



# INTERACTIVE DECISION TOOL

DATA FOR THE ASSESSMENT OF RDP ACHIEVEMENTS AND IMPACTS

## IMPACT INDICATOR:

I.07 EMISSIONS FROM AGRICULTURE

I.07 – 1 GHG EMISSION FROM AGRICULTURE

I.07 – 2 AMMONIA EMISSIONS FROM AGRICULTURE

JANUARY 2019

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LOGIC MODEL





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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>).





## ACKNOWLEDGEMENTS

*The interactive **decision tool**, ‘**Data for the assessment of RDP achievements and impacts**’, has been developed by an international team of rural development evaluation experts including Jerzy Michalek, Demetrios Psaltopoulos, Dimitris Skuras, Jela Tvrdonova, Darko Znaor. The related thematic working group has been coordinated by the Evaluation Helpdesk under the guidance of Valdis Kudiņš and Hannes Wimmer. Giulia Bekk, Valérie Dumont, Matteo Metta and Myles Stiffler supported the development work and ensured the quality and visual appearance of the final interactive tool. Various experts have provided valuable input as peer reviewers (Juris Hāzners, Jaroslav Pražan, Gerald Schwarz). Representatives of DG Agriculture and Rural Development have ensured the coherence of the tool with the EU’s policy framework.*

The interactive **decision tool**, ‘**Data for the assessment of RDP achievements and impacts**’, is based on the logic model approach which was originally developed by the EU collaborative project ENVIEVAL (Grant Agreement No. 31207 in the EU’s 7th Framework Programme for research, technological development and demonstration). The Evaluation Helpdesk has applied this approach for its thematic working group, which serves to support Member States in their assessment of RDP impacts in 2019 and the ex-post.





## INTRODUCTION

The choice of a suitable evaluation approach is a critical step in the evaluation process. The wish to carry out a robust assessment of the policy's effects needs to be matched with those aspects which factor into conducting an evaluation (data and information availability, budget and resources, and the skills of the evaluators).

In the non-binding Guidelines, 'Assessment of RDP impacts and achievements in 2019', published in August 2018, logic models have been presented for the 13 Common CAP impact indicators covering Pillar II. These logic models support Member States in discussing different criteria for the choice of evaluation approaches for assessing the RDP's impacts during the evaluation activities in 2019 and the ex-post (2024).

The decision tool, 'Data for the assessment of RDP achievements and impacts', transports the logic models developed in the above Guidelines into an interactive format, while providing further detailed and practical information. The decision tool has been specifically **designed for RDP** evaluators who may wish to gain further insights into the criteria for each step of the decision making process when choosing an evaluation approach. This tool also provides practical recommendations on what to do in case of data gaps both in the short and long term, when solutions are needed.





## OBJECTIVES

The **interactive decision tool** consists of a set of 7 logic models covering the 13 Pillar 2 CAP Impact Indicators. The 7 logic models can be read separately and aim to:

- **Assist evaluation stakeholders** in their decision on which evaluation approaches they can use for the assessment of the common RDP impact indicators, as well as providing the necessary data and information sources at the EU level for these approaches.
- **Provide recommendations on possible solutions for overcoming data-gaps at the national and regional levels** (e.g. by providing guiding questions, practical hints and links to external information sources).

The tool focuses on data and information sources pertinent for the assessment of RDP achievements and impacts in 2019 and the ex-post. The decision tool is based on the Guidelines '*Assessment of RDP impacts and achievements in 2019*'. Additionally, the tool provides:

- Explanations on data needs for proposed evaluation approaches including availability and suitability of data for RDP evaluations (frequency, delays, time series).
- Important questions to consider.
- Links to existing data sources and good practices.
- Complementary information on evaluation methods and their data needs.





# HOW TO USE THE TOOL

This interactive decision tool contains a set of **7 logic models**:

## Sector-related impacts



I.01 Agricultural entrepreneurial income



I.02 Agricultural factor income



I.03 Total factor productivity in agriculture

## Socio-economic impacts



I.14 Rural employment rate



I.15 Degree of rural poverty



I.16 Rural GDP per capita

## Environmental impacts



I.07 Emissions from agriculture

I.07 – 1 GHG emission from agriculture

I.07 – 2 Ammonia emissions from agriculture



I.08 Farmland Bird Index (FBI)



I.09 High Nature Value (HNV) farming



I.10 Water Abstraction in Agriculture



I.11 Water Quality:

I.11-1 Gross Nutrient Balance (GNB) (*Gross Nitrogen Balance (GNB-N) and Gross Phosphorus Balance (GNB-P)*)  
I.11-2 Nitrates in freshwater



I.12 Soil organic matter in arable land



I.13 Soil erosion by water

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





# HOW TO USE THE TOOL

Navigation within the clickable logic model:



Brings the user back to the starting page of the **logic model**

Are variables explaining participation known?

Takes the user to that specific **decision question** of the logic model



**Starting decision question** of the logic model

Hyperlinked text

Takes the user to an external source or to another slide



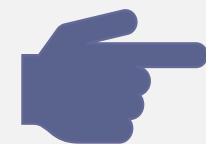
Examples



Additional notes



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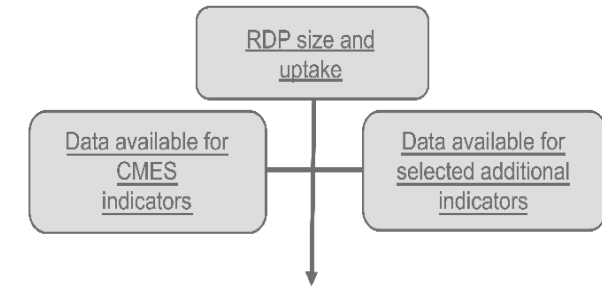


# HOW TO USE THE TOOL

## Structure:

Each logic model begins with a description of the:

- **RDP size, uptake** and other aspects that have to be considered for the selection of the evaluation approach.
- **Data availability for CMES indicators** needed to assess net impacts at the micro and macro levels, as well as, the specificities in the data availability for regionalised RDPs.
- **Data availability for selected additional indicators.**



Each **decision question** is organised in a way that facilitates the answers to the following **sub-questions**:

- Why is this question important?
- What are the conditions in order to answer the question with YES?
- Are there any specificities to be considered for regionalised RDPs?
- What can be done to improve the data situation (In the short term (for AIR 2019) and long-term (for ex-post)?

Each sub-question can be explored by clicking on its link.

Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

[Why is this question important?](#)

[What are the conditions in order to answer the question with YES?](#)

[Are there any specificities to be considered for regionalised RDPs?](#)

[What can be done to improve the data situation?](#)

[Short-term solutions \(for AIR 2019\)](#)

[Long-term solutions \(for ex-post\)](#)

By answering each decision question in the tool with either a **'YES'** or a **'NO'** one will be taken to the next question, which will ultimately lead one to all possible evaluation approaches that can be applied given the specific criteria they have selected.





## HOW TO USE THE TOOL

The tool will suggest various applicable approaches based on the data and other information:

- **Approach A (an evaluation approach in an optimal data situation).**  
It can be used in 2019 and/or can be planned for the ex post evaluation.
- **Approach B (an alternative evaluation approach in case of data gaps).**  
In several cases, approach B contains a qualitative component.

Approach A (optimal)



Approach B (alternative)



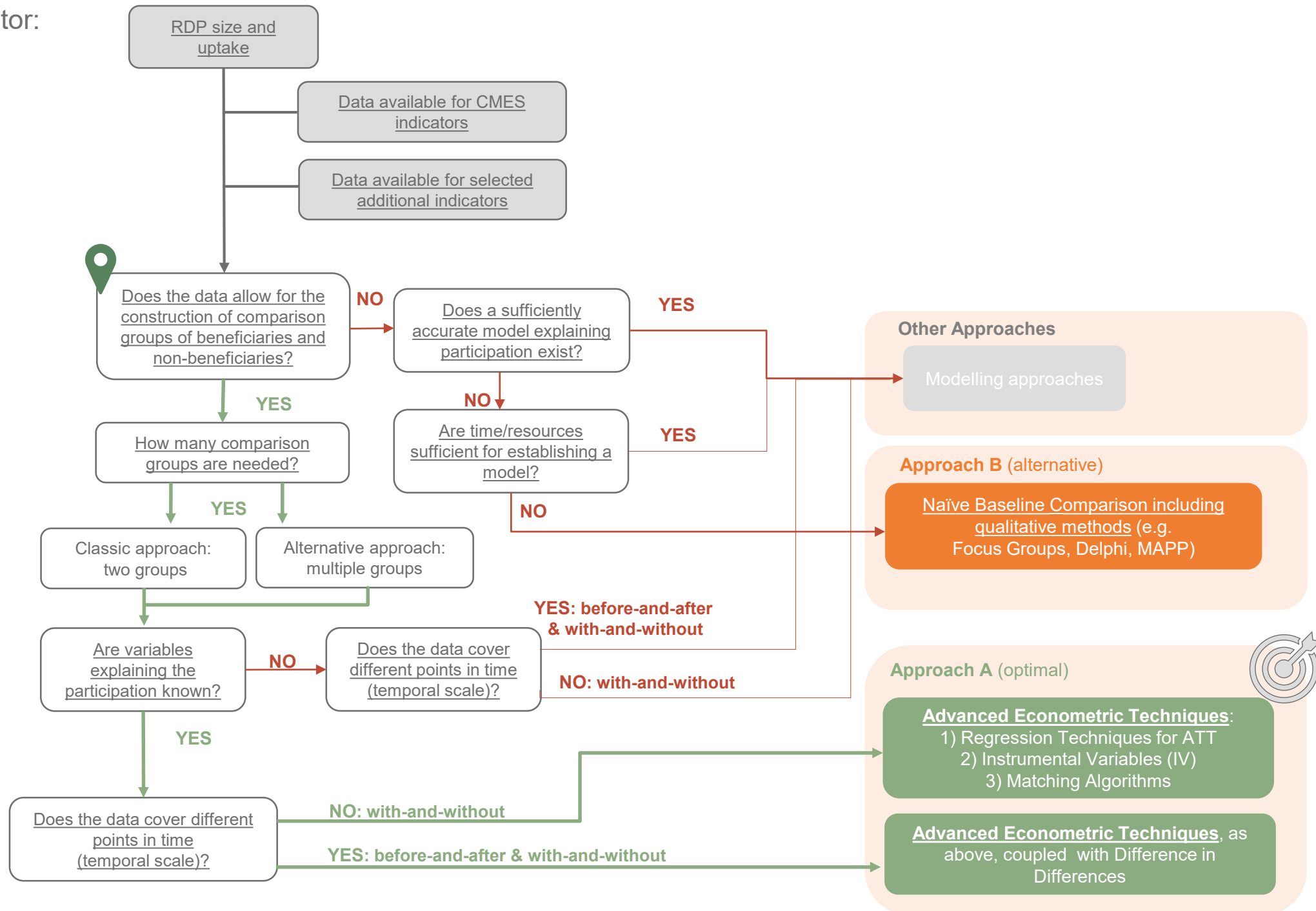
In case of questions or any technical difficulties in accessing the files, please contact the European Evaluation Helpdesk for Rural Development:

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Impact indicator:  
I.07





## Impact indicators

### I.07 Emissions from agriculture

- 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;
  - 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

Impact indicators fiches



Guidelines *Assessing RDP achievements and impacts in 2019*, PART II, Chapters 2.3.1 and 2.10.1, Section: 'Intervention Logic'

### Related Common Evaluation Questions:

**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?'



Guidelines *Assessing RDP achievements and impacts in 2019*, PART III, Chapter 3.3, Section: 'Clarification of general intervention logic linked to the CEQ'

**CEQ 28:** 'To what extent has the RDP contributed to the CAP objective of ensuring sustainable management of natural resources and climate action?'



