)



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### Additional indicators

For the assessment of the RDP impacts on the soil organic matters in arable land the **use and netting out of the common CAP impact indicator I.12 is mandatory**.

**The use of additional indicators is optional.** The indicator I.12 “Soil organic matter in arable land” provides however only partial information with regard to SOM in arable land and has two major shortcomings: it assesses only a portion of SOC in the soil and does not provide much information about the potential increase in SOM due to the implementation of RDP measures.

**Some examples of relevant additional indicators** (incl. their unit of measurement, potential use, data sources and frequency of collection) are shown in the Technical Annex (see chapter 4.5):

- SOC 0-60
- SOC change
- SOC bio

### Unit of analysis

**At the micro-level** the unit for analysing I.12 is an **agricultural holding** (farm) - regardless whether it benefits from the implementation of RDPs measures contributing to I.12 - or not (counterpart farms). Since SOM at an agricultural holding is usually assessed by taking and analysing soil samples from several points (fields), each soil sampling location could also be considered as a sub-micro unit of analysis.

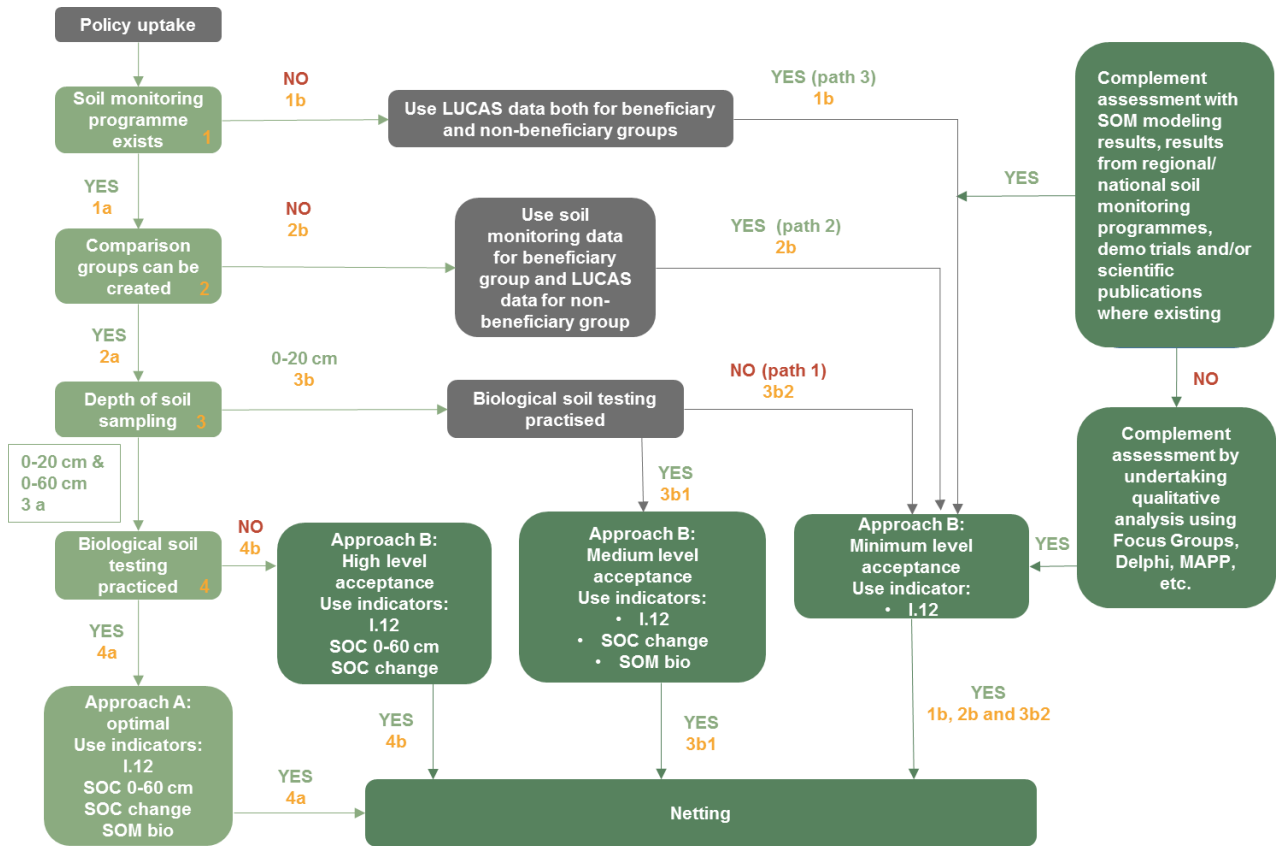
At the macro-level the unit of analysis is the **territory covered by the RDP** because the indicator I.12 has to be reported also in megatons of the total SOC in arable land.

The **baseline data** for the chosen assessment unit are ideally data collected in 2013 or close to this year.

2.7.2 Choosing evaluation approaches (logic model)

The logic model (figure 13) illustrates various of the possible evaluation approaches for the assessment of the common CAP impact indicator Soil organic matter in arable land (I.12) concerning a high level, medium level or minimum level assessment. The decision which method is applied for the assessment of RDP impacts depends from the specific situation in the RDP and lies with the stakeholders in the Member States.

Figure 13. Logic model for choosing the evaluation approaches for I.12



Source: European Evaluation Helpdesk for Rural Development (2018) based on ENVIEVAL (2015)

Based on the application of the logic model the guidelines suggest optimal and acceptable evaluation approaches for the micro-and macro-level assessment of the CAP impact indicator I.12. The approaches are described below as well as in the Technical Annex, chapter 4.5.

Table 9. Overview of assessment approaches for I.12

Evaluation approach	Micro level	Macro level
<b>Approach A –</b> Example of optimal approach	SOM assessment based on 0 – 20 cm and 0-60 cm soil depth	None
<b>Approach B –</b> Example of acceptable approach in 2019	SOM assessment based on simplified soil monitoring programmes	SOM assessment based on LUCAS database

### 2.7.3 Approach A - SOM assessment based on 0-60 cm soil depth

The **SOM assessment based on 0-60 cm soil depth**, assesses I.12 in a standard manner and by using the three suggested additional indicators based on the following soil sampling and analysis:

- SOC assessment at soil depth of 0-20 cm – which is required for indicator I.12;
- SOC assessment at soil depth of 0-60 cm, employing three additional indicators: SOC 0-60 cm, SOC change and SOC bio.



#### QUICK GUIDE #13: How to conduct a Soil Organic Matter assessment based on 0-60 cm soil depth (I.12)?

**Step 1:** Build comparison groups, involving both RDP beneficiaries and non-beneficiaries present in the soil monitoring programme (1 and 2 of figure 13).

**Step 2:** Obtain soil samples from both beneficiaries and non-beneficiaries (3 and 4 of figure 13)

**Step 3:** Up-scale the obtained data from solid monitoring programme from both groups (separately and together) at RDP level.

**Step 4:** Compare changes in SOC in time and space scale.

*Learn more about this evaluation approach in the Technical Annex (chapter 4.5).*

### 2.7.4 Approach B - SOM assessment based on simplified soil monitoring programmes and the LUCAS database.

This the approach fulfils at least the requirement of the standard I.12 with a simple SOC assessment at the depth 0-20 cm. However, it is likely that evaluation of some RDP will offer a more comprehensive assessment of I.12 than offering a mere figure of SOC at 0-20 cm. Such assessments can still not fully reach the above-advised optimal approach, but offer already more comprehensive

information. In the acceptable Approach B we therefore distinguish between three acceptance levels (figure 13)

- **High level acceptance:** an assessment based on indicators I.12, SOC 0-60 cm and SOC change. This level is identical to the approach A (optimal approach), except that it does not provide data for the use of SOC bio indicator.
- **Medium level acceptance:** an assessment based on indicators I.12, SOC change and SOC bio, on an “enhanced” soil sampling and soil analysis at the depth of 0-20 cm, providing data for the use of indicator I.12 and two additional indicators: SOC change and SOM bio.
- **Minimum level acceptance:** an assessment based solely on reporting on I.12 SOC at the depth 0-20 cm. While high and medium level acceptances are based on soil monitoring programmes, the minimum level acceptance can be based on one of three paths: Path 1 is solely built on soil monitoring. Path 2 combines soil monitoring and LUCAS data, while Path 3 relies solely on figures derived from LUCAS data, complemented by data from other sources (Figure 13).

The steps in the application of Approach B are identical with the steps of Approach A.

*Detailed information on the application of the recommended evaluation approaches for the common CAP impact indicators I.12 can be found in the Technical Annex, chapter 4.5.*

### 2.7.5 Dos and Don'ts



#### **Dos**

- Set up a soil monitoring programme with soil sampling more frequent than once a year if possible (e.g. by using technical assistance).
- Follow best practice regarding soil sampling and laboratory analysis. Use only laboratories accredited by national authorities for soil sampling and analysis.

#### **Don'ts**

- Forget to record soil bulk density for each soil sample analysed, because this is essential for calculating the SOC concentration in g/kg and for determining C stocks in soil and their sequestration potential.
- Expect SOC to be noticeable before several years of implementation of RDP measures conserving carbon.
- Expect LUCAS database to provide much data at NUTS 3 or lower level.

## 2.8 Soil erosion by water (I.13)

### 2.8.1 Setting up the frame for the assessment

#### Intervention logic

Soil is the most important natural resource for agriculture. Efforts to protect European soils from loss due to various forms of degradation is a continuing aim of the European Union<sup>72</sup>. Soil conservation measures were adopted by the Common Agricultural Policy (CAP) as an integral part of Good Agricultural and Environmental Conditions (GAEC)<sup>73</sup> with emphasis on limiting erosion, retaining and improving organic matter, and avoiding compaction. Today, the cost of soil erosion to European farmers is estimated at around €1.25 billion in annual agricultural productivity loss and €155 million in the gross domestic product (GDP) loss<sup>74</sup>.

#### CAP overall objective, common evaluation questions and common CAP impact indicators

Protection from soil erosion and prevention from land degradation and desertification are one of the **overall CAP overall objectives** stated as “Ensuring the sustainable management of natural resources, and climate action”<sup>75</sup>. This objective is assessed by answering **CEQ no. 28** “To what extent has the RDP contributed to the CAP objective of ensuring sustainable management of natural resources and climate action?”. Linked to this objective is also **CEQ no. 26**: “To what extent has the RDP contributed to improving the environment and to achieving the EU biodiversity strategy target of halting the loss of biodiversity and the degradation of ecosystem services, and to restore them?”.

The relevant **common CAP impact indicator** for measuring “soil erosion by water” is I.13 corresponding to Eurostat’s agri-environmental indicator AEI 21<sup>76</sup> and context indicator 42. The indicator fiche makes explicit reference to two sub-indicators:

- I.13-1 Estimated rate of soil loss by water erosion;
- I.13-2 Estimated agricultural area affected by a certain rate of soil erosion by water which also can be expressed as share of the total agricultural area affected by a certain rate of soil erosion.

The first sub-indicator on soil loss by water erosion in Europe is expressed in tonnes (t) per hectare (ha) and per year (yr) as  $t\ ha^{-1}\ yr^{-1}$  for geographic cells of 100m x 100m for the whole EU territory. The second sub-indicator is measured in hectares (ha) or in hectares per Utilized Agricultural Area. The indicators assess the soil loss by water erosion processes and provide an indication of the areas affected by a certain rate of soil erosion<sup>77</sup>. Data for indicator I.13-1 are available at Eurostat for the NUTS3 level for 2012<sup>78</sup>. It is expected that it will be replicated for the 2018 LUCAS Soil survey. Data for indicator I.13-2 can be calculated by overlaying the soil loss by categories rates shapefile (layer) at NUTS3 with a layer indicating agricultural areas at NUTS3. All of Eurostat’s soil erosion data are estimated by the European Soil Data Centre (ESDAC) using the 2015 Revised Universal Soil Loss

<sup>72</sup> Decision No. 1600/2002/EC at: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002D1600&from=en>, Communication COM/2006/0231 at: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52006DC0231&from=EN>. Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the implementation of the Soil Thematic Strategy and ongoing activities at: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012DC0046&from=EN>

<sup>73</sup> The GAECs wiki database is accessed after registration at: <https://marswiki.jrc.ec.europa.eu/gaec/index.php>

<sup>74</sup> <https://ec.europa.eu/jrc/en/news/soil-erosion-costs-european-farmers-125-billion-year>

<sup>75</sup> Article 4 of Regulation No. 1305/2013

<sup>76</sup> The indicator’ fiche is accessible at: [http://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental\\_indicator\\_-\\_soil\\_erosion](http://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental_indicator_-_soil_erosion) and data on soil erosion at NUTS3 for 2000 and 2012 at: [http://ec.europa.eu/eurostat/web/products-datasets/-/aei\\_pr\\_soiler](http://ec.europa.eu/eurostat/web/products-datasets/-/aei_pr_soiler). An excel sheet containing data, methods and raster maps can be downloaded from within the indicator’s fiche.

<sup>77</sup> The respective categories in tons per hectare per year are Very Low (<1), Low (1-2), Moderate Low (2-5), Moderate (5-10), Moderate High (10-20) and High (>20). Details on the methodology are provided in AEI 21 fiche.

