

CRITERIA FOR THE ENVIRONMENTAL EVALUATION OF REGIONAL SPATIAL PLANNING: THE CASE OF STRATEGIC ENVIRONMENTAL ASSESSMENT OF CENTRAL MACEDONIA'S SPATIAL PLAN

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ABSTRACT

Spatial planning is one of the main application fields of the Strategic Environmental Assessment (SEA). SEA is a compulsory procedure for spatial plans and is defined as a comprehensive and systematic process for ex-ante evaluation and environmental impact assessment at a “higher” level than that of an individual project, as its scope refers to policies, plans and programmes. Regarding the case of the Regional Spatial Planning and Sustainable Development Frameworks (RSPSDF), SEA is characterized as a complex procedure, as it requires, in contrast to the planning processes followed on the corresponding Sectoral Spatial Plans, the evaluation of a comprehensive multi-sectoral (and therefore multi-variate) strategic framework. The main output of the RSPSDF procedure can be summarized in the determination of guidelines and principals with various environmental effects and complex synergies. It includes guidelines regarding the adjustment of residential and population development, the enhancement of social welfare, inclusion and cohesion, the exploitation, use and management of natural resources (limited or renewable), economic development and the productive restructure of all economic sectors, the programming of communication, transport, energy and logistics networks. It also includes the policies for the management, protection and enhancement of the natural environment, cultural heritage, landscape which, along with the above-mentioned socioeconomic elements, must be integrated in a common strategic framework. SEA's main concern is to assess the resulting environmental effects of this framework and to give measures to prevent, reduce and, if possible, address any significant negative effect on the environment. In this procedure, the selection and specialization of the methodologies, methods and techniques play an important role on the environmental impact evaluation.

This paper deals with the methodology which is followed for the identification and selection of the evaluation criteria used in the context of the Environmental Report of the RSPSDF of Central Macedonia (Nuts II Region). The methodological tools, which were developed for the ex-ante evaluation of socio-economic programmes at European level by the Guide EVALSED, such as relevance matrices, logical framework analysis were used, aside with the typical environmental analysis tools such as DPSIR model.

In addition, special interest was given to integrating the subject of territorial impact assessment and territorial agenda (including the proposed macroregional strategies), in the overall evaluation in order to upgrade the use of SEA procedure in the wider development processes. Although this methodology is promoted at European level, indeed it does not have an official regulatory form. Finally, the paper focuses on the considerations, terms and restrictions proposed by SEA which provide additional measures to the Framework for Sustainable Development, which originally constituted a key objective of regional planning.

Keywords: Strategic Environmental Assessment, Spatial Development, Regional Planning, Territorial impacts

1. Introduction

The choices of Spatial Planning are of great importance for achieving sustainable development. Every instruction, guideline and measure proposed by the Spatial strategy has mixed economic, social and environmental impacts. The assessment of those impacts are usually subject of ex-ante evaluation, which, in the case of the environment, is carried out by the Strategic Environmental Assessment (SEA). Since spatial planning undertakes the land uses and development prospects organisation and regulation of different and often non compatible nature, SEA has to deal with the evaluation of complex impacts.

In Greece, Spatial Planning at Regional level as applied by Law (L.) 2742/1999 includes guidelines regarding the adjustment of residential and population development, the enhancement of social welfare, inclusion and cohesion, the exploitation, use and management of natural resources (limited or renewable), economic development and the productive restructure of all economic sectors, the programming of communication, transport, energy and logistics networks. It also includes the policies for the management, protection and enhancement of the natural environment, cultural heritage, landscape which, along with the above-mentioned socioeconomic elements, must be integrated in a common strategic framework.

In order to proceed the environmental evaluation of the above-mentioned sectors, first step is to determine the criteria that are expressing the ability to ask the right questions. Those that will provide evidence about the size of the significant effects on the Environment, the reversibility, the cumulative effects and the synergies that can arise. In order to do so, regarding the case of the SEA of the Central Macedonia's Spatial Plan we used various ex-ante evaluation techniques such as relevance matrixes, logical frame analysis and multicriteria analysis methods.