Guidelines *Assessing RDP achievements and impacts in 2019*, PART III, Chapter 3.7, Section: 'Clarification of general intervention logic linked to the CEQ'





## RDP size and uptake

The size, uptake and the structure of the RDP are important factors in the selection of the evaluation approach. In cases where the programmes are large and there is sufficient uptake, the evaluator can apply regression and matching techniques at the micro-level and generalised PSM at the macro level (using NUTS 3 data). However, if there are only a few units which are supported by measures covered by rural development priorities and focus areas, which affect production of Greenhouse Gases (GHG) and ammonia emissions from agriculture and significant RDP effects are not expected, the evaluator may instead choose robust evaluation approaches, such as naïve baseline comparisons and qualitative approaches.





## Data availability for CMES indicators

### What is the unit of analysis and data available (EU-level)?

- At the micro level, the unit of analysis is the agricultural holding.
- At the macro level, the unit of analysis is any spatial unit (NUTS 3 or lower) for which GHG and ammonia emissions exist or can be calculated.
- Specificities in the data availability for regionalised RDPs.





### Data available:

- There are not publicly available databases reporting GHG and ammonia emissions at the agricultural holding level. Therefore, it is recommended that the Member State or regions conduct a survey of agricultural holdings to collect data for indicators, preferably during the baseline period (before RDP has started) and after the RDP's implementation (the [Eurostat Manual](#) also, suggests the collection of data through well prepared surveys).

 [Note](#)


### Proxies:

- There are no proxy indicators for GHG and ammonia emissions.

### Data needed:

- Activity data for GHG and ammonia emission from livestock and land use – (Consult [Eurostat Manual](#), Part 4.7, on Page 24 on 'data requirements', and Part 7, Page 50 on 'sampling strategies').
- A coherent measurement of GHG and ammonia emissions **can be made based** on the collected activity data and coefficients used to 'translate' activity to emissions.
- A register of key characteristics of agricultural holdings can be used for the construction of a counterfactual (screening non-beneficiaries, comparing and matching the group of beneficiaries and the group of non-beneficiaries) or to be used as a 'control' variable.

### Surveys:

- Several Member States have either conducted surveys in the past or regularly carry out their own farm level surveys for the purpose of monitoring GHG and/or ammonia emissions.  [Note](#)



### Examples:

- [The United Kingdom](#)
- [Austria](#)





## Data availability for CMES indicators

## Micro level

A detailed overview of the methodology and data sources appropriate for calculating various ‘emissions’ is presented in Annex III of the latest ‘Annual European Union greenhouse gas inventory 1990–2016’ and the ‘inventory report 2018’. Further information can be found in the latest national inventory database and the national inventory submissions via the UN’s UNFCCC portal. Individual country reports are also available with detailed information on the agricultural sector and the LULUCF.



Examples:

- Italy
- The United Kingdom
- The Cool Farm Alliance







## Data availability for CMES indicators

## Micro level

## Note(s)



The Eurostat manual suggests that the, '[d]evelopment of cost-effective mitigation measures relating to greenhouse gas and ammonia emissions or nitrate leaching require relational statistics that can only be obtained by a farmer surveys'. The manual goes on to state that, '[s]ince farm management of nutrients tend to vary systematically with farm type (cattle, pig, etc.) and size, such surveys can be usefully stratified according to farm type and size' (Eurostat, 2011, p. 13 ).





## Data availability for CMES indicators

## Micro level

## Example(s)



**The United Kingdom:** The Farm Practices Survey (FPS) – Greenhouse Gas Mitigation edition, which is typically administered annually by the Department for Environment, Food and Rural Affairs (DEFRA) in collaboration with the Office for National Statistics collects information on a diverse range of topics usually related to the impact of farming practices on the environment.

**Austria:** An ad-hoc survey of 5,000 Austrian farmers was carried out in 2005 in order to provide an overview of the Austrian animal husbandry sector, improve the accuracy of the Austrian emissions inventory, and facilitate the modelling of typical farms in order to estimate their emissions and develop emissions scenarios.



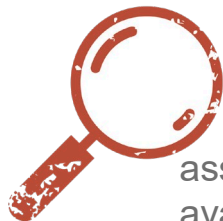


Once activity data and field measurements have been collected, they should be transformed into the appropriate measures of GHG and ammonia emissions. When estimating GHG and ammonia emissions from a survey of agricultural holdings two important considerations should be taken into account:

- the use of emission factors or coefficients; and
- the use of GHG calculators.

Emission factors are the simplest way to convert activity data into GHG fluxes. This can be achieved through the multiplication of management activity data by a relevant emission factor, (i.e. a coefficient that describes the amount of GHG flux per unit of activity). This is one of the most common methods used by countries to report GHG and ammonia emissions to the Intergovernmental Panel on Climate Change (IPCC) for the purpose of national inventory reporting under Tier 1. Evaluators should be aware of the methods used by each of their respective national inventories, in order to have results that can be compared with macro level indicators.





**Italy:** Consult the Italian Greenhouse Gas Inventory (1990 – 2016). GHG calculators (i.e. carbon calculators) have been developed to assist GHG emissions management and calculation at the agricultural holding level. A very comprehensive review of the majority of available calculators and associated tools including spreadsheets is presented in Annex III, Page 88 of the 'GHG Protocol Agricultural Guidance'.

**The United Kingdom:** The Farm Carbon Cutting Toolkit (FCCT) started in 2009 as a platform connecting farmers with other farmers with an aim to reduce their GHG emissions. The platform includes a carbon calculator and a toolkit.

**The Cool Farm Alliance:** Is a community of organisations including food retailers, manufacturers, input suppliers, NGOs, universities and consultancies, which aim to help farmers use measurement to inform management through the use of different tools and trainings. Among their tools is the 'Cool Farm Tool', which quantifies on-farm GHG emissions and soil carbon sequestration. The 'Cool Farm Tool' has been used in many cases in Europe, the US and developing countries.





### Data available:

- Data on GHG aggregates and per gas emissions from agriculture are available at the country level through Eurostat (for the following countries until 2016) or the EEA database (for all countries until 2016).
- Data on LULUCF are available at the country level through Eurostat for all countries until 2016.
- Data on ammonia emissions are available at the country level through Eurostat (for the following countries until 2016) or the EEA database (for all countries until 2016).
- Data on regional and sub-regional GHG emissions (not only from agriculture) have started to emerge in public databases. The CDP (Carbon Disclosure Project) currently provides regional disaggregation of aggregate GHG emissions for numerous countries including:
  - Spain (Andalucía, the Basque Country, Catalonia and Navarra);
  - Italy (Emilia-Romagna, Lombardia and Veneto);
  - France (La Reunion, Aquitaine and Provence-Alpes-Côte d'Azur);
  - Germany (Hesse, Bavaria, North Rhine-Westphalia and Thuringia);
  - Belgium (Wallonia);
  - The United Kingdom (Scotland and Wales);
  - Etc.

For all these regions there are comments concerning the methodology with information on how various sectors (including agriculture) were treated. For example, the Austrian GHG emissions reported for the region of Carinthia at CDP have been estimated by the accounting body of Austria and conform to the national emissions reported every year to the EU.

### Proxies:

- There are no proxy indicators for GHG and ammonia emissions.

### Data needed:

- Data at the regional (NUTS 2 or NUTS 3) or sub-regional (NUTS 4) level that can be used in an econometric analysis of causal effects such as the GPSM.





## Specificities in data availability for regionalised RDPs

Regional RDPs will have to estimate the indicators according to their national reports. For certain regions there are already aggregate estimates of emissions for all sectors. From these estimates, or by following the same methodology for other regions agricultural emissions and agricultural emissions with LULUCF can be calculated. Estimating a time series, or estimating at least two points in time may be more time consuming and difficult.





## Data availability for selected additional indicators



Examples of additional indicators, determining the unit of analysis and data sources are provided in the Guidelines *Assessing RDP achievements and impacts in 2019*, PART IV, Chapter 4.2, Section 4.2.1 'Additional indicators (examples)'

### Additional indicators include those contained in the guidelines:

- Share (%) of GHG emissions from livestock (enteric fermentation and manure management) to total agricultural emissions can be estimated from the National emissions reported to the UNFCCC and to the EU Greenhouse Gas Monitoring Mechanism, which can be found in the database of the European Environment Agency (EEA).
- Share (%) of GHG emissions from managed soils (data available from the same source as above).
- Share (%) of agricultural ammonia emissions (Eurostat).
- Share (%) of holdings with livestock which have manure storage facilities in total holdings with livestock and share (%) of manure applied with different techniques and manure incorporation time both (Eurostat).
- Number of animals of cattle, equidae, sheep, pigs and poultry in LSU and share (%) of major livestock types (cattle, equidae, sheep, pigs and poultry) in total livestock population (Eurostat).
- Utilised Agricultural Area (UAA) managed by low, medium and high input farms (Eurostat as reported by FADN).





RDP size and uptake

Data availability for CMES indicators

Data availability for selected additional indicators

Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

YES

NO

## Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

Why is this question important?

What are the conditions in order to answer the question with YES?

Are there any specificities to be considered for regionalised RDPs?

What can be done to improve the data situation?

Short-term solutions (for AIR 2019)

Long-term solutions (for ex-post)



Guidelines *Assessing RDP achievements and impact in 2019*, PART II, Chapter 2.1 and 2.3 and PART IV, Chapter 4.2.

Guidelines *Assessment of RDP results*, Chapter 2.1 and 6.2, and Annex 11, Chapter 2.14.  
*Guidelines for the ex post evaluation of 2007-2013 RDPs*, Chapter 4.3





RDP size and uptake

Data availability for CMES indicators

Data availability for selected additional indicators

Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

YES

NO

## Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

### Why is this question important?

The possibility to construct comparison groups is very important for the determination of which evaluation methods can be applied, especially when self-selection of programme participation is likely. The construction of comparison groups allows the evaluator to apply advanced statistics-based techniques that can mitigate self-selection bias.