<sup>78</sup> Data available at: [http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=aei\\_pr\\_soiler&lang=en](http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=aei_pr_soiler&lang=en)

Equation (RUSLE). RUSLE is the most widely used soil modelling system but has been criticised by some soil erosion modellers<sup>79</sup>.

Impact indicator I.13 is directly related to I.12, the two water indicators I.10 and I.11 as well as to indicator I.07 because soil is the largest carbon sink.

#### Rural development priorities, focus areas and measures

Most of the interventions which contribute to the above mentioned overall objective are realized through **Priority 4** and especially its **Focus Area 4C** (FA 4C).

The most directly related **measures** to achieve the objectives of soil erosion prevention and improved soil management are M10.1, besides M12.1 and M12.3 which is used especially in watersheds. The primary contribution of M10.1 and M12 to soil erosion prevention can be supported by M01 and M02. M16.5 also offers opportunities for limiting soil erosion through innovative forms of integrated land management interventions. For this reason, also CEQ no. 30 and 10 are relevant.

#### Relevant result indicators

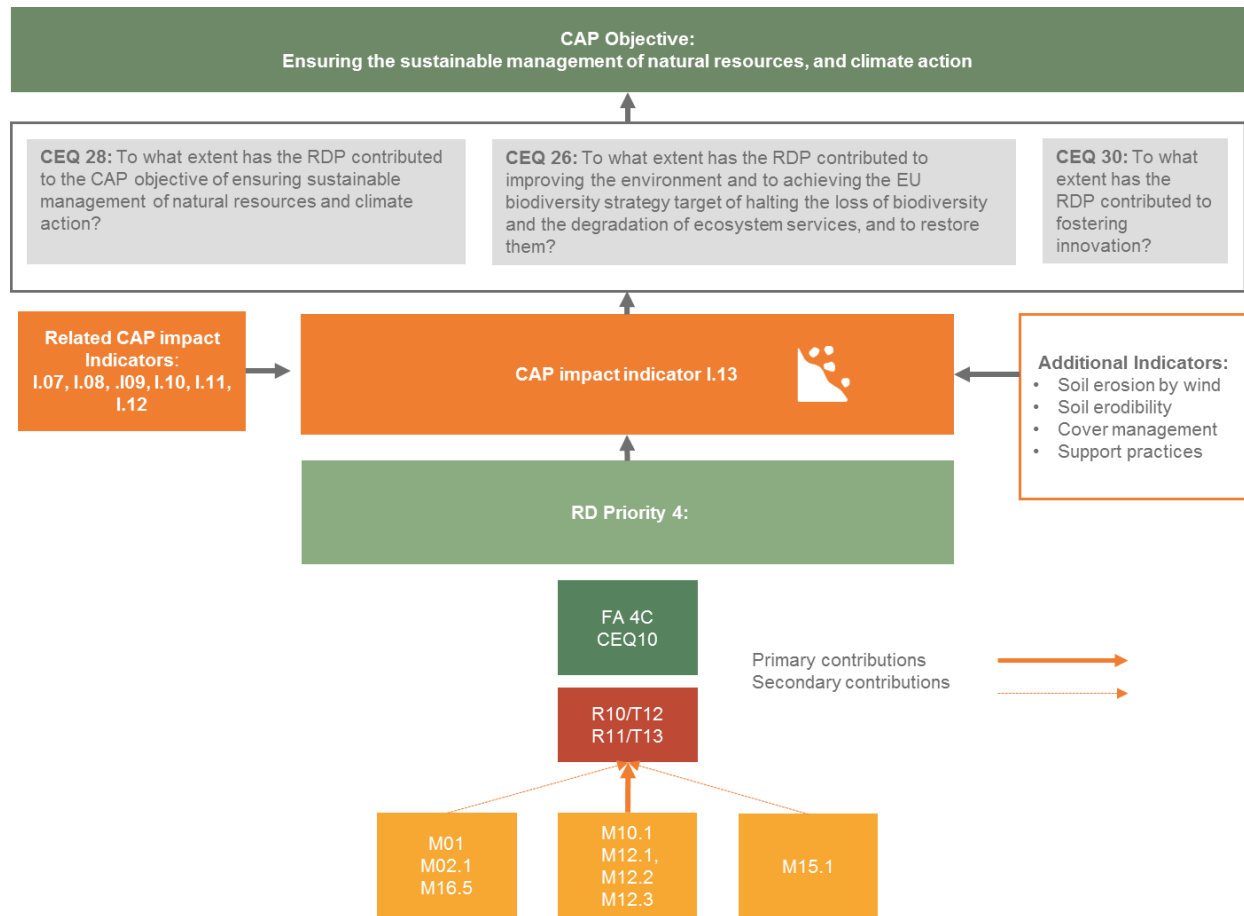
The result/target indicator directly linked to soil erosion by water is R10/T12. The indicator fiche explicitly excludes forest and wooded areas. However, these areas directly protect soil from erosion and regulate surface runoff which protects lowland agricultural areas. The forestry measure M15.1 is therefore included in the general intervention logic of I.12, just as also the corresponding result and target indicators R11/T13.

**An example of the general CAP Pillar II intervention logic** linked to the CAP impact indicator I.13 (soil erosion by water) is presented in the figure below. (N.B. An editable version of this intervention logic picture, to be adapted by stakeholders to the situation in their RDP is provided in a separate document.).

<sup>79</sup> The most commonly cited limitation of the RUSLE models is their applicability to regions outside of the US but improvements and modifications have made it applicable to larger scales outside the US. A frequently-cited limitation is that the RUSLE estimates soil loss through sheet and rill erosion, but not from other types of erosion such as gully erosion, channel erosion, bank erosion, or from landslides. By excluding these types of erosion, the RUSLE may underestimate the actual soil loss. RUSLE also does not account for deposition, leading to overestimation, or sediment routing. Information on the RUSLE can be obtained at: <http://www.sciencedirect.com/science/article/pii/S1462901115300654> and the fiche of the at AEI 21. A fair critique of the method is presented by Benavidez et al (2018) at: <https://www.hydrol-earth-syst-sci-discuss.net/hess-2018-68/hess-2018-68.pdf>. Long-term averages of annual soil loss and deposition rates using the spatially distributed WaTEM/SEDEM model in 2018 can be found at: <https://esdac.jrc.ec.europa.eu/themes/sediment-transport-using-watemsedem>



Figure 14. CAP intervention logic and impact indicator I.13



Source: European Evaluation Helpdesk for Rural Development (2018)

### Additional indicators

For the assessment of the RDP impacts on soil erosion by water the use and netting out of the common **CAP impact indicator I.13 is mandatory**. **The use of additional indicators is optional** if the evaluator wishes to put agricultural soil erosion from water into a wider frame.

**Some examples of relevant additional indicators** (incl. their unit of measurement, potential use, data sources and frequency of collection) are shown in the Technical Annex (see chapter 4.6):

- Wind erosion
- Soil Erodibility factor (K-factor)
- Cover-management factor (C-factor)
- Support practice factor (P-factor)

### Unit of analysis

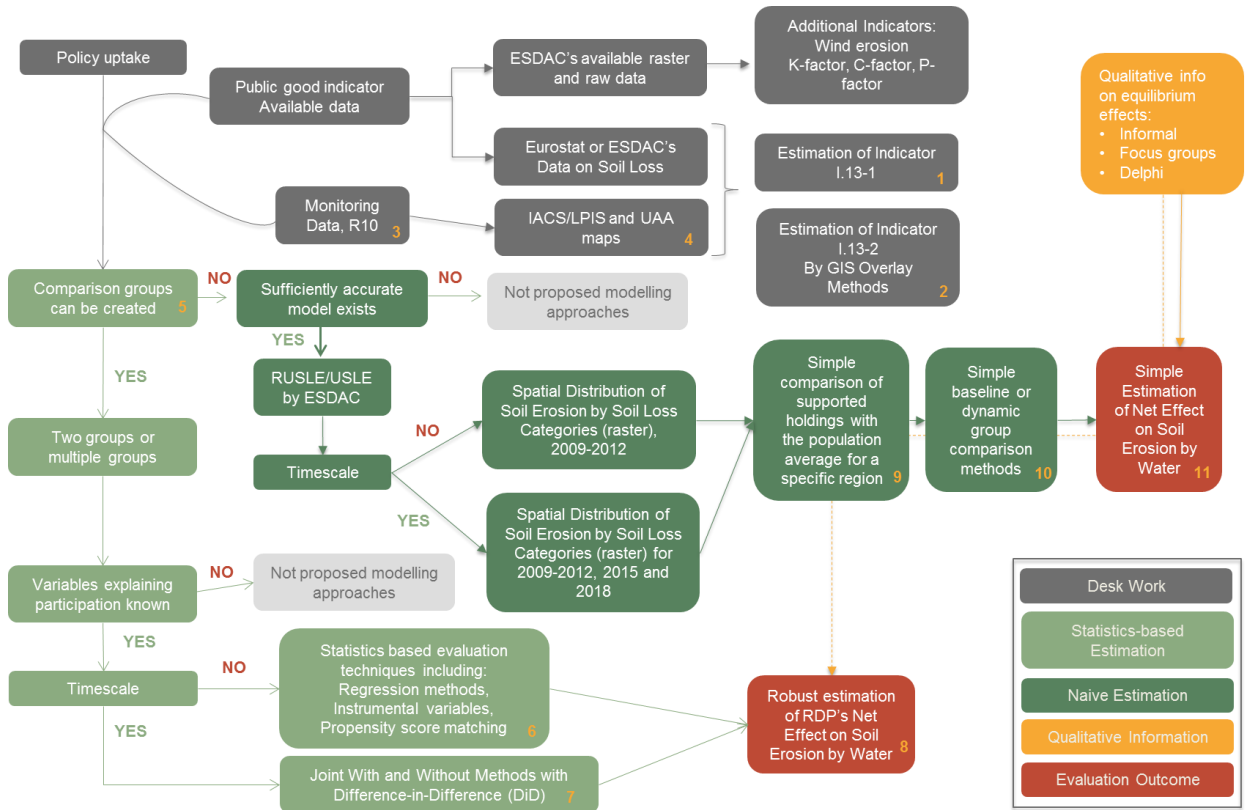
Depending on data availability, the unit of analysis can be the **agricultural holding at the micro level** and the whole **RDP area or RDP soil erosion targeted areas at the macro level**. The agricultural holding is the land management decision unit and the prime recipient of RDP support.

#### 2.8.2 Choosing evaluation approaches (logic model)

The logic model (figure 15) illustrates various of the possible evaluation approaches for the assessment of the common CAP impact indicator Soil Erosion by Water (I.13) focusing at the micro-

level. The decision which method is applied for the assessment of RDP impacts depends from the specific situation in the RDP and lies with the stakeholders in the Member States.

Figure 15. Logic model for choosing the evaluation approaches for Impact Indicator I.13



Source: European Evaluation Helpdesk for Rural Development (2018), based on ENVIEVAL (2015)

Based on the application of the logic model the guidelines suggest optimal and acceptable evaluation approaches for the micro-and macro-level assessment of the CAP impact indicator I.13. The approaches are described below as well as in the Technical Annex, chapter 4.6.

Table 10. Overview of assessment approaches linked to I.13

Evaluation approach	Micro level	Macro level
<b>Approach A –</b> Example of optimal approach	Statistics-based Evaluation Techniques	GPSM spatial econometrics supported by DiD
<b>Approach B –</b> Example of acceptable approach in 2019	Naïve baseline or dynamic group comparisons	Quantitative naïve assessment between spatial units and a national average

2.8.3 Approach A – Statistics based evaluation techniques

Approach A compares at the micro level the RDP supported and RDP non-supported agricultural holdings. At the macro level it compares the RDP supported and non-supported areas or areas presenting a different intensity of support. Because data on supported and non-supported holdings is

rather difficult to obtain, the evaluator could collect such data by setting up a farm holding survey with a counterfactual. The analysis of the data can be done with advanced econometric methods. Their application however depends on the type of existing and collected data, as well as from the statistical skills. The methodology allows the evaluator to measure the direct effect on supported holdings, the indirect effect on supported and non-supported holdings, to estimate the deadweight and to scale up the results to the RDP level. The specific choice of methods for Approach A will depend on the available data and should be decided by the evaluator on a case-by-case review. The suggested econometric techniques address the selectivity issue depending on the quality and the quantity of the data that exist or the data that can be collected specifically for this evaluation.



#### **QUICK GUIDE #14: How to apply statistics based evaluation techniques at the micro level for assessing Soil erosion by water (I.13)?**

##### **Selection of counterfactual option and micro-level method**

**Step 1:** Obtain the data for I.13-1 impact indicator from Eurostat and estimate by GIS overlay methods indicator I.13-2. (1 and 2 of figure 15)

**Step 2:** Retrieve the data for result/target indicator R10/T12 and all available monitoring data, that will reveal the number of the supported agricultural holding population and the variety of measures used within the RDP's intervention logic (3 and 4 of figure 15).

**Step 3:** Decide if the number of supported agricultural holdings (from step 2 above) is sufficient for carrying out a proper evaluation (5 of figure 15).

