

# Towards Sustainability Impact Assessment (SIA) of policies

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**Abstract:** The article explores on the basis of several definitions of environmental impact assessment, strategic environmental assessment and sustainability impact assessment the needs to develop a new sustainability impact assessment of policies as a framework to focus on the economic, social and environmental dimensions of sustainability. By using the example of rural development, indicator lists are discussed and a set of indicators is selected to model the policies' impacts on the regional and local scale level. Key issues have been formulated to transform environmental impact assessment and strategic environmental assessment into sustainability impact assessment by using typical programmes, plans and projects to scale down the policies' impacts ex-ante into scenarios for potential policy impacts.

**Key words:** *indicator, rural development, municipality, impact assessment, scenario*

## Introduction

Economic activities build on the local scale level are strongly initiated by EU funding mechanisms of Rural Development. Numerous projects financed via the European Agricultural Fund for Rural Development (EAFRD) or other comparable funds influence the rural economy, the social systems, and the rural environment respectively the landscapes. The importance of EU Rural Development Policy for the period 2007–2013 is characterised “with over 56% of the population in the 27 Member States of the European Union (EU) living in rural areas, which cover 91% of the territory, rural development is a vitally important policy area. Farming and forestry remain crucial for land use and the management of natural resources in the EU's rural areas, and as a platform for economic diversification in rural communities. The strengthening of EU rural development policy is, therefore, an overall EU priority” ([http://ec.europa.eu/agriculture/rurdev/index\\_en.htm](http://ec.europa.eu/agriculture/rurdev/index_en.htm)).

Additionally to the Rural Development Policy the European Commission is anxious to further develop Impact Assessment procedures, methods and applications. Impact Assessment (IA) is defined by the European Commission as follows “a process aimed at structuring and supporting the development of policies. It identifies and assesses the problem at stake and the objectives pursued. It identifies the main options for achieving the objective and analyses their likely impacts in the economic, environmental and social fields. It outlines advantages and disadvantages of each option and examines possible synergies and trade-offs. Impact assessment is an aid to political decision, not a substitute for it. It informs decision-

makers of the likely impacts of proposals, but it leaves it up to them to take the decisions” ([http://ec.europa.eu/governance/impact/index\\_en.htm](http://ec.europa.eu/governance/impact/index_en.htm)).

During the policy design the potential future impacts of a policy are not known in a spatial explicit way on the local or regional scale level because of several reasons including (1) missing methods for the prognosis of such complex impacts, (2) the lack of indicators and data to measure policy impacts on the municipality scale, (3) the missing knowledge of potential actors behaviour to apply the funds in different geographic environments, and (4) the dispersed and small knowledge about the regional and local assessment of sustainability impacts in general.

The investigation discussed in this paper is part of the 7 RPD EU-Project PRIMA (<https://prima.cemagref.fr/>) (PRototypical policy Impacts on Multifunctional Activities in rural municipalities) which aims to investigate how to scale down policy impacts to the local scale level. The goal is to develop methods by using multi-agent modelling and micro-simulation models on the basis of rural population developments. The work of PRIMA concerning sustainability impact assessment aims to develop better approaches to link local and regional impact assessment methods to policy assessment and to widen the scope of environmental impact assessment to sustainability impact assessment.

Therefore, aim of this paper is (1) to describe briefly the current approaches for Impact Assessment (IA) in the EU context, (2) to discuss a list of impact assessment indicators proposed to be sensitive for policy impacts and rural development and (3) to summarise the missing links between policy assessment and sustainability impact assessment for the local and regional scale level.

## ***Materials and Methods***

### ***Impact Assessment in the EU***

Impact assessment in the context of spatial developments and landscape ecological research is applied in the EU member states for projects by the application of Environmental Impact Assessment (EIA) and for plans and projects by the adaptation of Strategic Environmental Assessment (SEA). Both EIA and SEA do not include aspects of the economic and social dimension of sustainability.