RDP size and uptake

Data availability for CMES indicators

Data availability for selected additional indicators

Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

YES

NO

## Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

### What are the conditions in order to answer the question with YES?

For the micro-level assessment a database of the survey results of agricultural holdings should allow for the construction of comparison groups and contain:

- ✓ A representative sample of beneficiaries (identified from the CMES operations database).
- ✓ A correspondingly representative sample of RDP non-beneficiaries.
- ✓ A reliable and consistent measurement of the indicator at the agricultural holding level consistently applied to all sampled units.
- ✓ A record of key agricultural holdings' characteristics to be used for screening out non-beneficiaries, which are non-eligible, as matching variables when constructing the counterfactual or as 'control' variables for simple regression analysis.

At the macro level, if data on GHG and/or ammonia emissions exist and some RDP areas have received support while others have not, a counterfactual may be constructed. However, it is rather unlikely that there will be spatial units without any RDP support and if there is, they will be very few. If data on financial support exists, alternative statistical methods (e.g. Generalised Propensity Score Matching (GPSM)) may be employed.





RDP size and uptake

Data availability for CMES indicators

Data availability for selected additional indicators

Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

YES

NO

**Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?**

**Are there any specificities to be considered for regionalised RDPs?**

There are no specificities for regionalised RDPs.





RDP size and uptake

Data availability for CMES indicators

Data availability for selected additional indicators

Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

YES

NO

## Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

### What can be done to improve the data situation?

#### Short-term solutions (for AIR 2019)

In the short-term, if the CMES has a comprehensive database on beneficiaries, a short supplementary survey can be collected on RDP non-beneficiaries. Academics and evaluators have proposed the use of FADN data (see examples below). The evaluator should be aware that from FADN data, activity data may be deduced. However, FADN does not provide information on management practices (e.g. on farm management of manure, slurry, or on farm manure storage conditions). For this reason, if FADN or other data from complementary surveys are used, the evaluator should make sure that the management practices on the farms are also recorded. Having the FADN data in place, this can be done with an additional ad-hoc survey targeting only 'management practices'.

Examples on monitoring databases and on the use of FADN:



- Finland
- Italy
- Lithuania
- Poland

Examples on IT tools

#### Long-term solutions (for ex-post)

A regular survey of agricultural holdings like The Farm Practices Survey organised in the UK or any other survey such as the Farms Structure Survey (FSS), could be accompanied with a GHG supplement.





RDP size and uptake

Data availability for CMES indicators

Data availability for selected additional indicators

Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

YES

NO

## Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

Short-term solutions (for AIR 2019)

Example(s)

Examples of monitoring databases and the use of FADN data



**Finland:** The Action Plan to reduce ammonia emissions in Finland is accompanied by a comprehensive monitoring scheme that records all activity data by beneficiaries. Beneficiaries of the environment payment scheme declare the amounts of manure applied by injection to the agricultural authorities each year. Investments for manure storages are also monitored on an annual basis with respect to the size and volume of manure stores.

**Italy:** Coderoni et al. (2012) used FADN data in Italy, to estimate agricultural GHG emissions at the farm level. Table 2, of their paper links activity data to FADN data (Coderoni et al., 2012, p. 4). GHG emissions are derived by applying either national coefficients to activity data or, if national coefficients do not exist, applying IPCC default values.

**Lithuania:** Dabkienė (2017) analysed a sample of 1304 family farms and used a methodology based on an adaptation of the IPCC guidelines, supplemented by Lithuanian emission factors from Lithuania's National Inventory Report. Activity data of family farms were derived from the Lithuanian FADN. Table 1, is a useful example, as it corresponds FADN activity data to Lithuanian emission factors from Lithuania's National Inventory Report (Dabkienė, 2017, p. 226).

**Poland:** Syp and Osuch (2018) calculate GHG emissions from agriculture based on a sample of 11701 FADN farms.





RDP size and uptake

Data availability for CMES indicators

Data availability for selected additional indicators

Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

YES

NO

## Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

Short-term solutions (for AIR 2019)

Example(s)

### Examples of IT tools



In some countries, innovative solutions for ad-hoc surveys in agriculture have been applied through the use of crowdsourcing. A crowdsourcing iPhone app successful in collecting soil data across the UK has now been expanded to the EU. Researchers have proposed collecting farm activity data through existing mobile telephones to crowdsource geo-referenced land management data and create a new social network.





RDP size and uptake

Data availability for CMES indicators

Data availability for selected additional indicators

Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

**YES**

How many comparison groups are needed?

**Next**

## How many comparison groups are needed?

Why is this question important?

What are the conditions in order to answer the question?

Are there any specificities to be considered for regionalised RDPs?

What can be done to improve the data situation?

Short-term solutions (for AIR 2019)

Long-term solutions (for ex-post)



Guidelines *Assessing RDP achievements and impact in 2019*, PART II, Chapter 2.1 and 2.3 and PART IV, Chapter 4.2.

Guidelines *Assessment of RDP results*, Chapter 2.1 and 6.2, and Annex 11, Chapter 2.14.  
*Guidelines for the ex post evaluation of 2007-2013 RDPs*, Chapter 4.3



RDP size and uptake

Data availability for CMES indicators

Data availability for selected additional indicators

Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

**YES**

How many comparison groups are needed?

**Next**

## How many comparison groups are needed?

### Why is this question important?

The number of comparison groups reflects the evaluation's aims and objectives. The number of comparison groups also depends on the number of direct effects of measures to be evaluated according to the RDP's intervention logic. As a result, the decision on the number of comparison groups will affect the sampling design (sample size, stratification, etc.) and the surveys (questionnaire structure, etc.).

### What are the conditions in order to answer the question?

- ✓ The comparison groups to be formulated should have an adequate sample size to allow for their statistical representation in the sample and for the application of advanced statistics-based methods.
- ✓ The number of agricultural holdings involved in the assessment should take into account that each holding can only be the member of one comparison group, unless the impacts of each measure are distinct and separately measured.

### Are there any specificities to be considered for regionalised RDPs?

There are no specificities for regional RDPs.







RDP size and uptake

Data availability for CMES indicators

Data availability for selected additional indicators

Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

**YES**

How many comparison groups are needed?

**Next**

## How many comparison groups are needed?

### What can be done to improve the data situation?

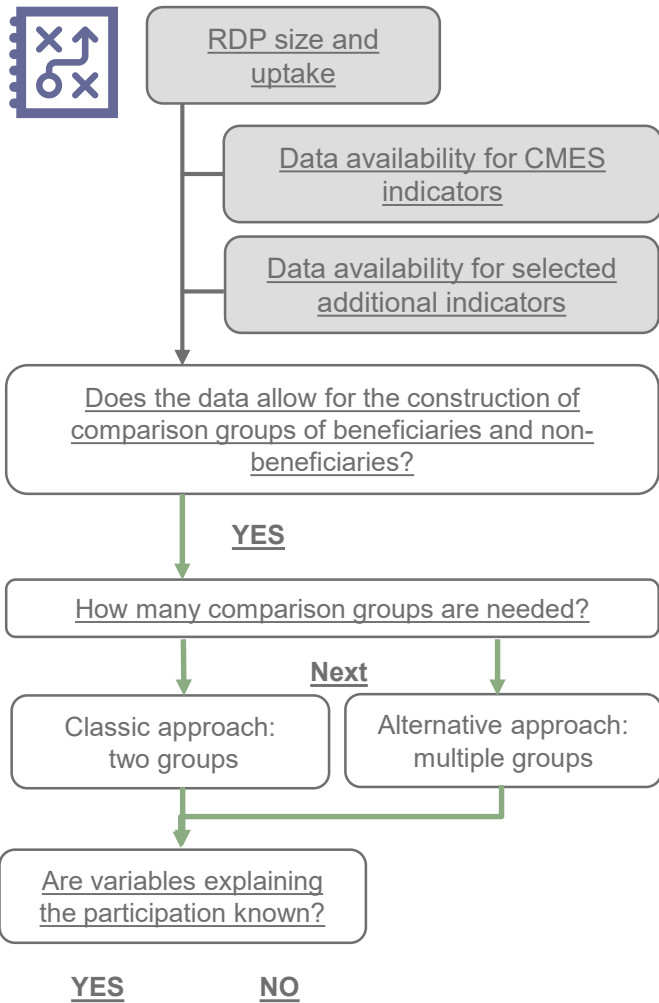
#### Short-term solutions (for AIR 2019)

If data on beneficiaries exist but their quantity or quality does not allow for the construction of more than two comparison groups, the evaluator should examine the possibility of increasing the quantity of data (e.g. the number of observations). Data on RDP non-beneficiaries should be constructed from ad-hoc surveys or other sources (e.g. FADN or FSS questionnaire returns).

#### Long-term solutions (for ex-post)

If a regular survey of agricultural holdings exists that records farm activity data on GHG and ammonia emissions then constructing multiple comparison groups should be feasible.





## Are variables explaining the participation known?

Why is this question important?

What are the conditions in order to answer the question with YES?

Are there any specificities to be considered for regionalised RDPs?

What can be done to improve the data situation?

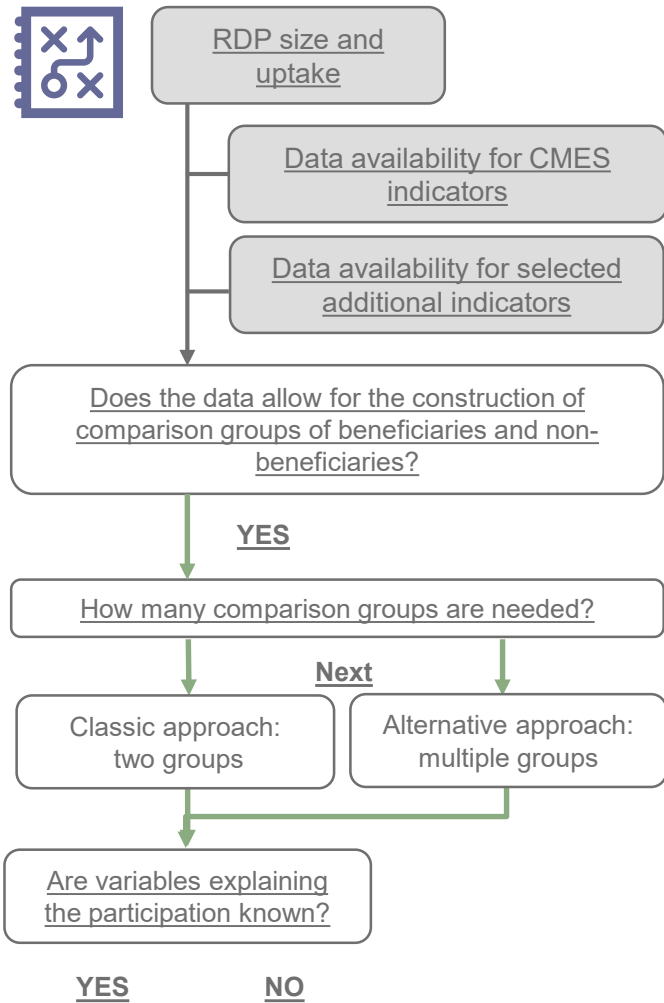
Short-term solutions (for AIR 2019)