2. Implementing sea in spatial planning (concept and definitions)

It is a fact that the academic literature regarding the multidisciplinary field of SEA has been continuously growing at such a pace that it can be difficult to follow the progression of scientific achievement (Caschili *et al.*, 2014) and the latest results showed that SEA practice changes very slowly when compared to advanced thinking supporting the noted shift, being still predominantly rooted in the logic of projects' environmental impact assessment (EIA) (Lobos and Partidario, 2014). It is usually referred as a compulsory procedure for spatial plans and is defined as a comprehensive and systematic process for ex-ante evaluation and environmental impact assessment at a "higher" level than that of an individual project, as its scope refers to Policies, Plans and Programmes (PPPs). The different results of the process and methods are described in a report (SEA Report), which is part of SEA and provides feedback to the bodies that make decisions and to public, as the consultation and public participation is another crucial element of SEA procedure. It also seems to include the socio-economic effects (as seen from the definition of Sadler and Verheem (1996) and Partidario (1999)) and is actually one of the main environmental management tools which aims at improving the environment and raising environmental sensitivity by ensuring that PPPs reflect sustainable development issues (Jones *et al.*, 2005).

However, according to White and Noble (2013) and their review of a decade of academic research regarding SEA, many underlying barriers were identified which challenge SEA for sustainability (i.e. the incorporation of sustainability in SEA), including "the variable interpretations of the scope of sustainability in SEA; the limited use of assessment criteria directly linked to sustainability objectives; and challenges for decisionmakers in operationalizing sustainability in SEA and adapting PPP development decision-making processes to include sustainability issues".

There are many connection factors between SEA and spatial planning, proving their dialectical relationship and interdependence, such as the convergence of their objectives, the similarity between SEA techniques and spatial planning tools, as well as between SEA and spatial planning process. Although one of the main scopes of Spatial Planning (Article 1, L.2742/1999)

is the protection of the environment and the promotion of sustainable development, the complex relationships between the development functions lead to an evaluation need of the overall environmental result in order to confirm this direction. Though commonly referred to as a tool, SEA represents a process which can improve decision-making and sustainable development. It is therefore arguably related to planning objectives, timing of the planning process and inclusion of what is referred to as strategic elements — i.e. assessment of alternatives and cumulative impacts (Bidstrup and Hansen, 2014). Despite this strategic SEA, various international studies conclude that current planning practice is not taking full advantage of the tool, and therefore according to Bidstrup and Hansen (2014) the paradox of SEA is defined as the methodological ambiguity of non-strategic SEA.

Having mentioned the main concept and definitions of SEA’s implementation in spatial planning, it should be noticed that regarding the case of the Regional Spatial Planning and Sustainable Development Frameworks (RSPSDF), SEA is characterized as a complex procedure, as it requires, in contrast to the planning processes followed on the corresponding Sectoral Spatial Plans, the evaluation of a comprehensive multi-sectoral (and therefore multi-variate) strategic framework.

3. The selection of evaluation criteria

The overall methodology for the Impacts evaluation and the identification of the prevention, control or restoring measures was based on the DPSIR model adopted by the EEA, according to the following scheme.