The European Commission defines Environmental Assessment (EA) as “a procedure that ensures that the environmental implications of decisions are taken into account before the decisions are made” (<http://ec.europa.eu/environment/eia/home.htm>). The EA-process “involves an analysis of the likely effects on the environment, recording those effects in a report, undertaking a public consultation exercise on the report, taking into account the comments and the report when making the final decision and informing the public about that decision afterwards. In principle, environmental assessment can be undertaken for individual projects such as a dam, motorway, airport or factory (‘Environmental Impact Assessment’) or for plans, programmes and policies (‘Strategic Environmental Assessment’)” (<http://ec.europa.eu/environment/eia/home.htm>).

Environmental Impact Assessment is defined by CEC (2009a): “The EIA procedure ensures that environmental consequences of projects are identified and assessed before authorisation is given. The public can give its opinion and all results are taken into account in the authorisation procedure of the project. The public is informed of the decision afterwards. The EIA Directive (CEC 1997) outlines which project categories shall be made subject to an EIA, which procedure shall be followed and the content of the assessment” (<http://ec.europa.eu/environment/eia/eia-legalcontext.htm>).

The aim of the Strategic Environmental Assessment is defined by § 1 in CEC (2001): “The objective of this [Strategic Environmental Assessment] Directive is to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans and programmes which are likely to have significant effects on the environment.”

Sustainability Impact Assessment (SIA) is explained by the European Commission: “a process undertaken before and during a trade negotiation which seeks to identify economic, social and environmental impacts of a trade agreement. The purpose of an SIA is to integrate sustainability into trade policy by informing negotiators of the possible social, environmental and economic consequences of a trade agreement. The idea is to assess how best to define a full package of domestic policies and international initiatives to yield the best possible outcome, not just in terms of liberalisation and economic growth, but also of other components of sustainable development. An SIA should also provide guidelines for the design of possible accompanying policy measures. Such measures may go beyond the field of trade as such, and may have implications for internal policy, capacity building or international regulation. Accompanying measures are intended to maximise the positive impacts of the trade negotiations in question, and to reduce any negative impacts” (<http://ec.europa.eu/trade/issues/global/sia/faqs.htm>).

It should be stated here, that EIA and SEA do not integrate social and economic assessment in the ex-ante investigations about the projects, plans and programmes planned. As SIA is an early step of methodological development and best applied in the context of trade negotiations for the international level of policy assessments, the SIA for projects, plans and programmes is not applied. Following the example of the Trade-SIA main aspects are structured how to translate this approach to the problems mentioned above.

The European Commission formulated the aspects taken into account in the context of SEA and EIA also in the indicator context. This formulation includes experiences out of a list of projects, plans or programmes with the need for Impact Assessment (CEC 2001) and from several European research projects (CEC (2001) names projects with the need for Impact Assessment (Annex I and Annex II SEA Directive)). Wider views have been raised by the development of impact assessment procedures in the context of Trade Sustainability Impact Assessment (see figure 1). Indicator lists have been formulated including environmental, social and economic aspects. This approach meets a multitude of approaches developed in science by the formulation of indicators to focus functional and multifunctional aspects of landscapes and regions for all sectors or from a sectoral viewpoint e.g. to focus the agriculture activity. More recently indicators systems have been developed in form of sustainability impact assessment tools (SIAT). Examples to demonstrate these scientific progress for land use indicators and other recent indicator approaches in EU Projects should be named e.g. by Sensor IP; Eforwood IP or Seamless IP.

Goal of the PRIMA project is the assessment of EU policies and the modelling of stakeholder' responses on policies changes by indicators. The indicators and parameters from the Rural Development Report (2008) are mentioned as integrative basis to screen and to assess policy impacts in a wider context of regional development.

The example of Trade-SIA investigates impacts for the economic, social and environmental dimensions of sustainability. The aim is to explore the positive or negative and the significance or insignificance of impacts of a trade negotiation result. A Trade SIA has two main purposes:

- “To integrate sustainability into trade policy by informing negotiators of the possible social, environmental and economic consequences of a trade agreement;

- To make information on the potential impacts available to all actors (NGOs, aid donors, parliaments, business etc.) EC” (EC (2009b): <http://ec.europa.eu/trade/issues/global/sia/faqs.htm>; access on 18.02.2008).