Long-term solutions (for ex-post)



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 Guidelines *for the ex post evaluation of 2007-2013 RDPs*, Chapter 4.3



## Are variables explaining the participation known?

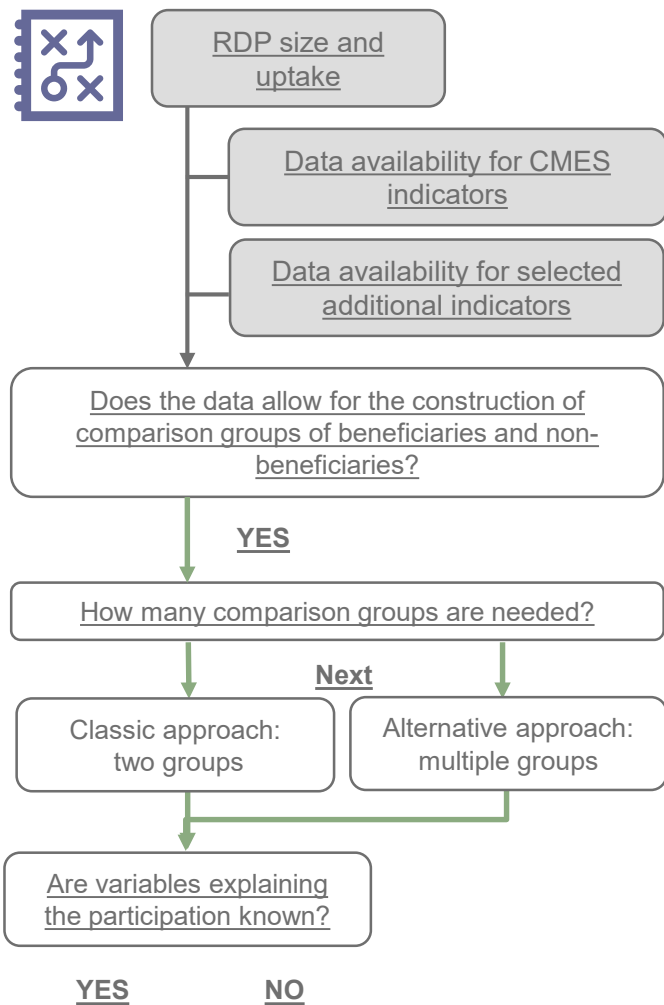
### Why is this question important?

To identify variables explaining participation is important since they will be used:

- To screen out non-supported holdings that would not fulfil the eligibility criteria
- To test the statistical similarity of the comparison groups
- As explanatory, matching or control variables in statistical analyses

Variables should be known for all comparison groups and should be defined and measured in the same way.





## Are variables explaining the participation known?

### What are the conditions in order to answer the question with YES?

The main condition is that the database of agricultural holdings (beneficiaries and RDP non-beneficiaries) should include all the appropriate variables:

- ✓ Variables capturing eligibility criteria
- ✓ Variables which indicate the level of support received during the former programming period 2007-2013, and/or the level of support received from other public sources in this period
- ✓ Variables related to the owner's/manager's involvement with Focus Area 1C measures (for beneficiaries only)

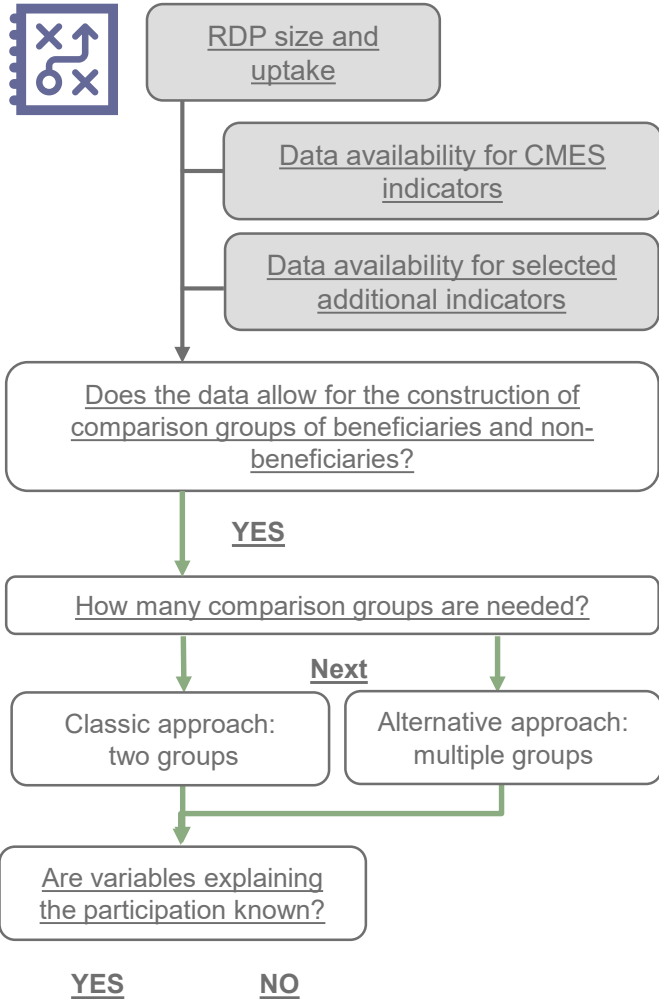


Example: Finland

### Are there any specificities to be considered for regionalised RDPs?

There are no specificities for regionalised RDPs.





## Are variables explaining the participation known?

### What can be done to improve the data situation?

#### Short-term solutions (for AIR 2019)

The evaluator should make sure that all relevant variables explaining participation are recorded. If the survey of beneficiaries is enriched with an ad-hoc survey of RDP non-beneficiaries, then critical variables explaining participation should be recorded.

If, instead of an ad-hoc survey the data on RDP non-beneficiaries is collected through means (e.g. FADN or the FSS) then the evaluator should make sure that:

- ✓ within the data there are variables matching the eligibility criteria and can be used to screen out non-eligible agricultural holdings;
- ✓ RDP non-beneficiaries can be isolated based on the data.

#### Long-term solutions (for ex-post)

If a regular survey of agricultural holdings, which records activity data on GHG and ammonia emissions already exists, then presumably all relevant variables explaining participation will also be recorded.





RDP size and uptake

Data availability for CMES indicators

Data availability for selected additional indicators

Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

YES

How many comparison groups are needed?

Next

Classic approach:  
two groups

Alternative approach:  
multiple groups

Are variables explaining the participation known?

YES

NO

## Are variables explaining the participation known?

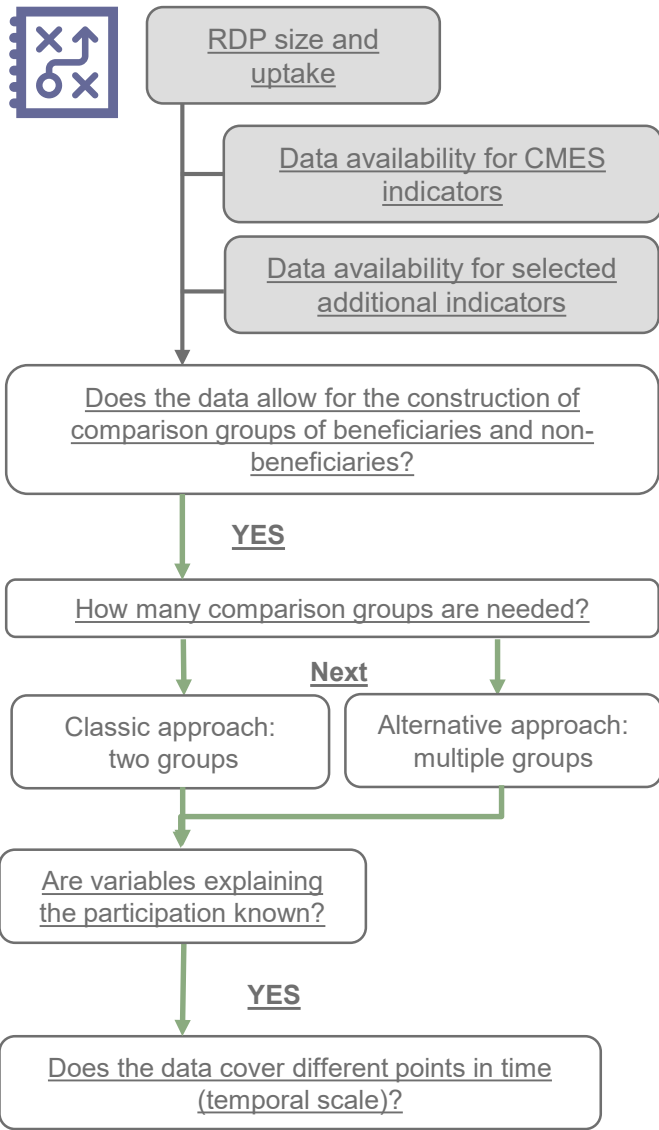
What are the conditions in order to answer the question with YES?

Example(s)



**Finland:** In the Action Plan to reduce ammonia emissions in Finland, environmental payments for the injection of slurry into the soils are paid to farmers that spread at least 20 m<sup>3</sup> per hectare/per year. This is a critical variable that allows the evaluator to screen out RDP non-participants who are not eligible under this measure of the Finish Action Plan.





**YES:**  
before-and-after  
& with-and-without

**NO:**  
with-and-without

## Does the data cover different points in time (temporal scale)?

Why is this question important?

What are the conditions in order to answer the question with YES?

Are there any specificities to be considered for regionalised RDPs?

What can be done to improve the data situation?

