

# NEW APPROACH FOR ELABORATING ENVIRONMENTAL STUDIES AS PART OF ROMANIAN TERRITORIAL PLANS

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**Abstract.** While the science of ecology progressed towards a systemic approach, due to being a regulated activity, territorial planning was unable to keep up with its developments. As a consequence, the elaboration of environmental studies as a part of urban and spatial plans utilizes in Romania an outdated methodology. In parallel with it, several studies employed a new methodology, developed in accordance with the principles of systemic ecology. This paper attempts to develop an analytical framework to compare the two approaches. The results indicate that the new methodology has numerous advantages and should be used despite of not being imposed by the regulatory framework.

**Key words:** global change, biodiversity, NUTS, natural protected areas, holistic

## 1. Introduction

The science of ecology evolved in time to adopt a holistic view, according to which the environment is organized as a hierarchy of units with quantifiable structural and functional units, represented by coupled socio-ecological systems (Vădineanu, 1998, 2004). However, the planning process is a regulated one (Lacaze, 1990), and therefore slower in incorporating the scientific progress, part due to the inertia of the juridical system, and part due to the uneasy relationship between science and politics (Silver, 2005).

In addition to it, the recommendations of the International and European Union with respect to environmental analysis

changed to account, using an integrated approach, for a Strategic Environmental Assessment instead of the Environmental Impact Assessment. The main difference between the two is that “*the object of assessment generates different methodological requirements related to the scale of assessment and to the decision-making process*” (Partidário, 2007). The new concept allows for a better integration of the pillars of sustainability (Abaza *et al.*, 2004) and is particularly useful to resolve specific environmental issues of transition countries, such as the consequences of industrialization (Alshuwaikhat, 2005). Under this framework, the new methodology accounts for several key principles, such as accountability, providing for a holistic,

cross-sectoral and integrated perspective, and focus on critical factors for decision-making, and meets the requirements related to differentiated methodologies and consideration of scale (Partidário, 2007).

This paper attempts to analyze existing recommendations on the elaboration of environmental studies associated to territorial plans (urban and spatial) in contrast with the results of using a new methodology accounting for the progress of ecology, already applied to over 30 urban and spatial plans, in an attempt to prove the need for change, using Romania as a case study.

### *1.1. Existing guidelines*

According to Grigorovschi (2008), the legislative instruments governing the elaboration of urban and spatial plans in Romania are:

- A 1991 order of the Ministry of Public Works and Spatial Planning discussing the forms, authorization procedure and contents of the urban and spatial plans,
- A 2000 joint methodology of the Ministry of Waters, Forests and Environmental Protection and the Ministry of Public Works and Spatial Planning describing environmental analyses required for the elaboration of territorial plans,
- A 2006 proposed contents elaborated by NRDI UBANPROIECT in 2006,
- A proposal started (and never completed) in 2008 by the Ministry of Development, Public Works and Housing

As it can easily be seen, the first two documents have a legal status (were approved), but are outdated, while the last two did not pass the proposal stage.

These documents require a description of the physical environment (relief, climate, fauna, and flora; water, soil, and forestry resources), areas exposed to natural or technological risks and pollution, issues such as lack of water resources, uncontrolled waste disposal, and overall environmental quality described for each environmental factor (component) separately: air, water, soil, fauna, and flora. In addition to them, a separate chapter describes the natural heritage: protected areas, and those requiring protection due to human aggression or presence of valuable resources.

The next step consists of assessing the gap between current and desired statuses, establishing a diagnosis and priorities as part of a strategy including a schedule of actions.

As it can be seen, the approach is a typical anachronism, reflecting a sectoral view of the environment, perceived as a sum of factors instead of a hierarchy of systems.

### *1.2. Proposed methodology*

The proposed methodology relies on an essential concept introduced by the Rio de Janeiro United Nations Conference on the Environment and Development in 1992. The key concept is eco-diversity, including the diversity of living systems, natural or man-dominated (biodiversity) and diversity of the non-living world (geological, climatic etc.); it is important to understand that diversity is crucial for the ability of ecological systems to maintain themselves within the carrying capacity limits, and has an optimal value; its decrease and increase have adverse consequences over the stability of systems (Tomescu and Savu, 2003).

In addition to diversity, its conservation is equally important. It has to be stressed out here that, unlike the 'Zero Growth Strategy' view of conservation as strict *preservation* (Meadows *et al.*, 1972), sustainability involves an active management applied in different ways to representative samples only, observing several principles:

1. Maintenance of systems within the carrying capacity limits instead of intact preservation
2. Biogeographical representativeness
3. Differentiated conservation, involving inner zoning
4. Local support of communities in drafting and implementing the plan of management
5. International cooperation

In more concrete terms, biodiversity is of systems placed at different hierarchical levels can be described by existing classification and data in relationship with the Nomenclature of Territorial Units for Statistics (NUTS) using its spatial levels (Table 2).