Figure 1 shows the indicators and the significance criteria analysed in the impact assessment study ([http://trade.ec.europa.eu/doclib/docs/2006/march/tradoc\\_127974.pdf](http://trade.ec.europa.eu/doclib/docs/2006/march/tradoc_127974.pdf)). The methods to investigate and the data to analyse the indicators are not standardised. The methods varying by each SIA study.

Trade-SIA uses a small set of indicators (economic, social and environmental) to explore the direction (positive, neutral or negative) of an policy change impact by using the significance criteria of existing conditions, equity, reversibility and capacity of change. The overall direction magnitude summarizes the change on the single indicators level (Figure 1).

	Dimensions / Significance Criteria				
	Overall Direction magnitude	Existing conditions	Equity	Reversibility	Capacity to change
<b>I Economic</b>					
1. Real Income	△	△	▽		
2. Net fixed capital formation	△	△			
3. Employment	△		▽		△
3.1 Self-employment, informal employment	↕	▽	▽	▽	△
4. Consumer effects	△	△			
<b>II Social</b>					
5. Poverty	△	↕	▽		△
6. Health and education	↕	▽			△
<b>III Environmental</b>					
7. Environmental quality	▽	▽			△
7.1 Air quality indicators	▽	▽			△
7.2 Water quality indicators	▽	▽			△
7.3 Land quality indicators	▽	▽			△
8. Biological diversity	○				
8.1 Designated eco-systems	○			□	
8.2 Endangered species	○				
9. Other natural resource stocks	□	▼		?	□

#### Legend

- insignificant impact compared with the base situation
- positive, less significant impact (marginally significant, by itself, to the negotiation decision)
- negative, less significant impact (marginally significant, by itself, to the negotiation decision but a potential candidate for mitigation)
- ▲ positive, greater significant impact (likely to be significant, by itself, to the negotiation decision)
- ▼ negative, greater significant impact (likely to be significant, by itself, to the negotiation decision. Merits serious consideration for mitigation)
- ↕ positive and negative impacts likely to be experienced according to context
- ? net effect uncertain

Fig. 1. Impact indicators for Trade-SIA, example of Trade SIA results: summary of sustainability impacts for Chile ([http://trade.ec.europa.eu/doclib/docs/2006/march/tradoc\\_127974.pdf](http://trade.ec.europa.eu/doclib/docs/2006/march/tradoc_127974.pdf)).

### Impact Indicators for Rural Development

When discussing indicators to assess the impacts of rural development policies on the local and regional scale level in the context of sustainability impact assessment, existing monitoring systems should be analysed first. The application EIA and the SEA includes investigations about environment, including

human health, flora, fauna, biodiversity, soil, climate, air, water, landscape, natural sites, material assets, cultural heritage and the interaction among these factors. Similar to Trade SIA, the data and investigation methods for the assessment studies are not standardised. The consultancies use risk analysis methods to practice.

Several indicator lists are available to widen the scope of impact assessment from environmental assessment to sustainability impact assessment. Potential lists usable and interesting for landscape ecology are based on (1) landscape functions (Bastian, Steinhardt, 2002), (2) ecosystem services (e.g. De Groot, 2006), (3) land use indicators and tools for impact assessment of sustainability (SIAT) as recently developed in European research projects (e.g. the projects: SEAMLESS, SENSOR, Eforwood, MEA-Scope) or (4) monitoring statistics on the European scale level (from EUROSTAT or from the EU rural development reporting). Different groupings of functions and indicators have been used:

- (1) Bastian & Steinhardt (2002) grouped the functions into production, ecological and social;
- (2) De Groot (2006) differentiated the functions into regulation, habitat, information and carrier functions. Each function describes a group of goods and services;
- (3) By different European research projects with the distinct social, environmental, economic indicators (SENSOR, Eforwood, MEA-Scope), or
- (4) By the rural development report with the grouping into the (1) Importance of rural areas, (2) Importance of rural areas; (3) Sectoral economic indicators; (4) Sectoral economic indicators and (5) the diversification and quality of life in the different categories of areas (OECD).