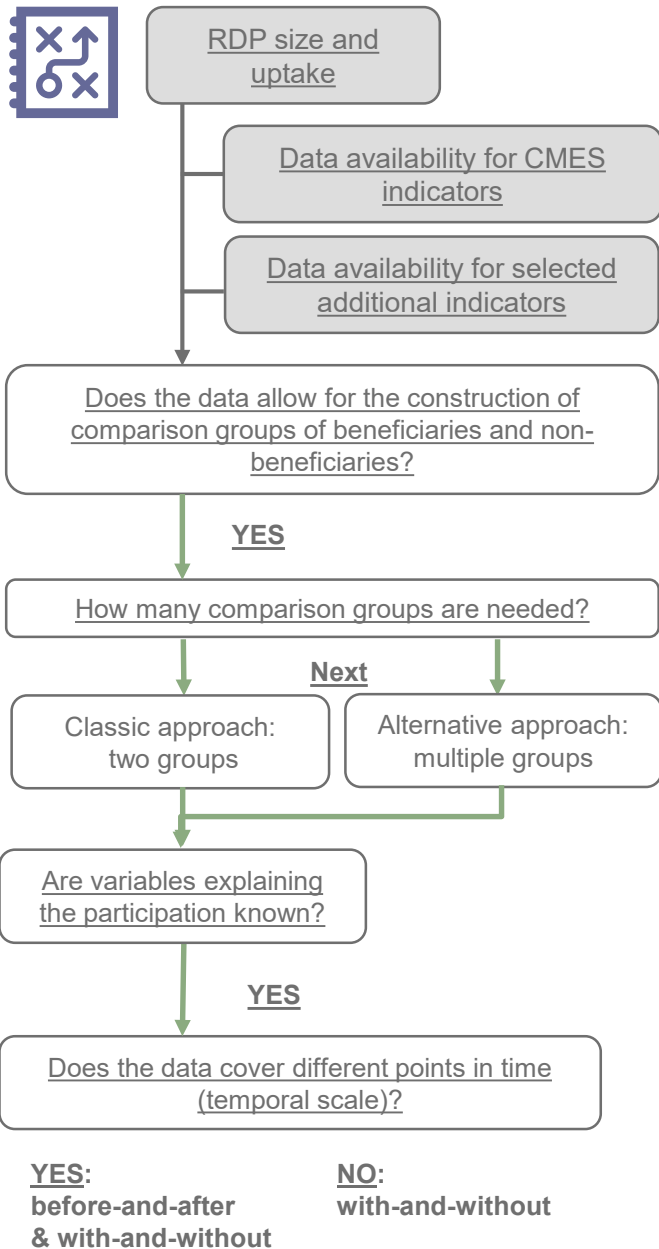
Short-term solutions (for AIR 2019)

Long-term solutions (for ex-post)



Guidelines *Assessing RDP achievements and impact in 2019*, PART II, Chapter 2.1 and 2.3 and PART IV, Chapter 4.2.

Guidelines *Assessment of RDP results*, Chapter 2.1 and 6.2, and Annex 11, Chapter 2.14.  
 Guidelines *for the ex post evaluation of 2007-2013 RDPs*, Chapter 4.3



## Does the data cover different points in time (temporal scale)?

### Why is this question important?

It is important to know whether the data covers various points in time (before, during and after the programming period), because if this is the case evaluation methods, such as, Propensity Score Matching (PSM) can be joined with Difference in Differences (DiD).

### What are the conditions in order to answer the question with YES?

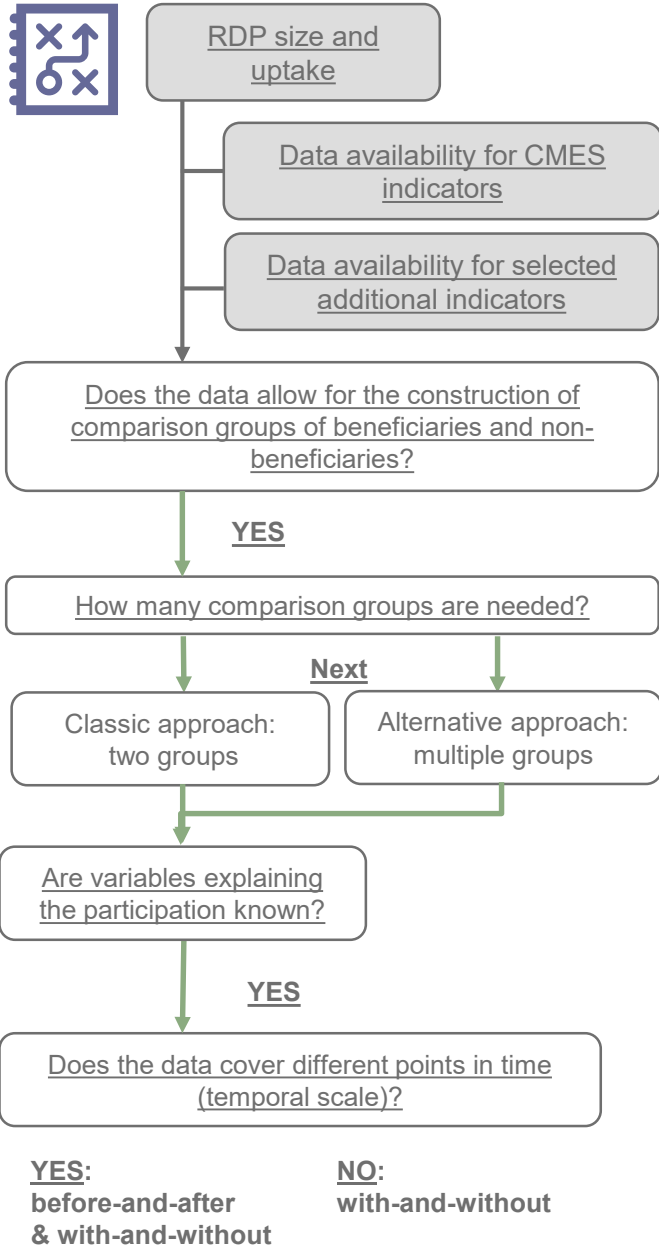
Data should be collected for the periods that allows one to determine values for the indicators (common, additional, programme specific) before the programme has started and at the time of the evaluation (during and after the programme implementation). In cases where a survey is used, a temporal scale can be introduced if the survey of agricultural holdings is repeated at regular intervals.

### Are there any specificities to be considered for regionalised RDPs?

There are no specificities for regional RDPs.







## Does the data cover different points in time (temporal scale)?

### What can be done to improve the data situation?

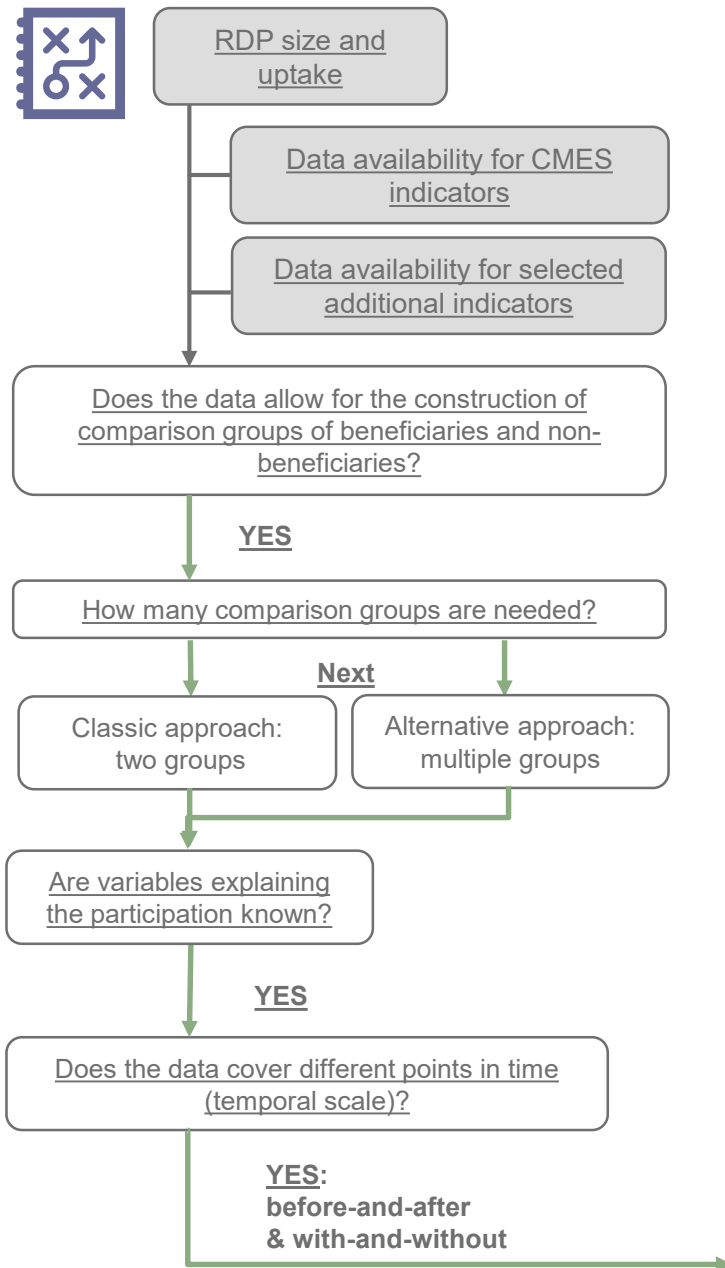
#### Short-term solutions (for AIR 2019)

The evaluator can use monitoring data on beneficiaries at different time intervals. If the monitoring database is enriched with data from surveys these should coincide in time. All other conditions allowing the use of external sources, such as, FADN should also be fulfilled.

#### Long-term solutions (for ex-post)

If there exists a regular survey of agricultural holdings to record farm activity data on GHG and ammonia emissions, then this data can be used to cover different points in time. It is important to take into consideration that surveys conducted on a regular basis are often changed and adapted to meet the current situation. These changes may be supplements to the data collected, changes to definitions or sampling sizes and/or sampling frames, etc. For this reason, it is important to make sure that the data is harmonised between the different periods.





## Advanced Econometric Techniques coupled with Difference in Differences

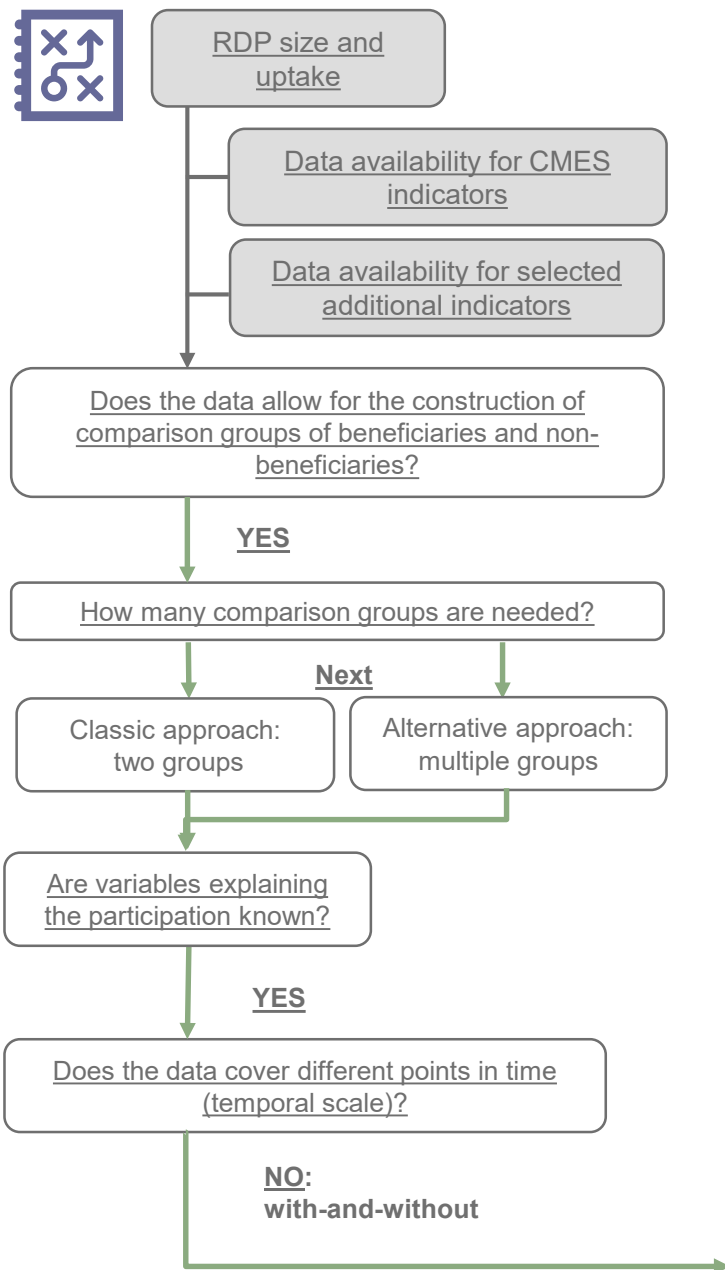
At the micro level, the assessment approach in case of sufficient data availability at the level of the agricultural holding is based on the comparison of beneficiaries and non-beneficiaries at the beginning of the programme start with that of the situation at the time of the evaluation with the goal of netting out the RDP's effects on the production of GHG emissions from agriculture.

