Policy brief No. 2:

Constructing counterfactuals in RDP environmental impact evaluation

Explicit definition of counterfactual scenarios is critically important to clearly attribute the observed environmental changes to the implemented RDPs and their measures. The ENVIEVAL project explains different options of constructing consistent counterfactuals depending on data availability.

Context

In the policy debate of European Union authorities, emphasis is placed on the need for high accountability in the fulfilment of RDP objectives. This is achievable using evidence-based impact evaluations extracting net impacts built on explicit construction of counterfactual scenarios. Constructing and using coherent counterfactuals is paramount to be able to clearly attribute the observed environmental changes to the implemented RDPs and their measures. However, this has proved difficult due to data gaps – sound evaluation requires cross-sectional or time-series data on indicators from comparison groups – and also due to a lack of understanding of what a counterfactual means in evaluation context.

A counterfactual is not a method *per se*. It is a point of comparison, the most likely state of the environment without the evaluated RDP. All evaluations make either an implicit or explicit assumption of the counterfactual since we cannot observe something that has not occurred, only the historical path leading to the present.

Work package WP3 of the ENVIEVAL project provides an overview of the methodologies used to construct counterfactuals explicitly and a logic model to:

a) delineate the requirements for monitoring and data collection for future evaluation (ex-ante)
b) contrast the available data with possible methods to construct a counterfactual (ex-post)

Guidance on steps for a good programme evaluation

Good programme evaluation builds on coherent policy design. The *objectives* of the evaluated programme should be well defined in words and indicators. The *intervention logic* of the programme and measures should describe how the measures should affect the policy objective and the chosen indicators. At this stage the environmental impacts assessed, their indicators, and the relevant external pressures should be identified and quantified if possible.

The greater the distance from the location of measures, and the more diffuse the environmental effects, the more often a quantitative counterfactual analysis requires pressure indicators for clear quantitative counterfactual construction. However, for issues such as diffuse water pollution, impact analysis using pressure indicators should be contrasted to actual water quality monitoring data to validate the analysis. A crucial and the most often forgotten source of data for constructing a counterfactual is the comparative data from non-participating farms and areas. Naïve comparisons of before-and-after or across participants and non-participants probably suffer from sample selection bias, thus leading to poorly informed policy recommendations.

To enable good programme evaluation, monitoring of policy-relevant environmental indicators should be set up so that information is available at a reasonable resolution to construct appropriate comparison groups. Reasonable resolution refers to spatial and institutional entities, at micro or macro levels – effects should be measured at a scale where effects are seen *and* where they can cost-effectively be linked to

programme measures. The case studies and deliverable D3.1 of the ENVIEVAL project show instances of how counterfactuals have been constructed for different scales of environmental impacts and quality of monitoring data.

Methods to construct a counterfactual

The logic model on counterfactual development - presented and elaborated in deliverable D3.3 and the methodological handbook - provides an explicit thought structure to determine possible methods with the available data. These methods are divisible into three families: i. elaborate statistical methods when data is abundant and attributable to single entities, ii. modelled evaluation options that can tackle cases where statistical comparison groups are not available for analysis, and iii. qualitative and naïve quantitative approaches when the counterfactual can only be based on assumptions or evidence with a varying degree of underlying knowledge for attribution of the evaluated measures to the impact.

In all cases, the explicit definition of comparison groups using the available data is key for the explicit construction of the counterfactual.

Many forms of the counterfactual - from evidence-based to assumed scenarios

A counterfactual is typically hoped to represent the state of the world absent of the evaluated programme. Assuming evidence-based evaluation to be the desire of the evaluator, the role of data quality and quantity rises in importance. However, reality, in the form of implementation strategy and uptake of the evaluated measures and external factors, may complicate statistics-based evaluation. The number of comparison groups arising from *or* underlying the data both helps and complicates evaluation. Each comparison group may form a counterfactual scenario providing more precise information on the impacts. However, added specificity comes at the cost of detailed data requirements, often difficult to gather. In such cases the evaluator may resort to approaches partially or totally independent of statistical data in constructing the counterfactual, such as modelling, qualitative evaluation or naïve quantitative estimates of the counterfactual. In the latter case, the evaluator needs to explicitly decide what state of the world the counterfactual represents. Deliverable D3.2 provides a structure on how to determine the number of possible comparison groups.

Lessons learnt

- Robust counterfactuals are critical for clear attribution of observed changes to policy measures
- Counterfactual analysis ensures transparency in impact assessment (Deliverable D3.3. gives rules for choosing methods based on data availability)
- The scale of environmental impacts affects data availability and causal links to measures (Deliverables D3.1 and D3.2 and the case studies provide examples of actual situations)
- Monitoring and farm-specific data should be collected from non-participants
    - methods are available to assess cases where non-participant data is lacking
    - situations with changing participation status are useful in impact assessment
    - data may allow for multiple counterfactuals
- Regional level assessment and programme level evaluation are challenging
    - multiple internal (measures) and external factors cause problems in macro-scale analysis
    - careful intervention logic can then help in constructing a counterfactual
    - programme measures may need to be separately evaluated and their impact to the whole programme assessed qualitatively.

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What is ENVIEVAL?

ENVIEVAL is developing and testing improved tools for the evaluation of environmental impacts of rural development measures and programmes in EU Member States. The project covers a representative set of EU member states, including Germany, Scotland, Greece, Finland, Italy, Lithuania, Hungary and regional case studies in the selected countries.

The main innovative aspects of the new methodological frameworks are that they enable the integration of micro- and macro-level evaluations (and their results) and provide guidance on the selection and application of cost-effective evaluation methods to estimate net effects of rural development programmes on the different main public goods from farming and forestry. In addition to the environmental public goods of climate change mitigation, biodiversity, landscapes, water quality and soil quality, the project will pay particular attention to animal welfare and include animal welfare case studies.

See the project website (www.envieval.eu) for additional information and documentation.

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