**Step 4:** Set up the counterfactuals (5 of figure 15).

**Step 5:** Seek any alternative source that can complement the existing sampling points from ESDAC, including national, regional and local sources.

**Step 6:** Design a questionnaire that will capture soil erosion through the C-factor.

##### **Net impact assessment at a micro-level (7 – 8 of figure 15)**

**Step 7:** Analyse the data by applying an adequate statistics-based method.

**Step 8:** If the sample data cover at least two distinct time periods,

**Step 9:** Estimate the Average Treatment Effect on the Treated (ATT) and compute the RDP's net direct effect coefficient on the C-factor.

**Step 10:** Use the findings of the previous step (K-factor, slope length and steepness) also for the estimation of net direct effect coefficient of the soil erosion by water.

**Step 11:** Apply qualitative methods if there are indications of important indirect effects either on supported or non-supported agricultural holdings due to the application of soil conservation measures.

**Step 12:** Aggregate the results and estimate the effects of the RDP at the macro level.

**Step 13:** Verify the results obtained by this process with qualitative data obtained by interviewing experts and by reviewing published case studies carried out in the RDP territory or in other RDPs facing similar agricultural conditions.

*Learn more about this evaluation approach in the Technical Annex (chapter 4.6).*

Approach A - conducted at the macro-level follows similar steps as at micro-level.

If there are spatial units that are not supported by the RDP and can be matched to spatial units that are supported by the RDP, then a propensity score matching algorithm on spatial data can be applied. In this exercise matching will consider the physical (especially climatic, sloppiness and soil texture) and agricultural characteristics. In case this is not possible the Generalized Propensity Scoring Matching (GPSM) methodology can be applied.

#### 2.8.4 Approach B – Naïve baseline or dynamic group comparisons

Approach B is suggested only in case the evaluator does not have time to collect the required micro level data or if the number of supported farm holdings is too small to justify a survey. For this reason, Approach B is limited to simple naïve group comparisons that are supported by qualitative methods such as in-depth interviews and focus groups, MAPP and Delphi (see 9 – 11 in figure 15).

Steps in conducting the MAPP and Delphi methods are described in the introduction to chapter on environmental indicators of PART II of these guidelines.

#### 2.8.5 Dos and don'ts



##### Dos




- Search for regional and national soil databases and examine if information and data on soil erosion are adequate.
- Register and fill in request forms for data from ESDAC as early as possible.
- Examine the possibility to set up comparison groups from LUCAS Soil sampling points.
- Set up a GIS evaluation framework and get hold of all georeferenced information from IACS/LPIS including the layer of the utilized agricultural area.
- Seek alternative European wide data at a lower resolution, e.g., CORINE and LUCAS for land cover if some geographical sources are missing.
- Search for environmental databases at NUTS3 or lower spatial level for the macro assessment methods.

##### Don'ts



## SOCIO-ECONOMIC IMPACTS

### *CAP impact indicators*

<p>I.14</p> 	<p>Rural employment rate</p>
<p>I.15</p> 	<p>Degree of rural poverty</p>
<p>I.16</p> 	<p>Rural GDP per capita</p>

### *Related Evaluation Questions*

<p>CEQ 29</p>	<p>“To what extent has the RDP contributed to the CAP objective of achieving a balanced territorial development of rural economies and communities including the creation and maintenance of employment”</p>
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## 2.9 Socio-economic impact indicators (I.14, I.15, I.16)

### 2.9.1 Setting up the frame for the assessment

#### Intervention logic

The choice of common approaches to assess the CAP socio-economic impact indicators is justified by two main reasons, namely:

- close theoretical and conceptual underpinning of the three socio-economic impact indicators. The close conceptual relationships are embodied in the links between the three impact indicators (I.14, I.15, I.16) with the same CAP overall objective, Common Evaluation Question (CEQ), rural development priority areas and the respective three Focus Areas (FA);
- application of the same evaluation approaches for the estimation of these three indicators.

#### Overall CAP objective, common evaluation questions and impact indicators

In the **general CAP Pillar II intervention logic** all three socio-economic impact indicators measure RDP impacts serving the third **overall CAP objective** “Achieving a balanced territorial development of rural economies and communities including the creation and maintenance of employment”. Furthermore, the issues they deal with (rural employment; rural poverty; rural GDP per capita) are addressed in the **CEQ no. 29** “To what extent has the RDP contributed to the CAP objective of achieving a balanced territorial development of rural economies and communities including the creation and maintenance of employment”.

The **first common CAP impact indicator**, I.14 “Rural Employment Rate”, is defined as employed persons aged 15-64 years and 20-64 years as a share of the total population of the same age group(s) in thinly populated areas which are used as a proxy for rural areas. The indicator deals with the very important policy issue of rural employment creation and maintenance in a direct manner and adheres to the Europe 2020 priority of “Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion”.

The **second common CAP impact indicator**, I.15 “Degree of Rural Poverty”, is defined as the share of population at risk of poverty or social exclusion in thinly populated areas which are used as a proxy for rural areas and is calculated as the percentage of people at risk of poverty or severely deprived or living in a household with low work intensity over the total population. The indicator deals directly with the crucial policy issue of rural poverty and indirectly with rural employment and adheres to Europe 2020 priority “Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion”.

The **third common CAP impact indicator**, I.16 “Rural GDP per capita”, is defined as GDP per capita in predominantly rural regions in PPS. As in the case of I.14 and I.15, this indicator is associated with the policy aim to reduce the gap in the standard of living between rural and other areas in the EU. It is strictly linked to the Europe 2020 priority “Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion”.

#### Related rural development priorities, focus areas and measures

All three socio-economic impact indicators measure the impacts addressed by the **rural development priority 6** “Promoting social inclusion, poverty reduction and economic development in rural areas”. Therefore, they are also directly addressed by **focus area 6A** (FA 6A) “Facilitating diversification, creation and development of small enterprises, as well as job creation” (which links to CEQ no. 16) and **focus area 6B** (FA 6B) “Fostering local development in rural areas” (which links to CEQ no. 17). Furthermore, they are indirectly addressed by FA 6C “Enhancing the accessibility, use and quality of information and communication technologies (ICT) in rural areas”, which links to CEQ

no.18. This is because the deployment of ICT in rural areas and the subsequent increase in intelligence, autonomous behaviour and connectivity is expected to reduce transaction costs faced by rural economic actors and population and to positively affect agricultural and rural competitiveness, employment and quality of life. In this manner, the deployment of rural ICT is expected to positively affect rural economic development, social and territorial cohesion across the EU.

The main **measures** to support the territorial development and employment are:

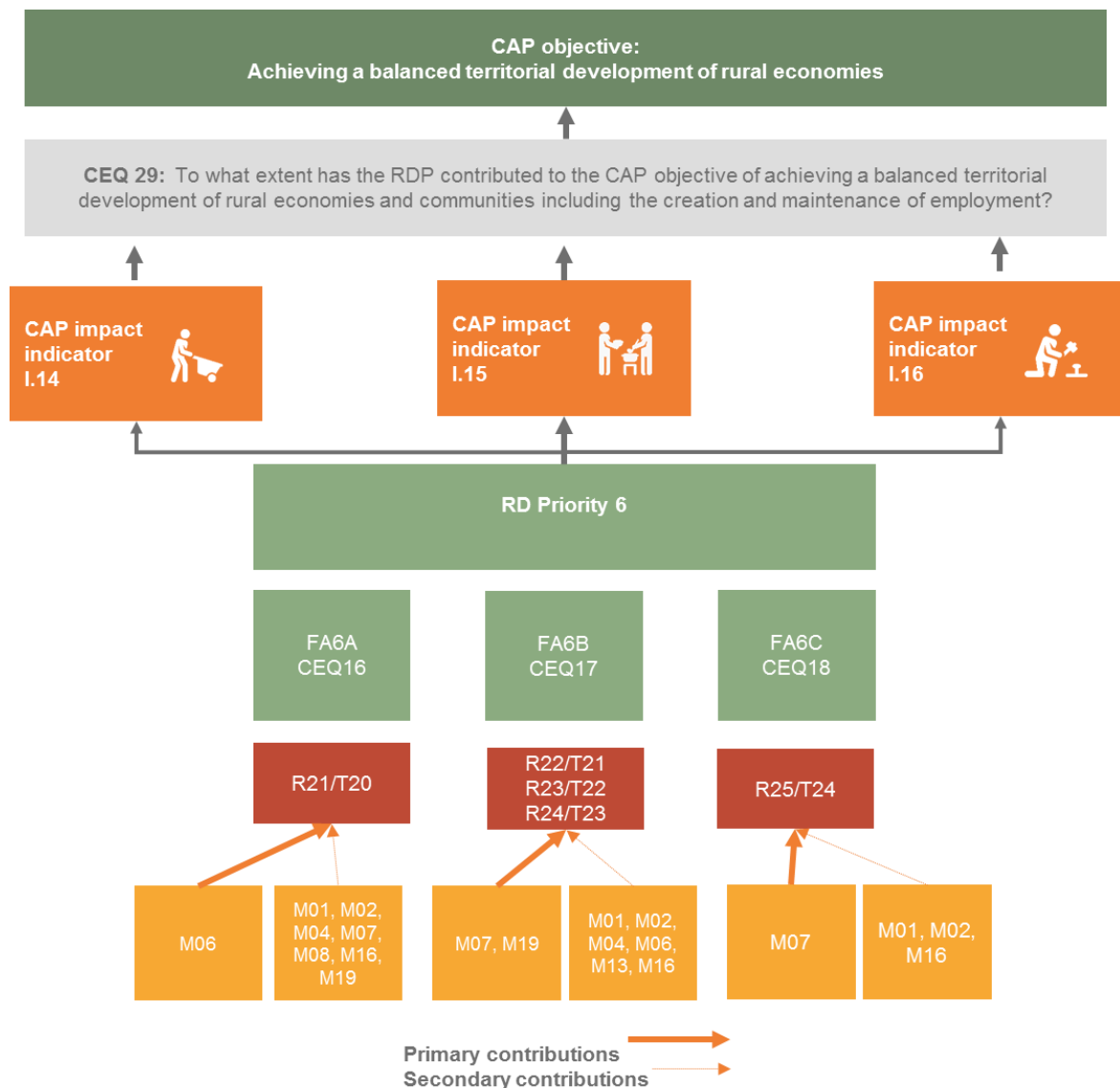
- FA 6A: M06 “Business development”. Secondary contributions to FA 6A originate from M01 “Knowledge transfer and information actions”, M02 “Advisory services, farm management and farm relief services”, M04 “Physical investments”, M07 “Basic Services”, M08 “Forest investments”, M16 “Cooperation” and M19 “Leader”.
- FA 6B: M07 “Basic services and village renewal in rural areas” and M19 “Leader”. Secondary contributions to FA6B come from M01 “Knowledge transfer and information actions”, M02 “Advisory services, farm management and farm relief services”, M04 “Physical investments”, M06 “Business development”, M13 “ANC” and M16 “Cooperation”.
- FA 6C: M07 “Basic services”, while secondary contributions to this focus area originate from M01 “Knowledge transfer and information actions”, M02 “Advisory services, farm management and farm relief services” and M16 “Cooperation”.

#### Related result indicators

The result/target indicators which are directly linked to the above-mentioned RD priorities can provide useful information for the assessment of I.14. These are mainly R21/T20 “Jobs created in supported projects” and R24/T23 “Jobs created in supported projects (LEADER)”, I.15 and I.16. In fact, it can be safely argued, that due to the focus of I.14, I.15 and I.16 on inter-related issues, in addition to the direct links between I.14 and R21 and R24, all three Common Impact Indicators examined here (I.14-I.16) have indirect links with all the result/target indicators associated with FA6A (R21/T20), FA6B (R22/T21, R23/T22, R24/T23) and FA6C (R25/T24).

**An example of the general CAP Pillar II intervention logic** linked to the CAP economic impact indicators (I.14, I.15, I.16) is presented in the figure below. (N.B. An editable version of this intervention logic picture, to be adapted by stakeholders to the situation in their RDP is provided in a separate document.).

Figure 16. CAP intervention logic and impact indicators I.14, I.15 and I.16 (example)



Source: European Evaluation Helpdesk for Rural Development (2018)

### Additional indicators

For the assessment of the socio-economic RDP impacts the use and netting out of the common **CAP impact indicators I.14, I.15 and I.16 is mandatory**. Impact indicators I.14, I.15 and I.16 deal with standard economic variables associated with rural employment and incomes and compared to the relevant indicators of programming period 2007-2013 on “Economic Growth” and “Employment Creation”, they are characterised by their stronger capacity to reflect RDP performance/impacts associated with EU 2020 headline targets<sup>80</sup>. Hence, in this case no additional or alternative (perhaps, simpler) impact indicators which can capture the issues raised by CEQ no. 29 are proposed.

<sup>80</sup> See CEQs 22 and 25.



## Unit of analysis

The most appropriate unit of analysis for the indicators I.14, I.15 and I.16 are the EU **rural areas within RDP territory**. Hence, the unit of analysis is the regional (rural) **macro level** of the RDP region, as the three Impact indicators aim to measure economy-wide effects.