In order to achieve this goal, advanced econometric methods can be applied (e.g. Regression Techniques, Instrumental Variables, Matching Algorithms (PSM) combined with Difference in Differences).

At the macro level (RDP area), the netting out of the RDP's effects on the production of GHG emissions from agriculture can be achieved through applying Generalised PSM to compare those areas supported by the RDP with those non-supported areas. Alternatively, a comparison can be achieved by comparing areas presenting different intensities of support.



Read more in guidelines *Assessing RDP achievements and impact in 2019*, PART II, Chapter 2.3.3 and PART IV, Chapter 4.2.2.



## Advanced Econometric Techniques



At the micro level, the assessment approach in case of sufficient data availability at the level of the agricultural holding is based on the comparison of beneficiaries and non-beneficiaries with the goal of netting out the RDP's effects on the production of GHG emissions from agriculture.

In order to achieve this goal, advanced econometric methods can be applied (e.g. Regression Techniques for ATT, Instrumental Variables, Matching Algorithms).

At the macro level (RDP area), the netting out of the RDP's effects on the production of GHG emissions from agriculture can be achieved through applying Generalised PSM to compare those areas supported by the RDP with those non-supported areas. Alternatively, a comparison can be achieved by comparing areas presenting different intensities of support.



Read more in guidelines *Assessing RDP achievements and impact in 2019*, PART II, Chapter 2.3.3 and PART IV, Chapter 4.2.2.



RDP size and uptake

Data availability for CMES indicators

Data availability for selected additional indicators

Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

**YES**

How many comparison groups are needed?

**Next**

Classic approach:  
two groups

Alternative approach:  
multiple groups

Are variables explaining the participation known?

**NO**

Does the data cover different points in time (temporal scale)?

**YES:**  
before-and-after  
& with-and-without

**NO:**  
with-and-without

## Does the data cover different points in time (temporal scale)?

Why is this question important?

What are the conditions in order to answer the question with YES?

Are there any specificities to be considered for regionalised RDPs?

What can be done to improve the data situation?

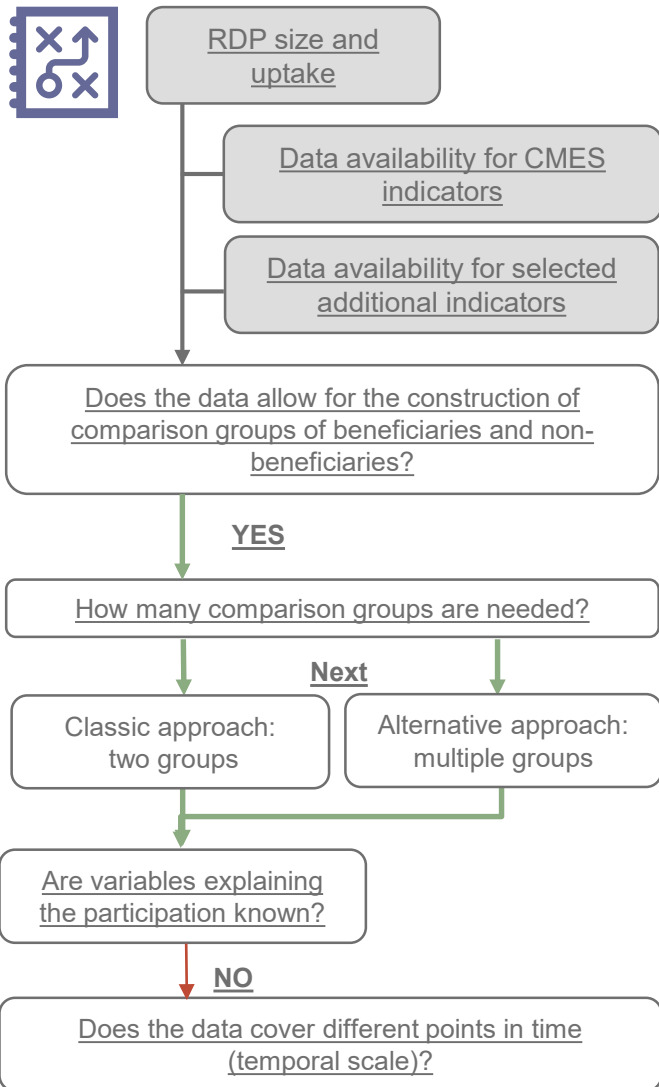
Short-term solutions (for AIR 2019)

Long-term solutions (for ex-post)



Guidelines *Assessing RDP achievements and impact in 2019*, PART II, Chapter 2.1 and 2.3 and PART IV, Chapter 4.2.

Guidelines *Assessment of RDP results*, Chapter 2.1 and 6.2, and Annex 11, Chapter 2.14.  
*Guidelines for the ex post evaluation of 2007-2013 RDPs*, Chapter 4.3



**YES:**  
before-and-after  
& with-and-without

**NO:**  
with-and-without

## Does the data cover different points in time (temporal scale)?

### Why is this question important?

If comparison groups can be constructed but the variables explaining participation are not known, qualitative evaluation methods should be used. In this case, it is important to know if the data covers different points in time. The effects of the RDP on emissions in agriculture erosion prevention measures can be correctly evaluated only if the baseline situation is established and the impact of the RDP measures are assessed during and the end of the programme. If this is the case, then the estimates of dynamic naïve quantitative comparisons between group averages can be discussed during the course of qualitative analyses.

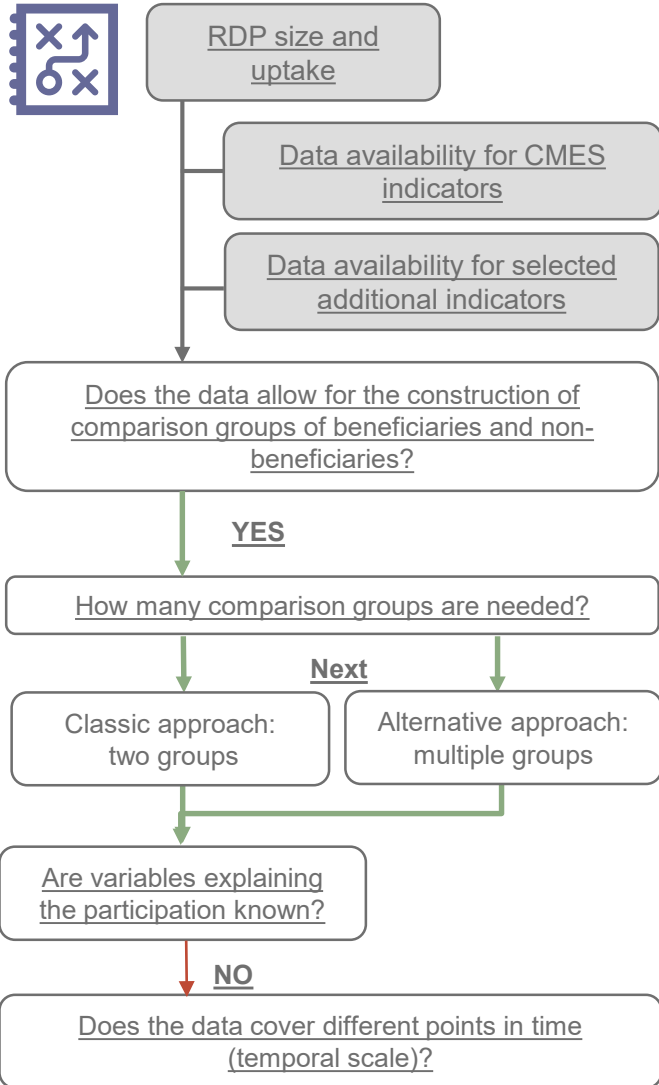
### What are the conditions in order to answer the question with YES?

The main condition is that the evaluator can estimate the values for beneficiaries and RDP non-beneficiaries at different points in time without knowing or having access to participation variables (before, during and after the programming period).

### Are there any specificities to be considered for regionalised RDPs?

There are no specificities for regional RDPs.