**Table 1.** Critical analysis of the existing approach

Advantages	Disadvantages
1. Legally approved	1. Not scientifically sound
2. Has a history of application	2. Not compliant with Strategic Environmental Assessment
3. Easier to apply	3. Updated information is costly
4. Does not require new data	4. Sectoral approach
	5. Irrelevant to decision makers

In more detail, the core contents of a study carried out according to the new methodology includes:

1. General characterization: ecological or biogeographical regions, relief units
2. Types of ecosystems or habitats: land cover and/or use, including changes (CORINE data)
3. Natural habitats, if known
4. Elevation, hydrography, climate (includes changes - DIVA-GIS data)
5. Data on soils, if available

6. Data on fauna and flora, including protected species
7. Natural protected areas
8. Natural hazards: floods, landslides, earthquake (zoning)
9. Proposals based on the results of all analyses presented above

**Table 2.** Correspondence of the hierarchies of systems in ecology and spatial planning and spatial diversity (Petrișor, 2012)

Ecological system	Descriptor	NUTS level	Diversity
Structural and functional sub-units of ecosystems	EUNIS habitats	-	$\alpha, \omega$
Ecosystem	Land cover and use (CORINE, Anderson)	NUTS V (LAU II)	$\alpha, \omega$
Regional complex of ecosystems	Ecological regions (second level), relief units	NUTS III	$\beta, \gamma, \omega$
Macro-regional complex of ecosystems	Continental biogeographical regions, ecological regions, relief units	NUTS II, NUTS I national territory, continent	$\gamma, \delta, \epsilon, \omega$
Ecosphere	Global biogeographical regions	Globe	$\omega$

## 2. Methodology

The method used in this study was to compare the two approaches using an analytical framework. The criteria were scientific soundness, availability of data, analytical capability, quantification possibilities, relevance for the beneficiary, legal character, type of approach, and costs.

### 3. Case study: Rușii Munți Commune, Mureș County, Romania

To illustrate the methodology with a brief example, a recent general urban plan of Rușii Munți Commune in Mureș County, Romania was chosen.

The analysis of land cover and use shows that the most important types of ecosystems are agro-ecosystems (57% of the total area), particularly pastures (25%

of the total area) and unirrigated arable land (16% of the total area), then natural ecosystems (38% of the total area), especially broadleaf forests (21% of the total area) and mixed forests (17% of the total area). Human settlements and waters make up together only 5% of the total area (Fig. 1).

The analysis of land use changes (Fig. 1) shows that 2.28 ha were deforested during 1990-2000 and 52.03 ha during 2000-2006. Also, in the first period an area of 55.52 transitional woodland-shrubs was transformed into forest by natural regeneration (reforestation) or human intervention (afforestation). These changes are characteristic to the mountain area in the northwest of Romania (Petrișor and Ianoș, 2012).

The analysis of natural protected areas (Fig. 2) reveals two NATURA 2000 Special Conservation Areas covering 80.95 ha, meaning 1.86% of the total area. Moreover, an important part of the territory falls under the incidence of the Carpathian Convention, reclaiming special protection.

#### 4. Results and discussion

The results of comparison, showing the superiority of the new approach, are shown in Table 3.

#### 5. Conclusion

The study aimed to compare two methodologies used to elaborate the environmental studies as a part of territorial plans: the approved or proposed methodology is outdated and no longer compliant with the recent developments of systemic ecology. The new methodology is scientifically sound and has strong analytical capabilities, especially if used in conjunction with GIS as a decision support system. Therefore,

the new approach should be preferred to the existing one despite of lacking the regulatory framework needed to enforce it.

The results suggest the superiority of the new approach. Apart from its scientific soundness, it benefits upon strong analytical capabilities, especially if used in conjunction with GIS as a decision-support system (Cowen, 1998; Sârbu, 2011); another advantage of this conjunction is the free availability of data.