However, the choice of the unit of analysis depends on the evaluation approach adopted. If the evaluation approach requires access to regional (rural) accounts (i.e. Recursive-Dynamic CGE Model), then the unit of analysis should be rural **NUTS 3 regions** as defined by the Eurostat Urban-Rural typology<sup>81</sup>. If the chosen evaluation approach requires access to data at a smaller area level (i.e. for Propensity Score Matching), then, Eurostat's urban typology should be used. However, the rural areas definition should be based at the LAU2<sup>82</sup> units level (i.e. thinly populated areas). If the data for applying the PSM is not available at the **LAU2 level**, then the NUTS3 level Eurostat specification of rural areas is suggested as a second-best option. It should be noted that both mentioned approaches can autonomously capture the counterfactual. In MS which do not have the "rural area" classification (e.g. Cyprus, Luxembourg, Malta), the most similar typology of "thinly populated areas or intermediate areas should be used.

By contrast, if a simpler macro model (such as Input-Output) is chosen, which is not "capable" of capturing a counterfactual analysis, then the measure-specific procedure which captures the counterfactual (which will be fed as a shock into the model) requires a micro approach which is specific to measure beneficiaries. These estimates can be specific to a sample of beneficiaries and then up-scaled to the beneficiary population, as thoroughly presented in the sectoral indicators section of this report.

Finally, model-specific estimates of all three indicators should be compared to those of medium and high densely-populated areas and/or those at the national/EU level.

The **baseline data** for the chosen assessment unit are ideally data collected in 2013 or close to this year.

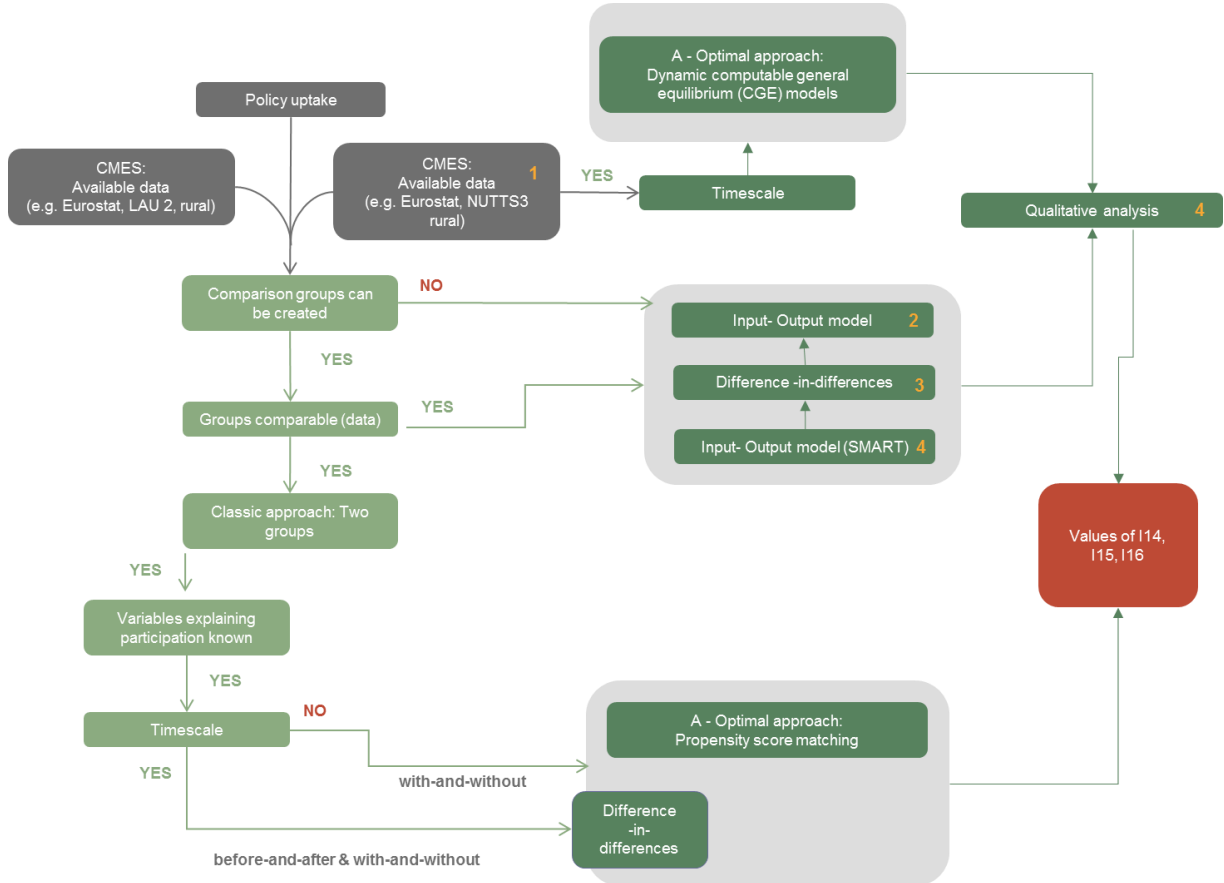
<sup>81</sup> [http://ec.europa.eu/eurostat/statistics-explained/index.php/Archive:Urban-rural\\_typology](http://ec.europa.eu/eurostat/statistics-explained/index.php/Archive:Urban-rural_typology) and <http://ec.europa.eu/eurostat/web/rural-development/methodology>

<sup>82</sup> Formerly NUTS5.

2.9.2 Choosing evaluation approaches (logic model)

The logic model (figure 17) illustrates various of the possible evaluation approaches for the assessment of the socio-economic common CAP impact indicators (I.14, I.15, I.16). The decision which method is applied for the assessment of RDP impacts depends from the specific situation in the RDP and lies with the stakeholders in the Member States.

Figure 17. Logic model for choosing the evaluation approaches for I.14, I.15 and I.16



Source: European Evaluation Helpdesk for Rural Development (2018) based on ENVIEVAL (2015)

Based on the application of the logic model the guidelines suggest three evaluation approaches, of which the first two (A1 and A2) are considered as optimal and the third (B), as acceptable for the 2019 AIR. The approaches are described below as well as in the Technical Annex, chapter 4.7.

Overview of the assessment approaches for I.14, I.15 and I.16

Evaluation approach	Micro level	Macro level
<b>Approach A1 –</b> Example of optimal approach	None	Recursive-Dynamic CGE model
<b>Approach A2 –</b> Example of optimal approach	None	Propensity Score Matching (PSM) and Generalised Propensity Score Matching (GPS),
<b>Approach B –</b> Example of acceptable	None	Input-Output Analysis (IO).

approach in 2019		
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The three approaches are proposed due to:

- a) their capacity to determine causation either autonomously (CGE and PSM) or through their integration with control group estimates at the sectoral level (IO);
- b) their capacity to concretely estimate ex-post the economy-wide impacts of development policy interventions and to use these estimates to compare RDP contributions to the EU2020 headline targets on employment and poverty and their wide application<sup>83</sup>.

**Approach A1** (CGE) and also **Approach A2** (PSM/GPS) combine rather advanced theoretical and analytical frameworks and utilize real economic data to assess policy impacts. Both approaches are demanding as regards the required technical and analytical skills. The data needs for model-building are rather high and it is time-consuming, whereas the data needs associated with policy shocks are rather simple and involve annual payments per measure for the programming period. Compared to the Recursive-Dynamic CGE approach, the PSM has perhaps a disadvantage associated with the systematic identification of economic behaviour underlying the impact estimates. On the other hand, it has several (rather important) advantages which link to the specification of Impact indicators I.14, I.15 and I.16.

- First, as in the case of CGE models, this approach embodies counterfactual analysis.
- Second, it can be used for the direct estimation of the impact indicators I.14, I.15 and I.16.
- Third, it can be applied to the assessment of impacts at the level of LAU2 rural areas, as suggested in the relevant Impact indicators fiches.
- Hence, the choice between CGE and PSM/GPS could be based on the available resources and the skills of the evaluator.

### 2.9.3 Approach A1 – CGE model

The CGE Model<sup>84</sup> can be applied to the estimation of RDP measures' impacts on employment, household income and GDP, which are all components of Impact indicators I.14, I.15 and I.16.

CGE models are effectively a set of simultaneous (non-linear) equations which capture inter-relationships between actors in the economy at a certain point in time. They are based on an area-specific Social Accounting Matrix (SAM) which is usually constructed through mechanical procedures. It accounts for all flows in a national/regional (in this case, rural within RDP) economy and consists of a set of accounts covering production activities, commodity balances, flows to and from factors of production (often disaggregated to various categories), households (also disaggregated) and other institutions such as government and the rest of the country/world. A CGE model assumes the existence of representative producers and traders in the economy who maximise profits, while representative consumers maximise utility. In addition to capturing policy-specific direct, indirect and induced effects, the CGEs can also account for displacement effects in factor and product markets, deadweight effects, primary and secondary and intended and unintended effects, while estimated impacts also take into account gains/losses in allocative efficiency.

A simple, static CGE model can be utilized for the ex-post assessment of the rural development policy impacts in an economy. However, a weakness of the static approach is that it cannot take into account that development policies are often implemented in a phased manner over time, and usually take several years to full effect. More fundamentally, they are often aimed at increasing the capacity

<sup>83</sup> For details, see Psaltopoulos et al. (2011; 2012), Phimister et al. (2014) and Espinosa et al. (2014) for CGE; Metis/WIFO/AEIDL (2014), Michalek (2012) and Becker et al. (2012) for PSM; and Metis/WIFO/AEIDL (2014), Psaltopoulos et al. (2011), Mayfield and van Leeuwen (2005) and Mattas (2001) for IO.

<sup>84</sup> Such as the Recursive-Dynamic CGE model developed by Thurlow (2008) and applied to the assessment of Pillar 1 and 2 economic impacts by (amongst others), Psaltopoulos et al. (2011; 2012) and Espinosa et al. (2014). Also, the Recursive-Dynamic MAGNET CGE model (Woltjer et al., 2014) which uses the GTAP database and has been used to assess the economic impacts of agricultural, trade, land use and biofuel policies.

of an economy through investment. A static model can be extended by allowing period-to-period updating of key parameters, either endogenously or exogenously, and then solved recursively in each period. In this way, it is possible to generate a dynamic time path for model shocks and allow adjustment processes to be incorporated. Consequently, time paths can be assessed to new equilibrium.

In this case, the model baseline should be set at 2013, which is the year preceding the 2014-2020 programming period. The horizon of the ex-post impact assessment could vary in accordance to the focus of the evaluation. If the CGE approach is used for the AIR in 2019, then the impact assessment horizon can be limited to 2019. In the case of the RDP's ex-post evaluation, the horizon can be extended up to 2025 or even 2028.



#### **QUICK GUIDE #15: How to apply the CGE model for the assessment of the socio-economic impacts (I.14, 1.15, 1.16)?**

**Step 1:** Construct the model with appropriate data

**Step 2:** Calibrate the dynamic CGE model

**Step 3:** Control model dynamics with appropriate adjustments

**Step 4:** Estimate the impact indicators with appropriate additional data

*Find out more about this evaluation approach in the Technical Annex (chapter 4.7).*

#### 2.9.4 Approach A2 - Propensity Score Matching

The Propensity Score Matching (PSM)<sup>85</sup> methodology can be applied to the estimation of RDP measures impacts on Impact indicators I.14, I.15 and I.16 at the level of rural areas within RDP<sup>86</sup>. Generalised Propensity Score Matching (GPS) is the extension of binary PSM in case almost all units or all units are supported by the RDP<sup>87</sup>.

This approach uses a quasi-experimental technique which based on counterfactual analysis involving the comparison of rural territories<sup>88</sup>.

Steps to conduct the Approach A2 are described in in boxes: "How to construct the control groups" (related to 2<sup>nd</sup> layer) and "How to assess the RDP net effects (related to 3<sup>rd</sup> layer) in chapter 2.1.

#### 2.9.5 Approach B – Input-Output analysis

The Input-Output (IO) analysis<sup>89</sup> is a quantitative technique for studying the interdependence of the producing and consuming units within an economy. Compared to Approaches A and B, the IO is certainly a second-best option. IO is based on linear relationships and this can lead to an

<sup>85</sup> For more information also read the chapter 2.1

<sup>86</sup> Michalek (2012); Becker et. al (2012).

<sup>87</sup> Guideliens for ex post evaluation of RDPs 2007-2013 , chapter 4.

<sup>88</sup> Lokshin and Yemtsov (2005); Michalek (2008).

<sup>89</sup> See Metis/WIFO/AEIDL (2014); Psaltopoulos et al. (2011); Mattas (2001);

overestimation of policy impact estimates. An IO table identifies the major industries in an economy and the financial flows between them over a stated time period (usually a year). It indicates the sources of each sector's inputs, which are purchased from the same or other sectors in the economy, imported, or earned by labour (household's wages and salaries). It also provides a breakdown for each sector's output, which can be sales to other industries and to final demand (household consumption, government consumption, capital formation, and exports). The interdependence between the individual sectors of the given economy is normally described by a set of linear equations, representing fixed shares of input in the production of each output.

IO does not embody counterfactual analysis and a separate exercise is needed in order to capture net effects.