**YES:**  
before-and-after  
& with-and-without

**NO:**  
with-and-without

## Does the data cover different points in time (temporal scale)?

### What can be done to improve the data situation?

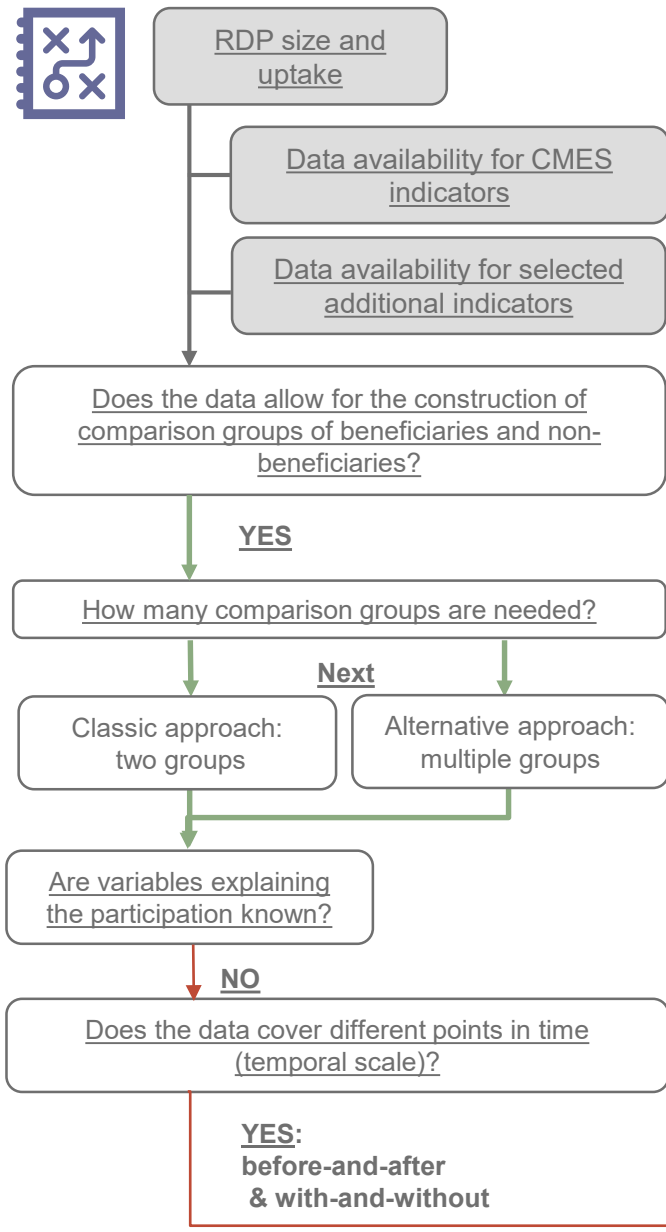
#### Short-term solutions (for AIR 2019)

Make sure that there is a good measurement of the indicator for RDP non-beneficiaries at different points in time. This depends on the way the evaluator has chosen to enhance its database of beneficiaries with RDP non-beneficiaries. If this information comes from FADN there will be no problem as FADN results are annual or bi-annual. Of course, all other conditions allowing the use of external sources, such as, FADN should also be fulfilled.

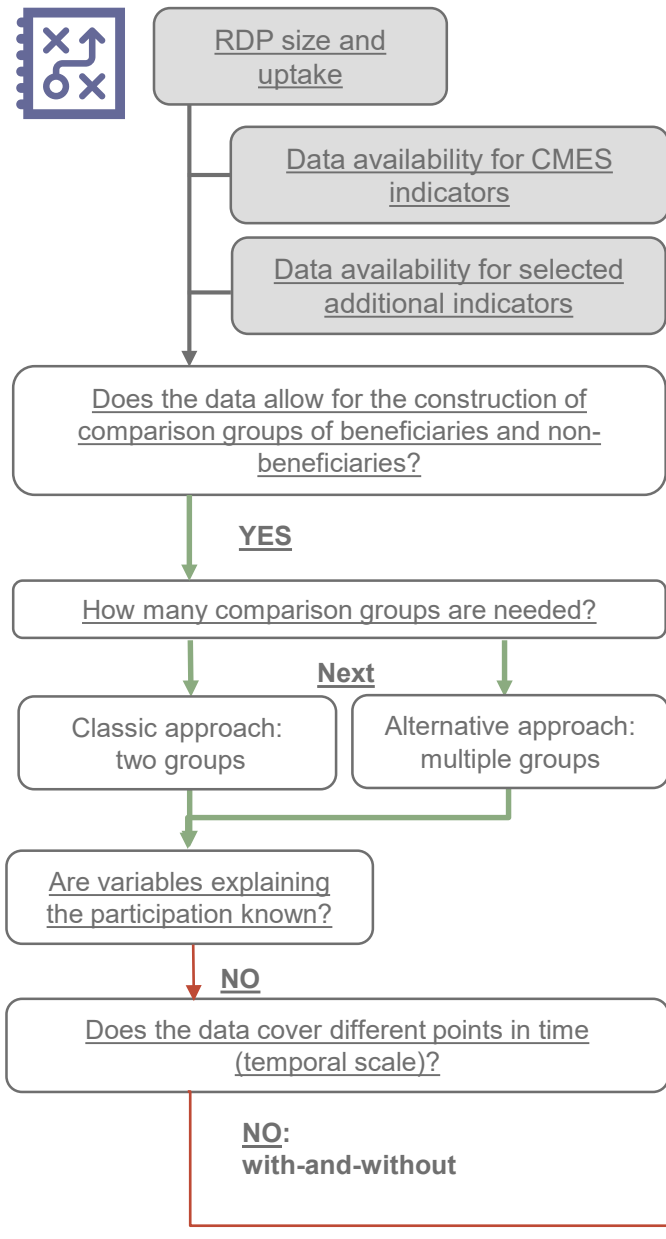
#### Long-term solutions (for ex-post)

If the Managing Authority establishes a regular survey of agricultural holdings to record farm activity data on GHG and ammonia emissions, then the data should cover different points in time even if participation variables are not known.



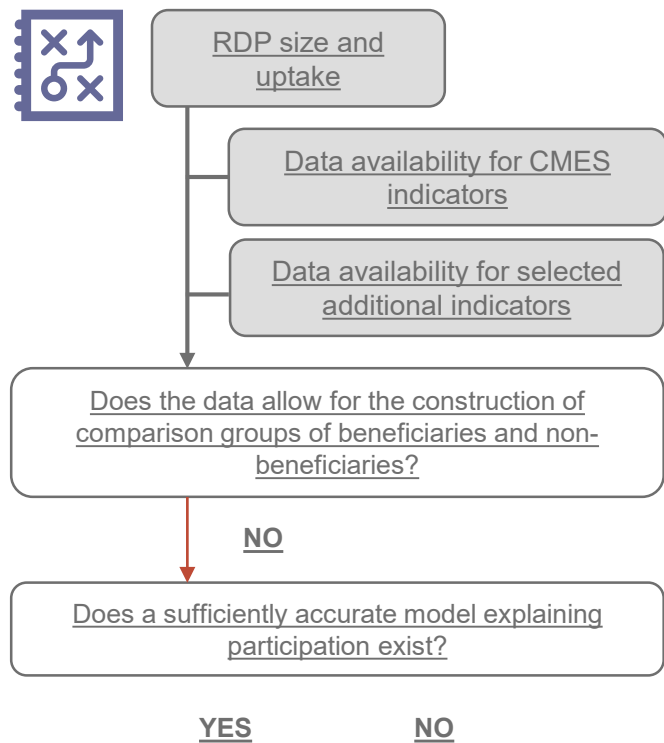


Other approaches:  
Modelling approaches



Other approaches:  
Modelling approaches





## Does a sufficiently accurate model explaining participation exist?

Why is this question important?

What are the conditions in order to answer the question?

Are there any specificities to be considered for regionalised RDPs?

What can be done to improve the data situation?

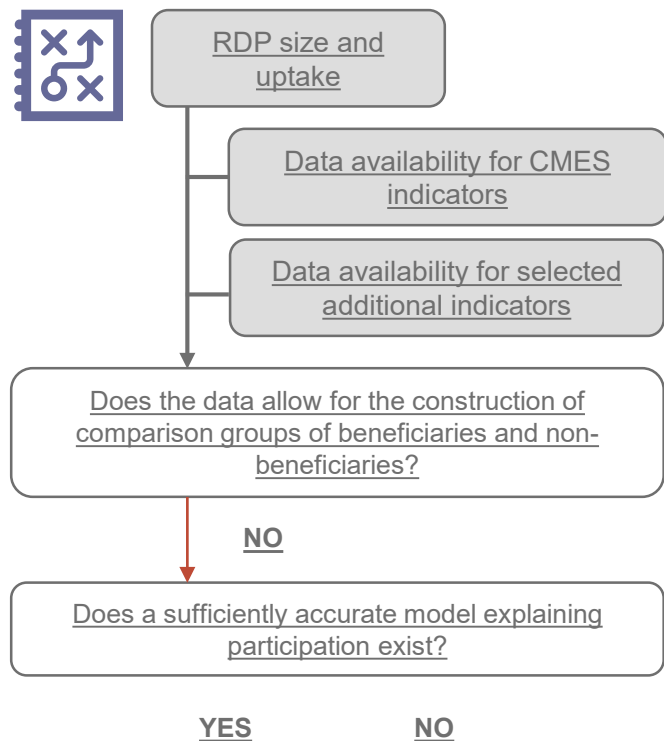
Short-term solutions (for AIR 2019)

Long-term solutions (for ex-post)



Guidelines *Assessing RDP achievements and impact in 2019*, PART II, Chapter 2.1 and 2.3 and PART IV, Chapter 4.2.

*Guidelines for the ex post evaluation of 2007-2013 RDPs*, Chapter 4.3.3.2.



## Does a sufficiently accurate model explaining participation exist?

### Why is this question important?

If the available data does not allow for the construction of comparison groups, then the evaluation could use agricultural distributed models for nutrients and GHG. If such a model has already been developed by research organisations for areas of the RDP then, of course, it's use is highly recommended. These models do not net out the effects of the RDP, but they are useful to the evaluators as they can simulate the effects of the RDP on emissions or fluxes and some of them also can provide projections under various scenarios.

Examples:



- GAINS-Europe
- JRC
- Poland

### What are the conditions in order to answer the question?

The only condition is that such a model exists and can be used for evaluation purposes.

### Are there any specificities to be considered for regionalised RDPs?

There are no specificities for regional RDPs if such a model exists at the regional level. Otherwise a country-wide model can be downscaled to the regional level.





RDP size and uptake

Data availability for CMES indicators

Data availability for selected additional indicators

Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

**NO**

Does a sufficiently accurate model explaining participation exist?

**YES**

**NO**

## Does a sufficiently accurate model explaining participation exist?

### What can be done to improve the data situation?

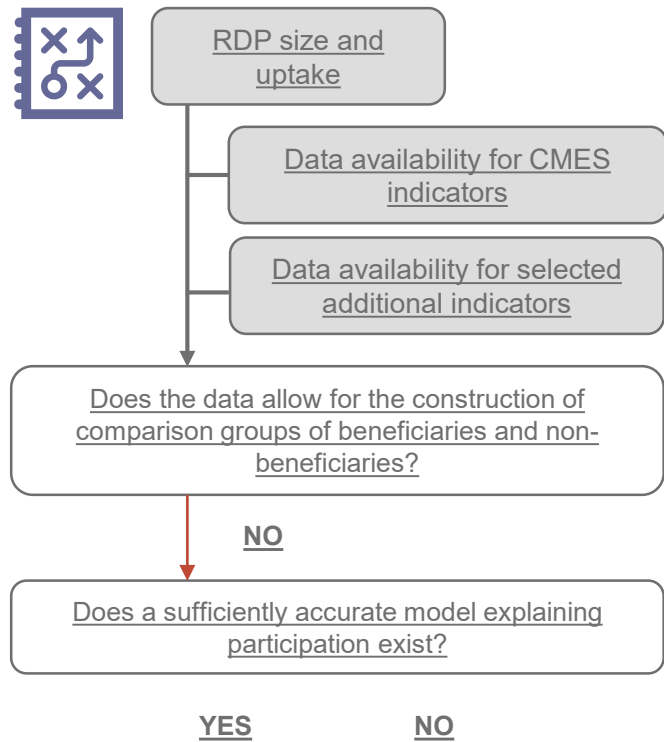
#### Short-term solutions (for AIR 2019)

Concerning evaluations using GHG models, nothing can be done in the short-term because constructing such models requires significant time and resources.