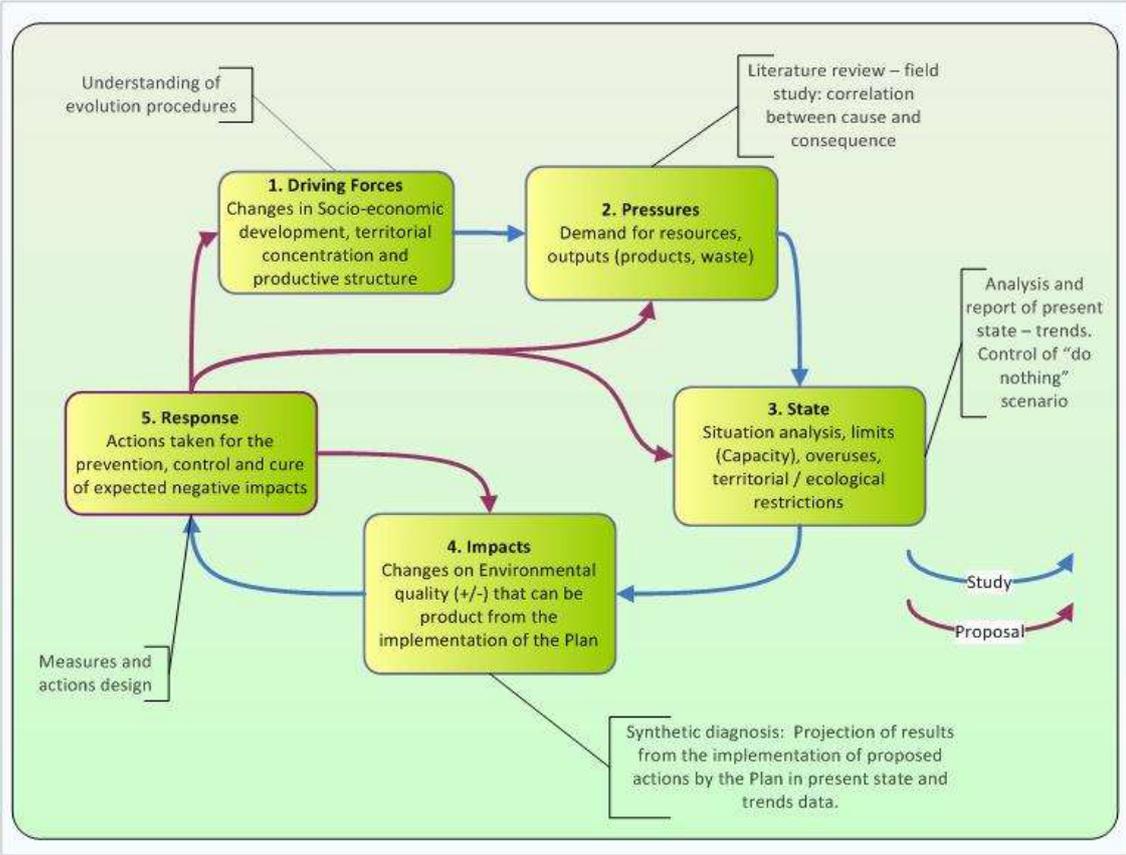


Figure 1: The DPSIR model used in Spatial Plan’s SEA

First step was to determine which environmental issues are likely to be affected by the Regional Spatial Plan. Since the plan has an holistic and multi-sectoral intervention all the proposed by the Directive themes (biodiversity, Flora- Fauna, Climate Change etc) were examined. In order to identify the key issues, a connection between Driving Forces (DF) and Pressures (P) was

established. DF considered all the provisions of the Spatial Plan that are likely to motivate -drive to motion- changes of the environmental status by modifying (negative or positive) current Pressures.

Second step was the "screening" of the relevant institutional and regulatory framework. In order to decide which policies or legal documents are relevant, we used the shortlist of issues provided by the first step. Three types of relevant environmental policies/strategies were identified:

- General policies concerning the Protection of the Environment (such as the 7th Environment Action Programme, the Habitats and Birds Directive, the EU Water Framework Directive etc) at international or national level
- Spatial Policies of "higher level" with significant environmental component, such as the European Territorial Agenda, the National Spatial plan
- Regional environmental strategies, such as the River Basin Management Plans (RBMP), the Regional Waste Management Plan, the Regional Operational Programme etc.

These policies/strategies were grouped by theme and sorted hierarchically (e.g. RBMP under WFD), whereas typical *ex-ante* evaluation tools were used. By the use of a relevance matrix, each theme was related to the Strategic Targets of the Spatial plan in order to determine, at a strategic level, the areas that the plan will affect/contribute.

In a more operational level, each theme was further analysed according to the DF-P investigation, in order to provide a set of key questions. In fact, these questions produced the variables in order to evaluate the environmental impacts at a strategic level and for practical reasons, a list of 44 key questions was created (see table 1).

As it can be seen in table 1, apart from "typical" environmental issues that the SEA Directive describes, two additions were made. The first one concerns special Climate Change issues (adaption and mitigation) as proposed by the EU guidance notes for SEA (EC, 2013). The second one refers to a thorough inclusion of variables referring to the Territorial Agenda with the Key Questions 18 to 30 related to specific topics of it.

Furthermore, the examination of the Plan's impacts was carried out using the above-mentioned 44 criteria. The assessment was made by sector/issue and then synergies and cumulative impacts were assessed per environmental issue.

Following the structure of the Plan, five main sectors were recognised:

1. Population Development - Residential Network
2. Productive Sectors
3. Transport
4. Natural and Cultural Environment and Landscape
5. Networks

Regarding these areas, the productive sectors were further analyzed to:

- a. Agriculture - Livestock - Aquaculture
- b. Mining
- c. Energy production (RES)
- d. Processing
- e. Tourism
- f. Services (including health, education)
- g. Mobility (the relevant provisions are incorporated in Transport)

The impact assessment was conducted by evaluate each sector (from 1-5 and from a-g) at the 44 questions, according to the possibility, size, reversibility, frequency/duration of each possible impact that can be produced.