In contrast to CGE, the IO is a much less demanding as regards the data and analytical skills needed for model-building and policy shocks. Therefore, it could possibly serve the requirements of the AIR in 2019. On the other hand, the restrictive underlying assumptions of IO (e.g. fixed input structure; unlimited capacity of primary factors to each and every sector; no price effects in the system) result in an overestimation of policy impacts. This makes the IO analysis hardly relevant for the more demanding requirements of the Ex-Post evaluation.



#### **QUICK GUIDE #16: How to apply the Input-Output analysis in the assessment of socio-economic impacts (I.14, I.15, I.16)?**

**Step 1:** *Construct the model with appropriate data*

**Step 2:** *Select counterfactual option and micro-level method*

**Step 3:** *Estimate the policy impacts*

**Step 4:** *Estimate the impact indicators with appropriate additional data*

In case qualitative methods are used for counterfactual assessment the following steps are recommended:

**Step 1:** *Select the regions as suggested for the quantitative methods*

**Step 2:** *Select the RDP measures as they are depicted in the RDP intervention logic*

**Step 3:** *Select the indicators to be assessed with the MAPP*

**Step 4:** *Select the participants - representatives of beneficiaries and non-beneficiaries*

**Step 5:** *Select the tools from the range of MAPP tools*

**Step 6:** *Report on MAPP results*

*Learn more about this evaluation approach in the Technical Annex (chapter 4.7).*

## 2.9.6 Dos and don'ts



### Dos

- Map available data and subsequently decide the model structure.
- Draw a line (cost/benefit) of searching for and utilizing model construction data.
- Make sure that data on the measures' financial flows become available with the model-specific suitable detail.
- Fill data gaps through clear and transparent assumptions declared in your report.
- Classify the CGE model components and specify the model structures according to RDP measures' priorities.
- Build systematic data bases specific to the model construction and measures' financial flows.

### Don'ts

- Forget to check for data availability before deciding which method to apply.
- Omit contacting the rural development experts and getting assistance on economic structures and on the interpretation of findings.



## EUROPE 2020

### Related Evaluation Questions

CEQ 22	“To what extent has the RDP contributed to achieving the EU 2020 headline target of raising the employment rate of the population aged 20-64 to at least 75%?”
CEQ 24	“To what extent has the RDP contributed to climate change mitigation and adaptation and to achieving the EU 2020 headline target of reducing greenhouse gas emissions by at least 20% compared to 1990 levels, or by 30% if the conditions are right, to increasing the share of renewable energy in final energy consumption to 20%, and achieving 20% increase in energy efficiency?”
CEQ 25	“To what extent has the RDP contributed to achieving the EU 2020 headline target of reducing the number of Europeans living below the national poverty line?”
CEQ 23	“To what extent has the RDP contributed to achieving the EU 2020 headline target of investing 3% of the EU’s GDP in research and development and innovation?”

## 2.10 EU 2020 Strategy

### 2.10.1 Setting up the frame for the assessment

#### Intervention logic

RDPs are expected to contribute to the five EU headline targets<sup>90</sup>, each corresponding to the EU 2020 Strategy<sup>91</sup> priorities<sup>92</sup>:

**Smart growth** - 3% of the EU's GDP should be invested in R&D:

- By investing in the competitiveness of agriculture and forestry, the RDP also contributes to the **R&D headline target** and to smart growth. This is assessed by answering **CEQ no. 23**.
- In addition, the competitiveness objective of the CAP together with all other CAP objectives contributes to smart growth by contributing to innovation as a cross-cutting priority. This is assessed by answering CEQ no. 30. For assessing the overall contribution of the RDP to smart growth, the evaluator is advised to combine the answers of both CEQs.
- Competitiveness is in turn fostered through the effects of the measures and sub-measures under the RD Priorities 1, 2 and 3 and the related focus areas. The corresponding impact indicators (I.01, I.02, I.03), target and result indicators measure this effect. Indirect effects on competitiveness may arise from the measures and sub-measures programmed under other focus areas and priorities of the RDP, from programme synergies, TA and NRN activities.

**Sustainable growth** - The “20/20/20” climate/energy targets should be met (including an increase to 30% of emission reduction if the conditions are right):

- The RDP contributes to the **“20/20/20” climate/energy headline target** and hence to sustainable growth through the contribution to the CAP objective of ensuring the sustainable management of natural resources, and climate action. This is assessed by answering **CEQ no. 24**.
- The RDP contributes to the **biodiversity headline target** and hence to the EU2020 biodiversity strategy through the contribution to the CAP objective of ensuring the sustainable management of natural resources, and climate action. This is assessed by answering **CEQ no. 26**.

For both headline targets, the sustainable management of natural resources, and climate action is in turn ensured through the effects of measures and sub-measures under the RD Priorities 1, 4 and 5 and the related focus areas. This is measured with the corresponding impact indicators (I.07, I.08, I.09, I.10, I.11, I.12, I.13), target and result indicators. Also in this case, indirect effects on the sustainable management of natural resources and climate action may arise from measures and sub-measures programmed under other focus areas and priorities of the RDP, from programme synergies, TA and NRN activities.

**Inclusive growth** - 75% of the population aged 20-64 should be employed, and 20 million less people should be at risk of poverty, both corresponding to the EU2020 strategy priority of inclusive growth:

- The RDP contributes to the **employment creation and poverty reduction headline targets** and hence to inclusive growth through the contribution to the CAP objective of balanced territorial development. This is assessed by answering **CEQ no. 22** (related to employment) and **CEQ no. 25** (related to poverty reduction).

<sup>90</sup> There is also the EU2020 headline target related to early school leaving 'The share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree'. There is however, no expected explicit contribution of RDPs to this headline target nor any evaluation questions related to it.

<sup>91</sup> [https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/european-semester/framework/europe-2020-strategy\\_en](https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/european-semester/framework/europe-2020-strategy_en)  
<http://ec.europa.eu/eurostat/web/europe-2020-indicators>

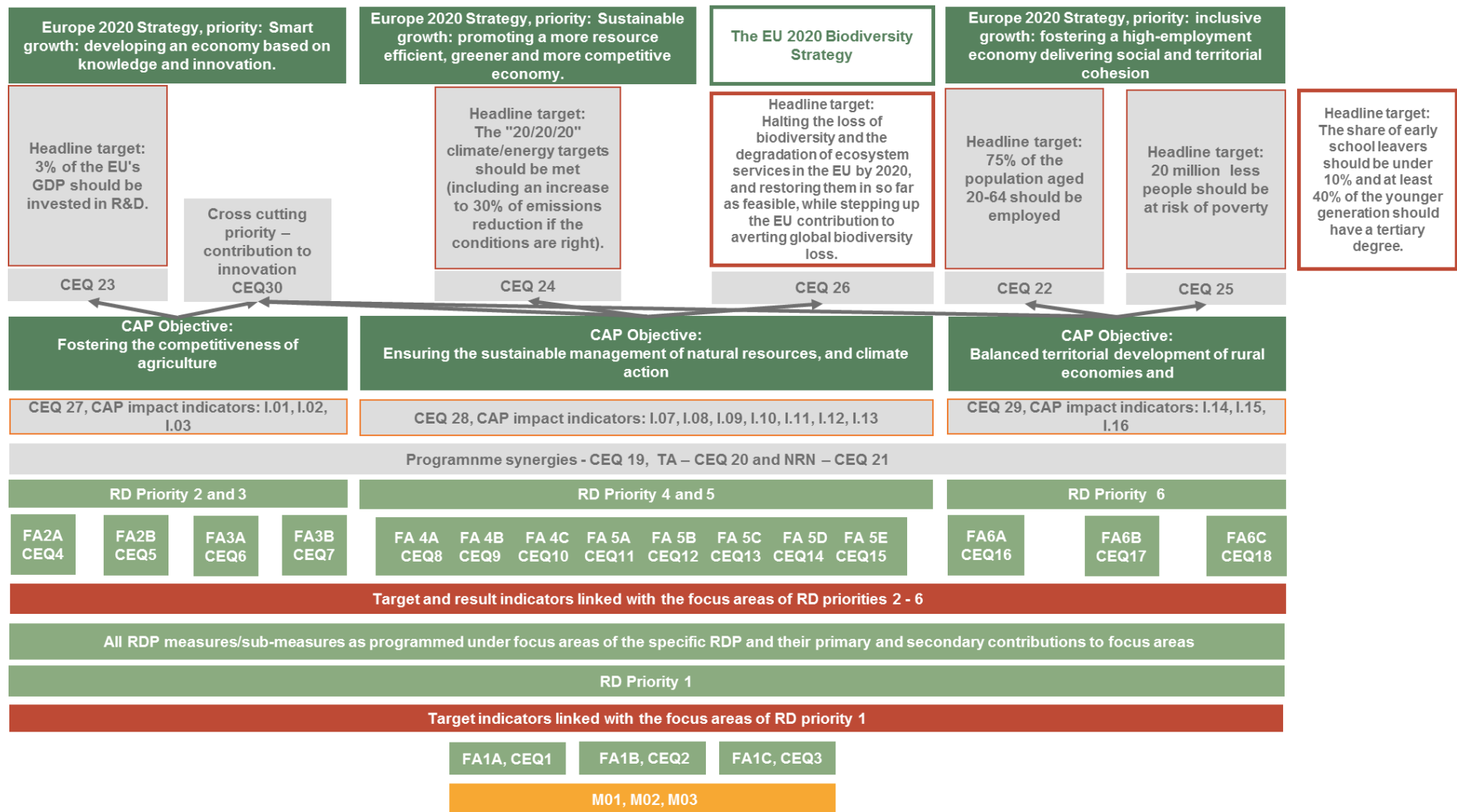
<sup>92</sup> Information on the progress of each Member State towards the headline targets as well as the EU and national targets can be found here: <http://ec.europa.eu/eurostat/web/europe-2020-indicators/europe-2020-strategy/headline-indicators-scoreboard>



- For both headline targets, balanced territorial development is in turn achieved through the effects of measures and sub-measures under priority 6 and related focus areas. This is measured with the corresponding impact (I.14, I.15, I.16) and target and result indicators. Indirect effects on balanced territorial development may arise from measures and sub-measures programmed under other focus areas and priorities of the RDP, from programme synergies, TA and NRN activities.

The figure 18 below illustrates the above described intervention logic of the EU2020 Strategy headline targets linked to the CAP Pillar II policy.

Figure 18. Intervention logic of the EU 2020 Strategy headline targets as linked with the CAP Pillar II policy



Source: European Evaluation Helpdesk for Rural Development (2018)

## Indicators

For answering the CEQs no. 22 to 26 linked to the EU 2020 and the biodiversity strategy headline targets<sup>93</sup>, the Working Paper “Common evaluation question for RDPs 2014-2020” suggests to use both the common CAP impact indicators/complementary result indicators as well as collected additional information. The present guidelines propose additional indicators linked to either headline as which is useful to answer the respective CEQs.

The list of indicators to answer the CEQ no. 22 – 26 can also be found the fiches in PART III of the guidelines. The overview of common CAP impact indicators and additional indicators to answer the above-mentioned CEQ are describe in the Technical Annex, chapter 4.8.

## Unit of analysis

The unit of analysis for the assessment of the contribution to the EU 2020 strategy is the **RDP territory**, since the entire RDP is expected to contribute to the respective headline target.

### 2.10.2 Choosing evaluation approaches

A general approach for assessing each headline target is described in the following:

**1. Assess the RDP potential for addressing the EU headline target** and understand how the RDP is constructed to address each of the EU 2020 headline targets:

- Understanding the intervention logic of the CEQ for the headline target, including the focus areas and measures that may contribute to it;
- Screening the RDP measures related to the headline target (as identified in the intervention logic of each indicator) for their potential to contribute to the headline target. The screening concerns the design of the individual measures and their combination under the focus areas from the point of view of their ability to contribute to the headline target;

The outcome of this screening informs on which RDP individual measures, sub-measures, and their combination under the FA can contribute to the headline target. This is taken into account for comparing the potential with the actual achievements of the RDP in contributing to the headline target.

**2. Assess the actual contribution of the RDP to the headline target** by:

- Reviewing the common evaluation elements (judgment criteria and indicators) and complementing them with additional ones if necessary;
- Obtaining the values of the common impact indicators using the methods already described in previous chapters;
- Calculating the values of the additional indicators using the methods described here in this chapter;
- Combine the values of common and additional indicators to assess the overall contribution to the headline target.

<sup>93</sup> [Working paper: Common Evaluation Questions for RDPs 2014-2020](#)

### 2.10.3 Approaches for the assessment of the headline target for employment

#### Assessment of the RDP potential to address the EU headline target linked to CEQ no. 22

The following approach is suggested:

► **Understanding the Intervention logic linked to CEQ no. 22<sup>94</sup>.** To what extent has the RDP contributed to achieving the EU 2020 headline target of raising the employment rate of the population aged 20-64 to at least 75%?’

The headline target is linked to the EU2020 strategy priority for inclusive growth. There is a clear need to foster a high employment economy and many of the measures proposed in the EU2020 strategy will do this. The Commission proposes a target of at least 75% employment rate. The RDP contributes to this target through the contribution to the CAP objective on balanced territorial development. Priorities 2 and 6 include focus areas whose operations can support an increase in employment, notably FA 2B, FA 6A and FA 6B, while Priorities 1 and 3 also have indirect contributions to employment creation through FA 1A, FA 1C and FA 3A. All RDP measures/sub-measures under these focus areas which contribute to employment creation should be taken in consideration as part of the intervention logic linked to CEQ no. 22.