#### Long-term solutions (for ex-post)

In the long term, establishing an agricultural holdings survey is preferable to constructing models. For this reason the Managing Authority for the purpose of evaluations should opt for a large and comprehensive survey rather than a model.





## Does a sufficiently accurate model explaining participation exist?

### Why is this question important?

### Example(s)



**GAINS-Europe:** GAINS is a model for assessing cost effective strategies that reduce emissions of GHG. GAINS estimates historic emissions of 10 air pollutants and 6 GHGs for each country based on data from international energy and industrial statistics, emission inventories and other data supplied by countries themselves. It assesses emissions on a medium-term time horizon, with projections being specified in five-year intervals until the year 2050.

**JRC:** The authors of this work compare country emissions of NH<sub>3</sub>, N<sub>2</sub>O and NO<sub>x</sub> and N leaching plus runoff for the EU-27 countries for the year 2000 using four models (INTEGRATOR, IDEAg, MITERRA and IMAGE). The IDEAg and INTEGRATOR models also address ammonia emissions and produce raster maps at a resolution of 1 Km<sup>2</sup>. These maps are useful for both statistics-based approaches or for spatial analysis.

**Poland:** The researchers of this study developed a geoinformation approach to a high-resolution spatial inventory of GHG emissions from the agricultural sector following the categories of the IPCC guidelines. The spatial distribution of CH<sub>4</sub> and N<sub>2</sub>O emissions was obtained for areal emission sources in the agricultural sector in Poland with a spatial resolution of 100 m. Such a spatial distribution of emissions may be utilised by evaluators in a GPSM model.





RDP size and uptake

Data availability for CMES indicators

Data availability for selected additional indicators

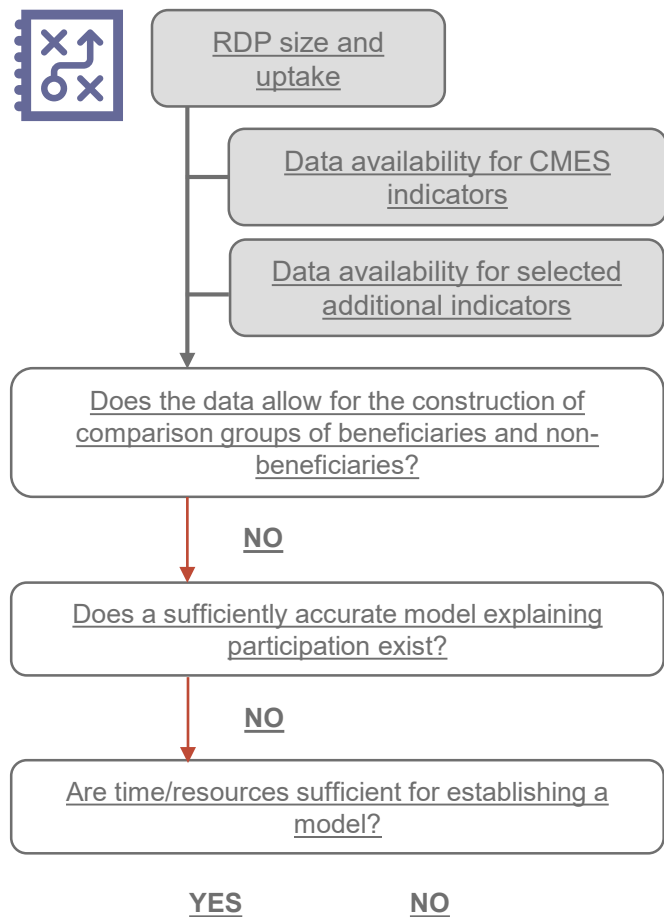
Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

**NO**

Does a sufficiently accurate model explaining participation exist?

**YES**

Other approaches:  
Modelling approaches



## Are time/resources sufficient for establishing a model?

Why is this question important?

What are the conditions in order to answer the question?

Are there any specificities to be considered for regionalised RDPs?

What can be done to improve the data situation?

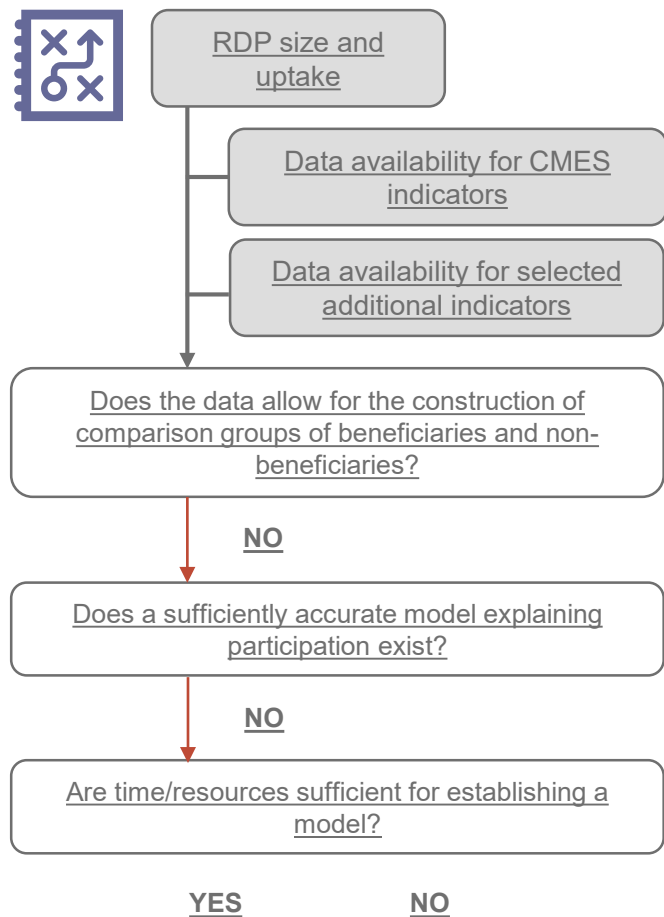
Short-term solutions (for AIR 2019)

Long-term solutions (for ex-post)



Guidelines *Assessing RDP achievements and impact in 2019*, PART II, Chapter 2.1 and 2.3 and PART IV, Chapter 4.2.

*Guidelines for the ex post evaluation of 2007-2013 RDPs*, Chapter 4.3.3.2.



## Are time/resources sufficient for establishing a model?

### Why is this question important?

It is important that the evaluator has sufficient time and resources to establish the model if it does not already exist. If time and resources are not sufficient for establishing a model while taking into account if existing data does not allow for the construction of comparison groups, then the only solution is to apply qualitative methods. If time and resources are sufficient for constructing a model, then establishing comparison groups should be possible, and is the most preferred approach for evaluation purposes.

### What are the conditions in order to answer the question?

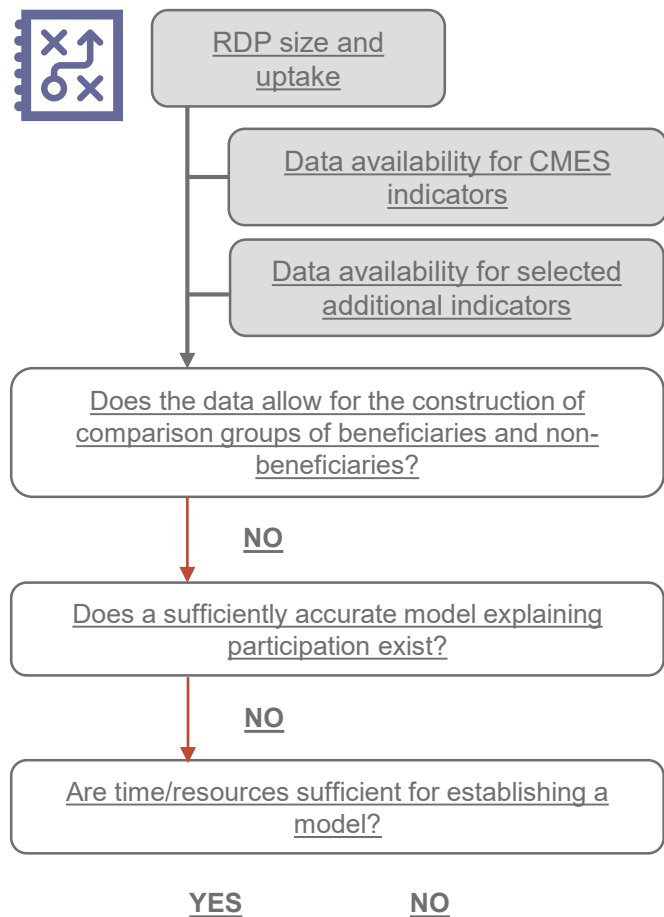
The conditions that allow one to build a model are:

- ✓ sufficient access to the scientific skills required to build the model, and
- ✓ to be able to retrieve the data required for the model.

### Are there any specificities to be considered for regionalised RDPs?

There are no specificities for regionalised RDPs.





## Are time/resources sufficient for establishing a model?

### What can be done to improve the data situation?

#### Short-term solutions (for AIR 2019)

If data on beneficiaries exists, the evaluator may estimate some naïve group averages between the beneficiaries and the ‘target’ population in the region or the country. These estimates may serve as a starting point for a qualitative analysis.

#### Long-term solutions (for ex-post)

In the long term, establishing an agricultural holding survey is preferable to constructing models. For this reason the Managing Authority for the purpose of evaluations should opt for a large and comprehensive survey rather than a model, even if the time and resources are sufficient to build a model.







RDP size and uptake

Data availability for CMES indicators

Data availability for selected additional indicators

Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

**NO**

Does a sufficiently accurate model explaining participation exist?

**NO**

Are time/resources sufficient for establishing a model?

**YES**

Other approaches:  
Modelling approaches



RDP size and uptake

Data availability for CMES indicators

Data availability for selected additional indicators

Does the data allow for the construction of comparison groups of beneficiaries and non-beneficiaries?

**NO**

Does a sufficiently accurate model explaining participation exist?

**NO**

Are time/resources sufficient for establishing a model?

**NO**

## Naïve Baseline Comparison including qualitative methods

If there is insufficient data, the evaluator can apply a naïve baseline group comparison at the macro-level, or naïve comparison between the average of those treated areas and the national average. Qualitative methods can then be used to net out the RDP's effects on the production of GHG emissions from agriculture.



Read more in guidelines *Assessing RDP achievements and impact in 2019*, PART II, Chapter 2.3.4 and PART IV, Chapter 4.2.3.



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