Impact assessment indicators should be calculated on public available data sets and the methodological approaches to model the risks of the sub-dimensions of sustainability should be simple and robust to apply (in this context the author will not discuss in detail the needs and methodological problems of indicator choice etc.).

Very briefly summarised the problems of the available lists mentioned, both the approaches of landscape functions and ecosystem services are very ambiguous for interpretations of impacts and not yet fully developed for impact assessment applications in risk analysis applications for SIA. The current SIAT developments of SEAMLESS, Eforwood and MEA-Scope are developed for sectoral applications of impact assessment. The SENSOR approach combines land use and functions into land use functions by analysing and assessing interesting indicator categories (e.g. Employment and labour markets (social), the Water quality and resources (environment) and competitiveness (economic)). In European statistics DG AGRI (2008) applied the CMEF (Common Monitoring and Evaluation Framework) in the Rural Development Report (2008). This Framework offers a large set of indicators suitable for impact assessment problems in the policy context.

## ***Results and Discussion***

Three main aspects are discussed in the following (1) the discussion of current impact assessment applications of EIA and SEA, (2) the analysis of indicator systems available and (3) the needs identified for the transformation of SIA to regional and local level.

(1) The content of impact assessment applications of EIA and SEA in the EU is legally fixed by naming main indicators (topics) and also by listing the projects, plans and programmes with the need of impact assessment in the annexes of the directives. These lists are also clarified by the legislation of the EU member states when adopting the EIA and SEA directives. Such lists have not been formulated for the

Sustainability Impact Assessment of policies. They also have not been transformed or reformulated to the scale level of regions (for projects and programmes) and municipalities (for projects) at Nuts 3, Lau 1 and Lau 2 scale level respectively.

Extensive work is needed to clarify the essential projects, plans and programmes with impacts on SIA. A methodical way to solve this problem will be to widen the existing approaches of EA to SIA when reformulating these projects, planes and programmes and focusing their impacts also on economy and social aspects. Recent studies quantified extensive deficits in application of EIA and SIA in the EU (CEC 2009a; CEC 2009b) regarding the documentation of the assessments and decisions applied, the stakeholder's participation and the varying quality of the studies in the member states.

(2) The choice of a balanced list of indicators of the economic, social and environmental dimension of sustainability for the usage in PRIMA was applied on the basis of several internal discussions and questionnaire applications. Experts were demanded to select main indicators out of the extensive indicators list of the Common Monitoring and Assessment Framework (DG Agri, 2008). Figure 2 shows the list of indicators used for the modelling of the impacts in PRIMA.

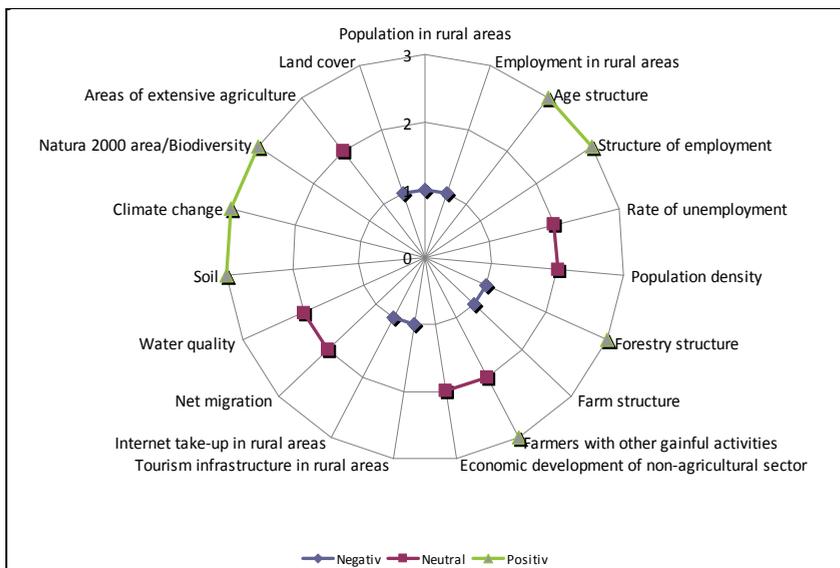


Fig. 2. Generalised spider diagram for the demonstration and assessment of changes induced by policy impacts for the selected PRIMA indicators (own figure)