► **The screening of the RDP measures related to the headline target** for their potential to create employment can be done by looking at how measures are designed to create employment. To carry out the screening, we propose a simple approach that consists of answering some key questions covering the following topics:

- How is the design of the measure/sub-measure addressing the underlying needs related to employment in rural areas;
- To what extent does the measure/sub-measure aim to create employment and how is it expressed in the formulation of the measure/sub-measure’s objective;
- How does the foreseen delivery system of the measure/sub-measure (eligibility of actions and costs, selection criteria, measure budgets etc.) support employment creation;

**The outcome of the screening** will be a description of how each measure and sub-measure plans to contribute to employment creation. The measures and sub-measures that are designed to contribute to employment will be used in the second step below.

#### Assessment of the actual contribution of the RDP to the headline target linked to employment

The following approach is suggested:

► **Review the common evaluation elements** for answering CEQ no. 22 including data needs and sources for the indicators (table 11):

- Rural employment rate – CAP impact indicator I14 (thinly populated areas as a proxy for rural areas)
- Employment rate of the population aged 20-64 – additional headline target indicator (national level)

<sup>94</sup> See also the PARTIII: fiche for answering CEQ no. 22, 1st step.

Table 11. Judgment criteria, indicators and data suggested to answer CEQ no. 22

Judgement criteria	Indicators	Data needs	Data sources
The rural employment rate of population aged 20- 64 has increased	Rural employment rate – CAP impact indicator I14 (see chapter 2.9 of PART II)  Employment rate of the population aged 20-64	(Same data needs as for I14)  Data on employment rate of the population aged 20-64	RDP monitoring system  Eurostat (LFS series, employment by sex, age and economic activity)  National/regional statistics  Survey

- ▶ **Calculate the I.14 indicator** according to the methodology described in chapter 2.9.
- ▶ **Conduct a survey** for the additional headline target indicator, with the beneficiaries of the measures which are supposed to contribute to the headline target based on the above screening. The survey should be conducted with beneficiaries and non-beneficiaries on the creation of employment. Here there are the following possibilities:
  - In case the RDP monitoring system collects data on the number of newly employed/maintained jobs for RDP beneficiaries, the evaluator can use this data as a starting point and then estimate the contribution to the headline target in a qualitative way through the survey.
  - In case the RDP monitoring system does not collect data on employment for the headline target, the survey will be used to collect information from beneficiaries and non-beneficiaries.
  - In both cases, the findings from the survey (RDP contribution) will be compared with the total employment figure provided by Eurostat (on employment by economic activity, focusing on agriculture, forestry and fishing activity as a proxy for the rural development sector<sup>95</sup>).
- ▶ Following the survey, the **assessment of the RDP contributions** towards the headline target shall be constructed as follows:
  - Use the value of the indicators with the methodologies provided above to give a numeric answer to the evaluation question. For example, the rural employment rate was x% in 2018, which represents an increase/decrease of y% from 2014, as a result of the RDP interventions. As a consequence, the RDP contributes to the headline target by y%.
  - Information collected via qualitative methods can be used to assess the factors that contributed to the change in the employment rate. For instance, the entry into the labour market in rural areas of young farmers or the range of diversification activities, etc.
  - Additional information through discussions with MAs and other programme stakeholders and experts can give more insights into the actual contribution of the RDP to employment and the main factors that influence this contribution. It is proposed to use structured interviews to this end to validate and analyse the findings from the quantitative methods applied.

<sup>95</sup> Eurostat, LFS series, employment by sex, age and economic activity in thousands per country per year.

#### 2.10.4 Approaches for the assessment of the headline target for climate/energy

##### Assessment of the RDP potential to address the EU headline target linked to CEQ no. 24

The following approach is suggested:

► **Understanding the intervention logic linked to CEQ no. 24**<sup>96</sup>: ‘To what extent has the RDP contributed to achieving the EU 2020 headline target of reducing greenhouse gas (GHG) emissions by at least 20% compared to 1990 levels, or by 30% if the conditions are right, to increasing the share of renewable energy in final energy consumption to 20% and achieving 20% increase in energy efficiency?’.

The headline target is linked to the EU2020 strategy priority “Sustainable growth: promoting a more resource efficient, greener and more competitive economy”. The RDP contributes to this target through the contribution to the CAP objective on “Ensuring the sustainable management of natural resources and climate action”. Priority 5 includes focus areas whose operations can support increasing efficiency in energy use in agriculture and food processing (FA 5B), facilitating the supply and use of renewable sources of energy, of by-products, wastes and residues and of other non-food raw material, for the purposes of the bio-economy (FA 5C) and reducing greenhouse gas and ammonia emissions from agriculture (FA 5D) while fostering carbon conservation and sequestration in agriculture and forestry (FA 5E). Focus Area 5A and Priority 4 also have indirect contributions to the headline target through reducing energy demands and GHG emissions for irrigation and increasing carbon sequestration from managing agriculture and forests for biodiversity. All RDP measures/sub-measures under these focus areas which contribute to reducing energy demands and increasing the capacity of managed lands to carbon sequestration should be taken into consideration as part of the intervention logic linked to CEQ no. 24.

► **The screening of the RDP measures related to each one of the sub-targets of the headline target** for their potential to reduce GHG emissions, to increase the share of renewables and increase energy efficiency can be done by exploring how each measure is designed to achieve the target. This exploration and screening can be achieved by answering some key questions covering the following topics:

- How is the design of each measure/sub-measure addressing the underlying needs related to each of the sub-targets in rural areas;
- To what extent does the measure/sub-measure aim to achieve the sub-targets and how it is expressed in the formulation of the measure/sub-measure’s objective;
- How does the foreseen delivery system of the measure/sub-measure (eligibility of actions and costs, selection criteria, measure budgets etc.) support achieving the sub-targets of GHG emission reduction and of renewable energy and energy efficiency increase;

► **The outcome of the screening** will be a description of how each measure and sub-measure plans to contribute to each one of the sub-targets. The measures and sub-measures that are designed to contribute to each one of the sub-targets will be used in the second step below.

##### Assessment of the actual contribution of the RDP to the headline target linked to climate/energy

The following approach is suggested:

► **Review the common evaluation elements** for answering CEQ no. 24, the data needs and sources (see table 12):

<sup>96</sup> See also the PARTIII: fiche for answering the CEQ no. 24, 1st step.

- Emissions from agriculture – CAP Impact Indicator I.07
- Additional headline target indicators on increasing the share of renewable energy in final energy consumption
- Additional headline target indicators on increasing energy efficiency

**Table 12. Judgment criteria, indicators and data suggested to answer CEQ no. 24**

Judgement criteria	Indicators	Data needs	Data sources
Climate change has been mitigated and the agricultural, forestry and food sector has been adapted	<p>Indicators on GHG and ammonia emissions together with LULUCF indicator (See chapter 2.3 of PART II)</p> <p>Increase in efficiency of energy use in agriculture and food processing in RDP supported projects (FA 5B - Complementary result indicator) (see <a href="#">Annex 11 of guidelines “Assessment of RDP impacts”</a> fiche for answering the CEQ 12”)</p> <p>Renewable energy produced from supported projects (FA 5C - Complementary result indicator) (see <a href="#">Annex 11 of guidelines “Assessment of RDP impacts”</a> fiche for answering the CEQ 13”)</p> <p>Additional indicators (see table 7 chapter 2.3 of PARTII)</p>	See data needs for each one of the sub-targets indicators below	See data sources for each one of the sub-targets indicators below
GHG and ammonia emissions have been reduced	See the chapter 2.3 of PART II	See chapter 2.3 of PART II	See chapter I.3 of PART II

Judgement criteria	Indicators	Data needs	Data sources
The use (and production) of renewables has increased	<p>Renewable energy produced from supported projects (FA 5C - Complementary result indicator) ) (see <a href="#">Annex 11 of guidelines “Assessment of RDP impacts”</a> fiche for answering the CEQ 13”)</p> <p>share (%) of renewable energy in final energy consumption</p> <p>Production of renewable energy from agriculture and forestry (<a href="#">Common context indicators fiches</a>, C.43)</p> <p>share of renewable energy from agriculture and forestry as of total renewable energy production</p>	<p>Data on shares of use of renewables in final energy consumption</p> <p>Data on shares of production of renewables in total renewable production</p>	<p>Eurostat - national values with a 2 years delay at: <a href="http://ec.europa.eu/eurostat/web/products-datasets/-/t2020_31&amp;lang=en">http://ec.europa.eu/eurostat/web/products-datasets/-/t2020_31&amp;lang=en</a></p> <p>Eurostat: Energy Statistics, Table nrg_107a <a href="http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do">http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do</a></p> <p>(Agri-environmental Indicator No. 24 – Renewable energy production)</p> <p>RDP monitoring data and complementary indicators R15/T16</p>
Energy efficiency has increased	<p>Increase in efficiency of energy use in agriculture and food processing in RDP supported projects (FA 5B - Complementary result indicator) (see <a href="#">Annex 11 of guidelines “Assessment of RDP impacts”</a> fiche for answering the CEQ 12”)</p> <p>% increase in energy efficiency</p> <p>Energy use in agriculture, forestry and food industry (<a href="#">Common context indicators fiches</a>, C.44)</p> <p>Direct use of energy per ha of UAA (<a href="#">Agri-environmental Indicator No. 8 – Energy Use</a>)</p>	<p>Data on energy consumption</p> <p>Energy use in agriculture and the sum of UAA and forest area from the corresponding farm structure survey</p>	<p>Eurostat energy saving statistics at: <a href="http://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_saving_statistics">http://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_saving_statistics</a></p> <p>Divide Energy use in agriculture by the sum of UAA and forest area from the corresponding farm structure survey</p> <p>RDP monitoring data and complementary indicators R14/T15</p>

► **Calculate the I.07 indicator** according to the methodology described in chapter 2.3. This will provide both the RDP’s gross and net effect on reducing GHG and ammonia emissions from agriculture.

► **Calculate the Additional indicators** according to the methodology described in CEQ no. 24. This, in relation to the complementary result indicators R14/T15 and R15/T16, will provide the RDP’s gross contribution as concerns increase in energy efficiency and renewable energy produced correspondingly.

► **Address the issue of data scarcity** and of not having netted out the RDP effects on energy efficiency and production of renewables because they are not supported by relevant impact indicators. Is there a scope to collect more data?



The decision to collect more data should take account of the available monitoring data and the expert's knowledge of the situation in the RDP territory. Is there a substantial number of beneficiaries? Is the contribution of supported projects substantial for energy efficiency or renewables energy production? Have similar projects been undertaken from non-supported farm holdings? If the number of beneficiaries is adequate (e.g. more than 20) and/or their gross contribution to renewable energy production from agriculture is substantial (e.g. a contribution of more than 10% of the total renewable energy produced from the agricultural sector) or if similar projects are undertaken by non-supported holdings, then there is scope for a survey that will net out the RDP effects. If the decision is to conduct a survey, then the evaluator should follow the methodology suggested for netting out impact indicator I.07 or follow any other sound methodology that will make better use of survey data or other available data.

► Following the estimation of I.07 and of additional headline indicators, **the assessment of the RDP contributions** towards the headline target can be constructed as follows:

- Use the value of the indicators estimated with the regression and matching techniques suggested for I.07 to give a numeric answer to the evaluation question. For example:
    - The RDP has contributed to the reduction of GHG emissions by x% (compared to the start of the programming period).
    - The RDP has contributed to the reduction of ammonia emissions by x%
    - The RDP has contributed to the increase in carbon sequestration from Land Use Land Use Change and Forestry (LULUCF) by % (compared to the start of the programming period).
    - Relative decreases in energy use are due to RDP efforts as indicated by complementary result indicators R14/T15 and the additional indicator on energy use in agriculture
    - The RDP has contributed to the gross (or net) increase of renewable energy production by x% (compared to the start of the programming period). Hence, the RDP has contributed to renewable energy been increased by the figures captured by complementary result and target indicators R15/T16 or those estimated by netting out the impact.
  - Information collected via qualitative methods such as focus groups, Delphi or MAPP used for the calculation of indicator I.07 but also for indicators that are indirectly linked to CEQ no. 24 such as water abstraction (I.10) or soil erosion (I.13) can be used to assess the factors that contributed to energy savings (water abstraction is a major energy consumer) or carbon sequestration (soil is the largest carbon sink).
- The evaluation for the headline target in the part that concerns with climate change, addresses only the reduction in GHG emissions and mitigation actions. However, major efforts are undertaken by RDPs towards the **adaptation** of agriculture to forecasted climate change and for this reason the judgment criteria also address adaptation. Adaptation activities are not easily quantified; the evaluator can explore various RDP actions that were related to adaptation. This exploration and screening can be achieved by reviewing topics like:
- Resource use and conservation activities (e.g., reduction of water abstraction, protection from soil erosion) have targeted climate change hotspots of the RDP's territory (especially taking account of droughts and floods)
  - Support to water management infrastructure has taken account of climate change scenarios to prioritize investment
  - Support to conservation and sustainable use and development of genetic resources in agriculture has taken account of climate change resilient or climate change adapted local varieties or of the biological control of invasive species due to climate change

- Climate change hotspots have been targeted for soil conservation practices (especially erosion and loss of organic matter)

### 2.10.5 Approaches for the assessment of the headline target for poverty

#### Assessment of the RDP potential for addressing the EU headline target linked to CEQ no. 25<sup>97</sup>

The following approach is suggested:

► **Understanding the Intervention logic linked to CEQ no. 25<sup>98</sup>:** “To what extent has the RDP contributed to achieving the EU2020 headline target of reducing the number of Europeans living below the national poverty line?”.