Table 1: Key questions for the Assessment of Central Macedonia's Spatial Plan

<p>Biodiversity. Is the Plan implementation expected to affect:</p> <ol style="list-style-type: none"> 1. The extent and consistency (internal) of protected areas? 2. The coherence of the system of Significant Biodiversity areas, ecological corridors? 3. The alteration of characteristics of natural ecosystems? 4. The ecosystem services? 5. The integration of conservation in planning process and the promotion of "green infrastructure"? 6. The security - protection level of under pressure and/or forest areas?
<p>Flora - Fauna. Is the Plan implementation expected to affect:</p> <ol style="list-style-type: none"> 7. The maintenance of genetic diversity? 8. The richness and composition of the populations of wildlife species? 9. The supporting of local crop and animal breeding of genetic, scientific, ecological, or cultural value?
<p>Adaptation to Climate Change. Is the Plan implementation expected to affect:</p> <ol style="list-style-type: none"> 10. The ability of the environment to extinguish - alone - the impact of climate change? 11. The likelihood or magnitude of natural disasters due to extreme weather events (heat waves, floods)? 12. The need to protect coastal areas from erosion/sinking? 13. The combat of the "Urban Heat Island" phenomenon and living conditions in the cities?
<p>Mitigation of Climate Change. Is the Plan implementation expected to affect:</p> <ol style="list-style-type: none"> 14. The achievement of the targets for GHG? 15. The carbon sequestration capacity of natural ecosystems? 16. The achievement of the targets regarding the renewable energy and energy efficiency? 17. The shift to small or zero emissions (traffic)?
<p>Population - health - material goods. Is the Plan implementation expected to affect:</p> <ol style="list-style-type: none"> 18. The level of living conditions in the city? 19. The social cohesion and the protection of vulnerable groups? 20. The abandonment or aging in hilly - mountain and/or rural areas? 21. The accessibility of health and social services? 22. The value of the land, the public nature and access to public goods? 23. The likelihood and magnitude of impacts from natural or technological disasters?
<p>Land use and development perspectives. Is the Plan implementation expected to affect:</p> <ol style="list-style-type: none"> 24. The protection of productive land and the efficient use of space? 25. The need to develop transport, energy and environmental management and the cost of construction/operation? 26. The balanced territorial development (population and income retention) and city relations - countryside? 27. The land use conflict and competition for space or resources (that may increase pressure on them)? 28. The efficient use of resources in relation to their distribution? 29. The local income, entrepreneurship and employment? 30. The reuse/recycling, urban - unutilized building stock?
<p>Waste Management. Is the Plan implementation expected to affect:</p> <ol style="list-style-type: none"> 31. The production of solid waste, their qualitative composition or their risk? 32. The programming of projects - infrastructure for achieving the targets of the National Waste Management Plan? 33. The reducing and reusing of materials and consumer products?
<p>Air pollution - Noise. Is the Plan implementation expected to affect:</p> <ol style="list-style-type: none"> 34. The locally levels of air pollution (or the conditions of its formation)? 35. The residential exhibition or tourist areas to noise?
<p>Cultural heritage - Landscape. Is the Plan implementation expected to affect:</p> <ol style="list-style-type: none"> 36. The existing character of the landscape or creating new degraded landscapes? 37. The commitments to protect the coastal zone? 38. The enhancement of natural and cultural monuments - sites?
<p>Water. Is the Plan implementation expected to affect:</p> <ol style="list-style-type: none"> 39. The consumption of water resources to meet human activities? 40. The pressure on surface or underground systems (pollution, salination)? 41. The implementation of management measures to achieve the objectives set?
<p>Soil - desertification. Is the Plan implementation expected to affect:</p> <ol style="list-style-type: none"> 42. The increase of fertilizer or pesticides application? 43. The depreciation/change of the irrigation systems efficiency? 44. The consolidation/rehabilitation of polluted soils?

4. Conclusions

The Strategic Environmental Assessment of the Regional Spatial Plans is a very complex process because it refers to all sectors and issues concerning the regional space, including the integrated planning of economic sectors and infrastructures, the urban development, the

mobility, the environmental protection and social policy. This multidimensional approach results in the formation of complex and some times conflicting forces that are likely to affect the environment. The reduction of this complexity is necessary in order to have a certain result. This is why, a thorough link between the Spatial Plan and all the broader Policies, concerning environmental protection and sustainable development, is needed in order to formulate "key evaluation questions".

Regarding the case of Central Macedonia's Regional Spatial Plan, the combination of environmental assessment methodology, such as DPSIR model with "classic" socio-economic evaluation tools provide a context to focus the environmental questions and to create an evaluation matrix system of 44 variables which was used in order to examine the impact of 10 different sectors that the plan regulates. This system helped to control complexity in order to provide evidence for the overall (including cumulative) impacts on the environment.

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