The indicators in Figure 2 have been described in a checklist. This list includes information about the data used for the indicator application on the local and regional level in the case studies applied in PRIMA (6 case study regions all over Europe). The list includes indicators to clarify the policies' impacts on the agricultural, forestry and tourism economic activities as main aspects of rural development. As described above all indicators are included in the EU Common Monitoring and Evaluation Framework for rural development.

(3)The transformation of SIA to regional and local level requires the widening of the current approaches of the policies' assessment (Figure 3). The missing links between SIA and policies' impacts assessment and prognosis of potential impacts to the local and regional scale level can be seen in the clarification of the policies' impacts from a general change (as applied in the Trade-SIA example) to the formulation of

programmes or plans of investments on the regional level. The application should be carried out by the competent authorities responsible for the projects funding or related specialised consulting companies. The application should include stakeholders and should also include the local key actors.

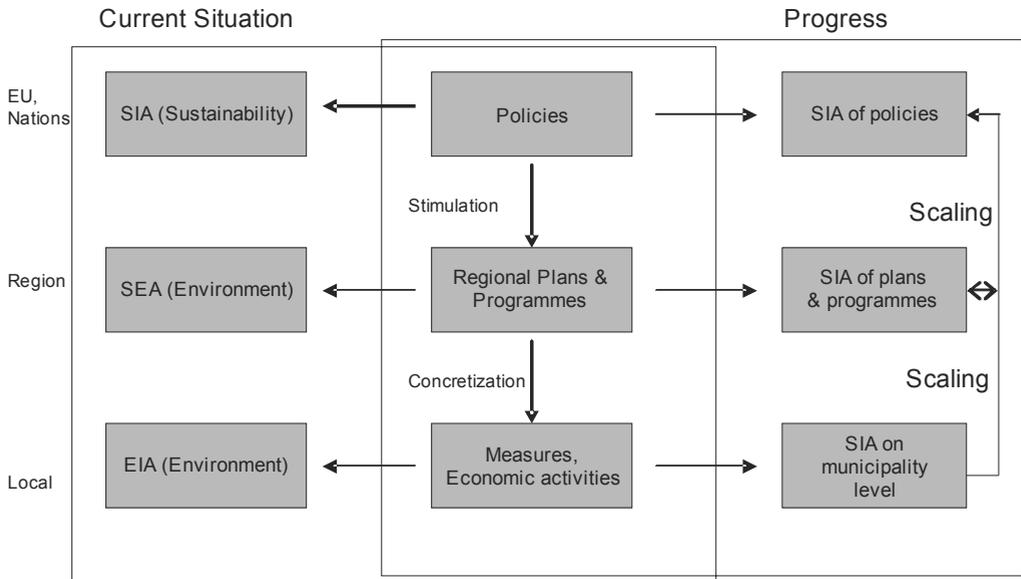


Fig. 3. Progress in SIA adaptation to plans, programmes and projects for regional and municipality scale compared to current IA application (own figure)

When the SIA be applied during the policy formulation process a wide set of potential regional plans and programmes will be focused as scenario by including a set of potential projects with impacts on the economic, social and environmental dimension of sustainability and with land use impacts. A feedback loop is essential by scaling up and summarising the impacts to the policy formulation level.

It should be clear, that the scaling down of the policies' impacts implies several methodological problems of assessment, data, scaling, modelling and policy design. These potential impacts are a result of diverse positive, neutral and negative influences on landscapes and regions. The SIA development offers the chance to apply and widen landscape ecology to decision making before the landscape change is done and the impact is given. This relays to the early forecast of ecologic, social and economic impacts as part of the decision making process.

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