The headline target is linked to the EU2020 strategy priority for inclusive growth. There is a clear need to reduce the risk of poverty and social exclusion rates and the RDP contributes to this target through the contribution to the CAP objective on balanced territorial development. Priorities 1, 2, 3 and 6 includes focus areas with direct and indirect impacts on poverty reduction. For instance, FA 1C contributes to improved skills and therefore employability and this directly influences social exclusion. FA 2A and FA 2B directly influence employment which in turn reduces poverty and social exclusion. Competitiveness improvements through FA 3A influence incomes which in turn have an effect on poverty reduction. FA 6A and FA 6C contribute to employment and accessibility respectively and therefore to the reduction of poverty. Finally, FA 6B is the one most directly linked to the objective of reducing poverty and social exclusion. All RDP measures/sub-measures under these focus areas which contribute to poverty reduction should be taken in consideration as part of the intervention logic linked to CEQ no. 25.

► **The screening of the RDP measures related to the headline target** for their potential to reduce poverty and social exclusion can be done by looking at how measures are designed to this end. To carry out the screening, we propose the same approach as for CEQ no. 22, that consists of answering some key questions covering the following topics:

- How is the design of the measure/sub-measure addressing the underlying needs related to poverty reduction and social inclusion in rural areas;
- To what extent does the measure/sub-measure aim to reduce poverty and how it is expressed in the formulation of the measure/sub-measure’s objective;
- How does the foreseen delivery system of the measure/sub-measure (eligibility of actions and costs, selection criteria, measure budgets etc.) support the alleviation of poverty;

► **The outcome of the screening** will be a description of how each measure and sub-measure is envisaged to contribute to poverty reduction and social inclusion. These measures and sub-measures will be used in the second step described below.

#### Assessment of the actual contribution of the RDP to the headline target linked to poverty

The following approach is suggested:

► **Review the common evaluation elements** for answering CEQ no. 25 and data needs and sources for indicators:

- Degree of rural poverty – CAP impact indicator I.15 (thinly populated areas as a proxy for rural areas)
- Number of people at risk of poverty and social exclusion – additional headline target indicator (rural areas, national level)

<sup>97</sup> Also see PARTIII, fiche for answering the CEQ no. 25, 1st step

<sup>98</sup> Also see PARTIII, fiche for answering the CEQ no. 25, 1st step

**Table 13. Judgment criteria, indicators and data suggested to answer CEQ no. 25**

Judgement criteria	Indicators	Data needs	Data sources
The number of people living below the national poverty rate has decreased	Degree of rural poverty – CAP impact indicator I.15 (Chapter 2.9 of PART II)  Number of people at risk of poverty and social exclusion (the <b>AROPE</b> indicator of Eurostat)	(Same data needs as for I.15)  Data on people at risk of poverty and social exclusion	RDP monitoring system  Eurostat (income and living conditions series, risk of poverty and social exclusion by degree of urbanisation)  National/regional statistics  Survey

- ▶ **Calculate the I.15 indicator** according to the methodology described in chapter 2.9.
- ▶ **Conduct a survey** for the additional headline target indicator, with the beneficiaries of the measures which are supposed to contribute to the headline target based on the above screening. The survey should be conducted with beneficiaries and non-beneficiaries. The content of the survey should address questions that make up the definition of AROPE (the Eurostat indicator for the risk of poverty and social exclusion), notably:
  - Income poverty
  - Severe material deprivation
  - Living in households with very low work intensity
- ▶ **Compare the survey with Eurostat data.** The findings from the survey will be compared with the AROPE numbers in rural areas (degree of urbanisation allows the disaggregation of data into rural areas). The former (RDP survey) provides the figures for the RDP contribution and the latter (AROPE) provides the total figures at national level.
- ▶ Following the survey, the **assessment of the RDP contributions** towards the headline target shall be constructed as for CEQ no. 22, with specificities including:
  - A numeric answer to the CEQ no. 25, for example, x number of people were at risk of poverty and social inclusion in 2018 compared to y number in 2014 as result of the RDP. As consequence, the RDP has contributed to the headline target by reducing the number of Europeans living at risk of poverty by x thousand/million.
  - Information collected via qualitative methods used for the calculation of the indicators can be used to assess the factors that contributed to the change in the at risk of poverty numbers or rates. For instance, the improvement in skills has created new job opportunities for farmers or local development strategies have supported the integration of disadvantaged groups, etc.
  - Additional information through discussions with MAs and other programme stakeholders and experts can give more insights into the actual contribution of the RDP to poverty reduction and the main factors that influence this contribution.

#### 2.10.6 Approaches for the assessment of the headline target for biodiversity

#### Assessment of the RDP potential to address the EU headline target linked to CEQ no. 28

The following approach is suggested:

► **Understanding the Intervention logic linked to CEQ no. 26<sup>99</sup>:** “To what extent has the RDP contributed to achieving the EU 2020 headline target of improving the environment and of achieving the EU Biodiversity strategy target of halting the loss of biodiversity and the degradation of ecosystem services, and to restore them?”.

The headline target is linked to the EU Biodiversity Strategy that aims to halt the loss of biodiversity and ecosystem services in the EU and help stop global biodiversity loss by 2020. The strategy reflects the commitments taken by the EU in 2010, within the international Convention on Biological Diversity. The strategy’s 2050 vision is that “by 2050, European Union biodiversity and the ecosystem services it provides — its natural capital — are protected, valued and appropriately restored for biodiversity’s intrinsic value and for their essential contribution to human wellbeing and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided<sup>100</sup>. Target 3 of the EU’s Biodiversity Strategy is to “Achieve more sustainable agriculture and forestry”. Within Target 3, RDP is directly related to Action 9 “Better target Rural Development to biodiversity conservation” and more specifically to Action 9a: “The Commission and Member States will integrate quantified biodiversity targets into Rural Development strategies and programmes, tailoring action to regional and local needs” and Action 9b: “The Commission and Member States will establish mechanisms to facilitate collaboration among farmers and foresters to achieve continuity of landscape features, protection of genetic resources and other cooperation mechanisms to protect biodiversity”.

The RDP contributes to this target through the contribution to the CAP objective on “Ensuring the sustainable management of natural resources and climate action”. Priority 4 on “Restoring preserving and enhancing ecosystems related to agriculture and forestry” and especially its Focus Area 4A (FA 4A) on “Restoring, preserving and enhancing biodiversity, including in Natura 2000 areas, and in areas facing natural or other specific constraints, and high nature value farming, as well as the state of European landscapes” are specifically designed to achieve this target. Since the very existence of ecosystems depends on the status, quantity and quality of natural resources, and especially of water and soil, FA 4B and FA 4C on managing water and soil resources indirectly contribute to achieving the biodiversity target. In addition, since ecosystems will be affected by climate change any actions to mitigate and adapt also work, indirectly, towards achieving the biodiversity targets. All RDP measures/sub-measures under these focus areas which contribute to improving the environment and achieving the biodiversity targets should be taken into consideration as part of the intervention logic linked to CEQ no.26.

► **The screening of the RDP measures related to the biodiversity target** can be achieved by exploring how each measure is designed to achieve the target. This exploration and screening can be achieved by answering some key questions covering the following topics:

- How is the design of each measure/sub-measure addressing the underlying needs of the biodiversity strategy in rural areas;
- To what extent does the measure/sub-measure aim to achieve the targets and how it is expressed in the formulation of the measure/sub-measure’s objective;
- How does the foreseen delivery system of the measure/sub-measure (eligibility of actions and costs, selection criteria, measure budgets etc.) support achieving the biodiversity targets;

► **The outcome of the screening** will be a description of how each measure plans to contribute to the biodiversity targets. The measures and sub-measures that are designed to contribute to each one of the biodiversity targets will be used in the second step below.

<sup>99</sup> See also the PARTIII: fiche for answering CEQ no. 26, 1st step.

<sup>100</sup> The strategy can be retrieved at: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0244&from=EN>

## Assessment of the actual contribution of the RDP to the headline target linked to biodiversity

The following approach is suggested:

► **Review the common evaluation elements for answering CEQ no. 26** and data needs and sources for indicators (table 14):

The basic Impact Indicators for the Biodiversity Strategy:

- Farmland bird index (I.08)
- High Nature Value (HNV) farming (I.09)
- The proposed additional impact indicators
- The EU Biodiversity Indicators linked to Target 3A - Agriculture<sup>101</sup>
- The EU Biodiversity Indicators linked to Target 3B – Forestry

**Table 14. Judgment criteria, indicators and data suggested to answer CEQ no. 26**

Judgement criteria	Indicators	Data needs	Data sources
Biodiversity and ecosystems services have been restored	<p><u>Impact Indicators</u></p> <ul style="list-style-type: none"> <li>● Farmland bird index (I.08) (Chapter 2.4 of PARTII)</li> <li>● High Nature Value (HNV) farming (I.09) (Chapter 2.5 of PARTII)</li> </ul> <p><u>Additional Indicators</u></p> <ul style="list-style-type: none"> <li>● Number of flora and fauna species on contracted land (Chapter 2.4 and 2.5 of PARTII)</li> <li>● Number of farmland bird individuals(Chapter 2.4 and 2.5 of PARTII)</li> <li>● Singing males of corncrakes (example of individual bird species indicator) (Chapter 2.4 and 2.5 of PARTII)</li> <li>● Bumblebee indicator (Chapter 2.4 and 2.5 of PARTII)</li> </ul> <p>EU Biodiversity Indicators linked to Target 3A - Agriculture (<a href="#">Streamlining European Biodiversity Indicators</a>) (SEBI 01, 03, 05, 20)</p> <p>EU Biodiversity Indicators linked to FA 3A – forestry <a href="#">Streamlining European Biodiversity Indicators</a> (SEBI 01, 03, 05)</p>	<p>Data needs for Impact and Additional Indicators can be found in chapters 2.4 and 2.5of Part II and fiche for CEQ no. 26 of PART III</p> <p>SEBI Indicators are readily available at national level at: (<a href="#">Chapter 2.4 and 2.5 of PART II</a>) <a href="https://biodiversity.europa.eu/policy/eu-biodiversity-indicators-and-related-eu-targets-simplified-overview">https://biodiversity.europa.eu/policy/eu-biodiversity-indicators-and-related-eu-targets-simplified-overview</a></p>	<p>Data sources for Impact and Additional Indicators can be found in chapters 2.4 and 2.5 of Part II and fiche for CEQ no. 26 of PART III</p> <p>SEBI Indicators are readily available at national level. The national authorities and other national agencies responsible for collecting and reporting SEBI data usually aggregate regional data or have an informed guess of whether a region converges or diverges from its national average. Unpublished biodiversity records from academic and research institutions or NGOs may provide an alternative source of regional SEBI data.</p>
<b>Additional Judgment criteria, Indicators, Data Needs and Sources for the Biodiversity Target</b>			
Freshwater, riparian and coastal ecosystems are protected from agricultural activities as concerns abstraction (ecological flows) and pollution (GES - Good Ecological Status)	<p>Water abstraction (I.10)</p> <p>Water Quality – Gross Nutrient Balance (I.11)</p> <p>Water Quality – Nitrates Pollution (I.11)</p> <p>Ammonia emissions from agriculture (I.07)</p>	<p>See the chapters 2.6 and 2.3 of Part II and fiche for CEQ no. 28 of PART III</p>	<p>See the chapters 2.6 and 2.3 of Part II and fiche for CEQ no. 28 of PART III</p>

<sup>101</sup> <https://biodiversity.europa.eu/policy/eu-biodiversity-indicators-and-related-eu-targets-simplified-overview>

The EU Biodiversity Indicators for agriculture and forestry are composed of a) the Streamline European Biodiversity Indicators (SEBI) b) the European Environment Agency's Core Set Indicators (CSI) and c) the Agri-Environmental Indicators (AEI).

Judgement criteria	Indicators	Data needs	Data sources
Soil resources that are vital for ecosystem operation are protected and loss of soil resources is halted	Soil organic matter in arable land (I.12) Soil erosion by water (I.13)	See the chapters 2.7 and 2.8 of Part II and fiche for CEQ no. 28 of PART III	See the chapters 2.7 and 2.8 of Part II and fiche for CEQ no. 28 of PART III
Genetic resources in agriculture and forestry are protected from lost and conserved from genetic erosion.	List of local breeds in danger of being lost to farming and of plant genetic resources under threat of genetic erosion <sup>102</sup>	RDP Content	RDP Content

► **Calculate the I.08 and I.09 indicators** according to the methodology described in chapter 2.4. and 2.5. This will provide both the RDP's gross and net effects.