**Table 3.** Comparison between the existing and proposed approaches to the elaboration of environmental studies as part of territorial plans

Criterion	Existing approach	Proposed approach
Scientific soundness	No longer sustained by the progress of ecology	Compliant with recent developments in ecology
Availability of data	Data must be provided by local authorities; the process takes times and does not always yield results	Data freely available, including Internet sources; however, data such as CORINE are not frequently updated
Analytical capability	Very reduced; the approach is merely descriptive	Good analytical capabilities (e.g. use of transitional dynamics to analyze land cover/use changes)
Quantification possibilities	Very reduced; additional numeric data can be used to support statements	GIS allows for quantifying the results by measuring areas, in conjunction with spatial analyses
Relevance for the beneficiary	Not always useful; can be the simple result of a literature review	The quantitative results are relevant and can pinpoint trends relevant to planning
Legal character	Some approved, but outdated; some are proposed	Not approved, not proposed
Type of approach	Sectoral, simple literature review	Holistic; desk study based on data analysis
Costs	Additional costs can be charged for data	GIS licensing costs

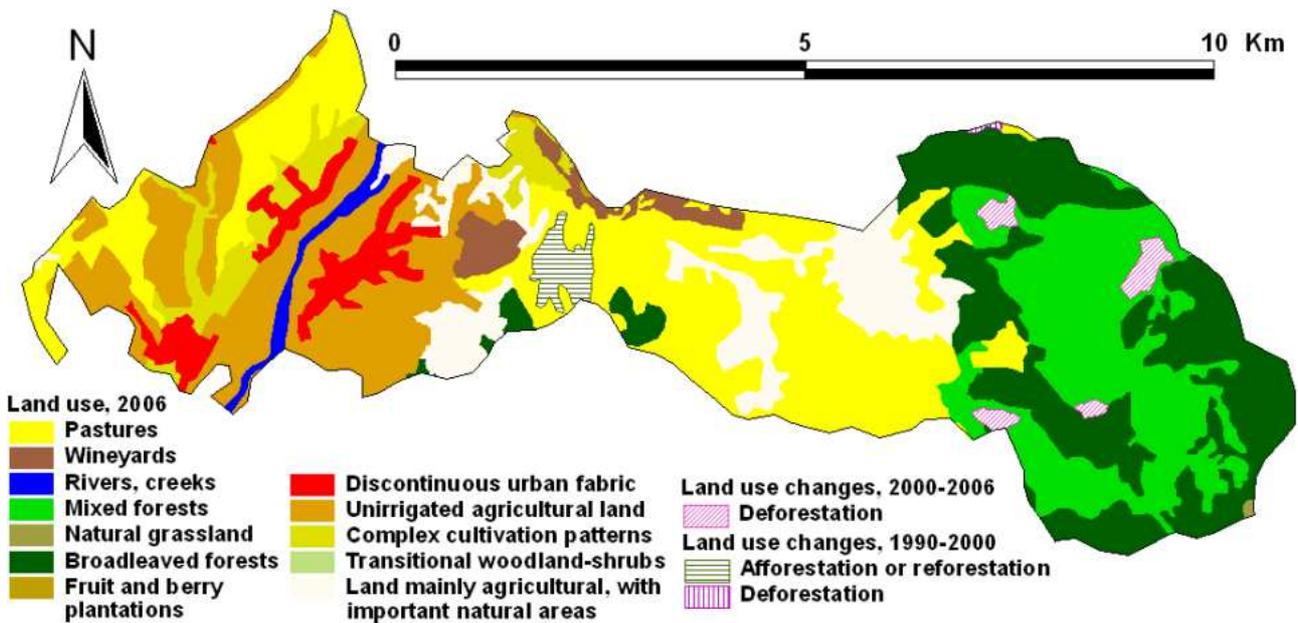


Fig. 1. Analysis of land use and land use changes in Rușii Munți Commune, Mureș County, Romania

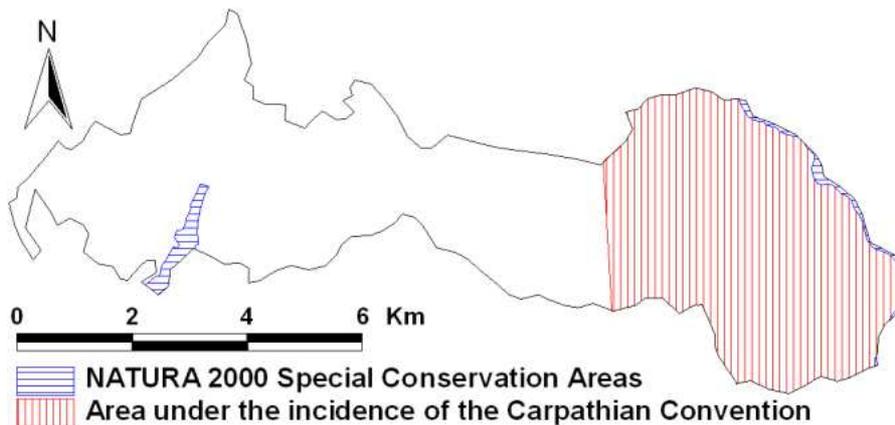


Fig. 2. Analysis of natural protected areas in Rușii Munți Commune, Mureș County, Romania

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