► **Calculate any additional or alternative indicator** according to the methodology described in chapter 2.4 and 2.5.

► **Compare the SEBI indicators with the Impact Indicator** on the Farmland Bird Index. Address the issue of SEBI at regional level. Certain SEBI indicators, and especially those proposed here, are very useful to reveal the importance of rural agricultural and forested areas for biodiversity. For example, the use of SEBI 01 disaggregates (at the national level) the Common birds population index to “All common birds”, “Common farmland birds” and “Common forest birds”. The fiche of SEBI 01<sup>103</sup> also provides valuable information for grassland butterflies.

► Following the estimation of the I.08 and I.09 and the additional headline indicators, the **assessment of the RDP contributions** towards the EU's Biodiversity Strategy shall be constructed by giving a numeric answer to the evaluation question. For example:

- The RDP has contributed to an increase in the Farmland Bird Index by % (compared to the start of the programming period). Hence, the RDP has contributed to an increase of the biodiversity indicator SEBI 1.
- The RDP has contributed to an increase in the Number of flora and fauna species on contracted land by %. Hence, the RDP has contributed an increase in biodiversity.
- The RDP has contributed to an increase in the Number of farmland bird individuals, e.g. singing males of corncrakes, by x (absolute or percentage). Hence, the RDP has contributed to an increase of biodiversity indicator SEBI 1.
- The RDP has contributed to an increase in the Bumblebee indicator by x%. Hence, the RDP has contributed to an increase of biodiversity indicators SEBI 1.
- The RDP has contributed towards reversing/supporting declining/increasing population trends of agriculture related butterfly species by x%. Hence, the RDP has contributed to an increase/sustain of biodiversity indicator SEBI 1.

► **Use simple GIS methods** to overlay RDP georeferenced data of support in Natura2000 with Natura2000 boundaries shapefiles to measure the extent of RDP intervention within Natura2000 in terms of percentage of agricultural or forest land supported by the RDP for biodiversity management. Natura2000 areas also are classified as Habitats or Birds Directives areas. An overlay can produce the percentage of agricultural and forest areas that are supported by each type (Habitats or Birds) of Natura2000 site. Following this estimation, the **assessment of the RDP contributions** towards the

<sup>102</sup>Annex I, Part I, point 8 of the content of RDPs of Regulation (EU) No808/2014.

<sup>103</sup><https://www.eea.europa.eu/data-and-maps/indicators/abundance-and-distribution-of-selected-species-6/assessment>

EU's Biodiversity Strategy shall be constructed by giving a numeric answer to the evaluation question<sup>104</sup>. For example:

- The RDP has contributed towards Birds Directive areas by supporting x% of their agricultural area and y% of their forest area
- The RDP has contributed towards Habitats Directive areas by supporting x% of their agricultural area and y% of their forest area.

► **Use all the relevant results of CEQ no. 28** that refer to water and soil to examine and support the argument that the RDP has protected and conserved water (the fundamental resource of freshwater, riparian and coastal ecosystems), halted the loss of soil (erosion) and supported the management of soil resources (organic matter and erosion) on which the terrestrial ecosystems are based. Following this estimation for CEQ no. 28, the **assessment of the RDP contributions** towards the EU's Biodiversity Strategy can be constructed by giving a numeric answer to the evaluation question. For example:

- Water abstraction from agriculture was reduced in %x of the RDP's watersheds supporting an ecological flow
- x% of water monitoring stations in RDP supported watersheds achieved Good Environmental Status (GES) and Good Chemical Status.
- x% of agricultural areas that are in risk of high erosion from water are within Natura2000 sites. From these areas y% was supported for soil management (including erosion)
- x% of areas supported for cover crops and residue management are in Natura2000 sites

► If the RDP targets **genetic resources** in agriculture and forestry (measures 10.2 and 15.2) then the RDP will have a list of local breeds that are in danger of being lost or in threat of genetic erosion. The evaluator can calculate how many of the species on the RDP's list have been protected and give a numeric answer to the evaluation question. For example:

- The RDP protected x local breeds from being lost and conserved from genetic erosion y number of species.

► It is very important when **addressing biodiversity strategy** issues to show how the RDP combated (or took account of) habitats and landscape fragmentation and promoted the continuation of landscape features. Use examples or case studies to show how established agri-environmental programmes have consolidated fragmented landscapes and have supported the continuation of the landscape. For example, cover crops, and residue management avoid landscape fragmentation during the year by avoiding leaving large fragments of bareland. Also, you may be able to refer to situations where the RDP restored the continuation between farmland and forest land or avoided the spread of fragmentation by adopting a smart design of infrastructure. Finally, there may be cases where the RDP or the CLLDs promoted the local and/or regional synergies among farmers and farm cooperatives, forest owners, conservation NGOs, municipal authorities, etc. for restoring landscape fragmentation

<sup>104</sup> Additional information to help the evaluator assess the extent at which the RDP has a presence in Bird and Habitats Directive areas in its territory. It addresses SEBI 20 and especially within protected areas. SEBI 20 is accessed at: <https://www.eea.europa.eu/data-and-maps/indicators/agriculture-area-under-management-practices/agriculture-area-under-management-practices-2>. For example, if there are georeferenced data, a conservationist would consider very helpful and appreciate an information stating whether an RDP intervened with conservation management measures to 30% or 3% of the agricultural areas in Habitats territories.

### 2.10.7 Dos and Don'ts



#### Dos

- Consult MAs for any monitoring data on headline targets (not only MA of RDP but also other operational programmes which relate to headline targets)
- Design carefully the questions/issues to be addressed prior to the screening of measures
- Consult rural development experts for advice on the structure and content of the survey
- Select comparable target groups for the survey
- Check definitions of Eurostat indicators/data to ensure there is comparability of information between surveys and Eurostat data
- Explore the existence of georeferenced data which might be of great help to assess the RDP contributions to headline targets
- Establish synergies with evaluators working on CEQs that address headline targets, e.g., CEQ no. 24, CEQ no. 28, etc.

#### Don'ts

- Spend time on screening all RDP measures, focus on the ones depicted in the intervention logic of each headline target
- Forget to use all available information, e.g. from the calculation of common impact indicators and additional indicators if you use them in assessment of impacts or answering CEQs - Do not reinvent the wheel!





## INNOVATION

### *Related Evaluation Questions*

CEQ 30	“To what extent has the RDP contributed to fostering innovation?”
CEQ 23	“To what extent has the RDP contributed to achieving the EU 2020 headline target of investing 3% of the EU’s GDP in research and development and innovation?”

## 2.11 Innovation

Innovation is a cross cutting priority of EU rural development policy of 2014-2020. It is expected that RDPs will foster innovation through various measures and sub-measures and that innovation will play a substantial role in achieving the rural policy objectives.

In this context, innovation is understood as a process which emerges from the interactions of actors in the innovation system. Therefore, the assessment of RDP contributions to innovation is not product but rather process oriented. The RDP can foster innovation through three pathways which mutually interact: a) nurturing innovative potential, b) building the capacity to innovate, c) building an enabling environment.

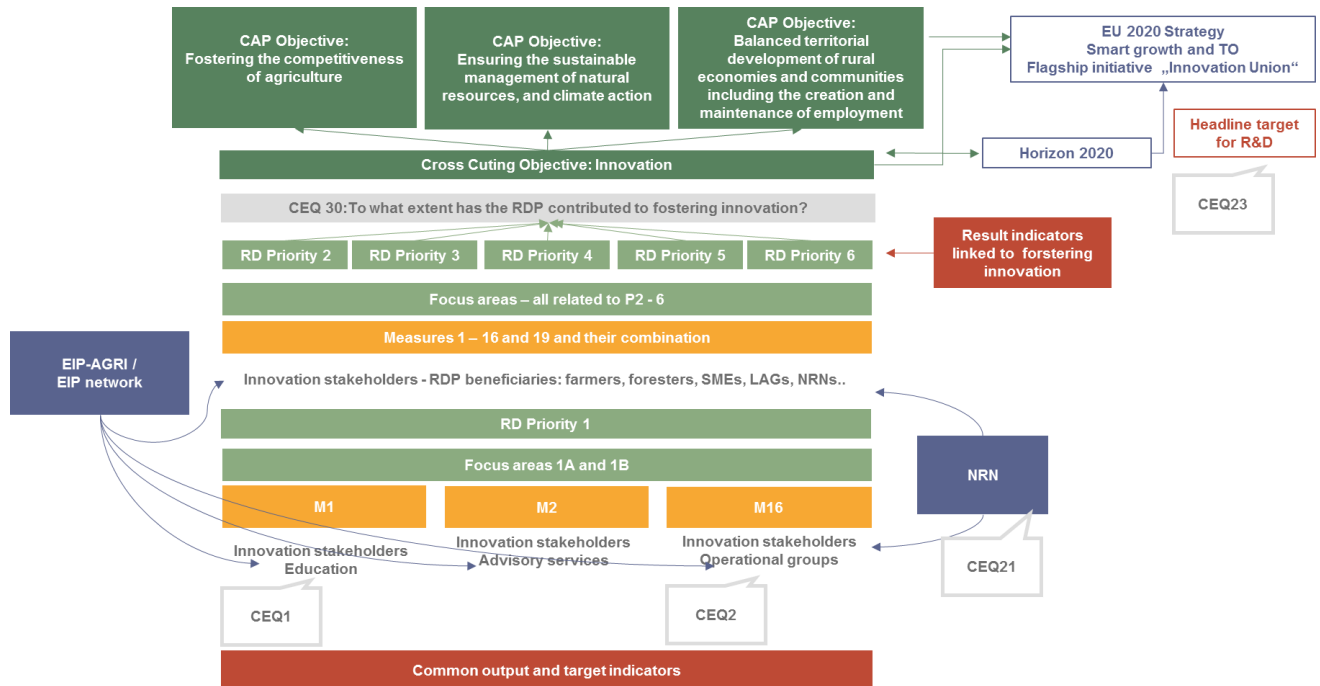
### 2.11.1 Setting up the frame for the assessment

#### Explaining the intervention logic

There are rural development measures which are expected to contribute directly to fostering innovation (M01 - Knowledge transfer, M02 - Advisory services and M16 – Cooperation through the achievement of objectives of focus areas 1A – fostering innovation, cooperation and development of knowledge base in rural areas and 1B – strengthening the links between agriculture, food production and forestry and research and innovation). Other rural development measures implemented under other focus areas can also show a potential to support innovative projects and foster innovative processes in their contribution to the rural development objectives at focus area and rural development priority level, as well as to cross cutting priority on innovation, overall CAP and the EU 2020 policy objectives (figure 19).

As for its evaluation elements the CEQ no. 30 is linked to the cross cutting priority on innovation, which closely relates to the CEQ no. 1, 2, 21 and 23. This implies that findings used to answer the above mentioned CEQs should not contradict each other. The common target indicator linked to FA 1A: T1 - expenditures related to Art. 14, 15 and 35, is proposed to be used in answering the CEQ no. 30. Moreover the guidelines *Evaluation of Innovation in Rural Development Programmes 2014-2020* (Chapter 2.4.5, table 9) suggest several additional quantitative and qualitative result indicators for this purpose. The RDP innovation related intervention logic and its linkages with the evaluation elements is shown in the figure below.

Figure 19. RDP intervention logic in fostering innovation



Source: European Evaluation Helpdesk for Rural Development, (2018)

### Defining the unit of analysis

The [Guidelines Evaluation of Innovation in Rural Development Programmes 2014-2020](#) suggest examining the innovation potential of the entire RDP and its measures/sub-measures. Therefore, the unit for the assessment of RDP contributions to innovation is the **entire RDP area**.

### Choosing evaluation approaches for the assessment of RDP contributions to fostering innovation

Evaluation approaches to assess the RDP contributions to innovation and a procedure to answer the CEQ no. 30 in three steps is described in detail in the [Guidelines Evaluation of Innovation in Rural Development Programmes 2014-2020](#), Chapter 2.4.5. These three steps are:

- ▶ **Step 1** - Identify a significant change or changes to which the RDP can claim it has contributed through fostering innovation through one or more of the three pathways (described in the Guidelines)
- ▶ **Step 2** - Gather information about the RDP's performance against the judgment criteria and indicators
- ▶ **Step 3** - Develop a causal timeline and narrative describing how the change(s) identified in Step 1 came about.

For details consult the above mentioned guidelines.

### 2.11.2 Dos and Don'ts



#### **Dos**

- Consider innovation efforts and trends in the RDP territory as the baseline for the assessment of the RDP innovation potential.
- Examine the innovation potential of all RDP measures/sub-measures, not only those which are primarily designed for this purpose.
- Check where the innovation is directly encouraged by the project selection criteria.

#### **Don'ts**

- Forget to consider the project selection criteria as the starting point to define innovation for your RDP territory

**European Evaluation Helpdesk**

Boulevard Saint-Michel 77-79

B - 1040 BRUSSELS

T: +32 2 737 51 30

Email: [info@ruralevaluation.eu](mailto:info@ruralevaluation.eu)

<http://enrd.ec.europa.eu>

