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Formulation Matters! The Failure of Integrating Landscape Fragmentation Policy

Tereza Aubrechtová ^{1,*} , Eva Semančíková ² and Pavel Raška ³

¹ Department of Physical Geography and Geoecology, Faculty of Science, University of Ostrava, Chittussiho 10, 10 00 Slezská Ostrava, Czech Republic

² Department of Ecosystem Biology, Faculty of Science, University of South Bohemia in České Budějovice, Branišovská 1760, 370 05 České Budějovice, Czech Republic; evi@jcu.cz

³ Department of Geography, Faculty of Science, Jan Evangelista Purkyně University, České mládeže 8, 400 96 Ústí nad Labem, Czech Republic; pavel.raška@ujep.cz

* Correspondence: tereza.aubrechtova@osu.cz; Tel.: +420-776-714-154

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Abstract: Uncoordinated land development results in landscape fragmentation, which is a complex and serious environmental threat to the Czech landscape. It poses a challenge especially for (post)industrial urban agglomerations with extremely low connectivity of green–blue infrastructure. Environmental and spatial planning strategic policy documents are considered to represent long-term communicative instruments for effective environmental protection. Current experience shows that policy documents are commonly poorly integrated, and burdened by formulation inconsistencies. In this study, we (i) specified the driving factors causing landscape fragmentation, describing how the issue is understood by environmental and spatial planning strategic policy documents and (ii) identified criteria for the formulation of these documents at the national and regional governance levels. A content analysis of 12 strategic policy documents enabled the calculation of internal consistency and an assessment of their inter- and cross-sectoral integration. The results revealed formulation flaws in documents, leading to serious misunderstandings of the meaning of the landscape fragmentation between environmental (biocentric) and planning (anthropocentric) policy domains. This aspect makes the horizontal and further vertical cooperation between policy domains difficult. Guidelines for the formulation of strategic policy documents may improve their intelligibility and support smoother environmental policy integration.

Keywords: environmental policy integration; policy documents; landscape fragmentation; internal consistency; SMART policies; green

1. Introduction

Policy making is a multi-actor and multi-level complex process expressing political decisions, where the actors, as well as the distribution of resources and other factors, play the main roles [1,2]. The actors set the policy agenda prioritizing specific issues [3,4] which are influenced by their values, knowledge and emotions [5]. Actors' interactions develop the policy and they are responsible for its implementation [1,2,6]. Environmental and any other policies are expressions of the objectives of national governments [7] communicated in a form of decentralized sectoral strategies, and represented by strategic policy documents. Jacob et al. [8] understand those documents as communicative instruments defining visions and longer-term objectives [9]. Their mutual synergies are important for policy implementation [2] and avoidance of unexpected and undesirable environmental events.

The general concept of integrating environmental concerns into sectoral policies is embedded in the environmental policy integration (EPI) principle. EPI is a part of a number of international

agreements, including the Earth Summit in Rio de Janeiro 1992, Chapter 8 of Agenda 21, the European Union's Fifth Environmental Action Program, and the European Community Treaty [10–12]. The need to integrate environmental policy and sustainable development into inter-sectoral policies became one of the key policy objectives of the European Union (the Third Environmental Action Program, 1983 and the Amsterdam Treaty, 1997). Member states were encouraged to develop sectoral integration strategies supporting environmental integration into non-environmental policy sectors. A statement was signed in 1998 in Cardiff and is referred to as the “Cardiff process” [13].

EPI was emphasized to increase environmental protection, which should encourage a more holistic view of the associated problems. EPI can be understood as an outcome of strategies/plans, as well as a policy process, or its product (i.e., policy objects, goals, measures, actors, actor's networks, structures, procedures, and instruments) [14,15]. To secure policy integration, the strategic policy documents must be compatible, non-conflicting, and coordinated. They should proactively allow the early stages of the policy process to be able to prevent and reduce environmental damage and the negative effects of different sectoral policies on the environment [15]. This aspect is especially important in the process of spatial planning [16]. To avoid the internal inconsistency of strategic policy documents, and support their intelligibility across policy sectors and governance levels, the proposed goals and measures must be well specified and linked together and the documents must be well structured [7,17].

National strategic policy documents provide an overall framework for lower-level policies that help implement the general strategic aims into practice, using specific goals, measures, and activities [18]. Current experience shows, however, that especially environmental aims are frequently poorly implemented into strategic policy documents. Policy implementation depends on many factors [1,4,5]. One of those factors is the intelligibility of the strategic policy documents.

The incomprehensibility of strategic policy documents has several causes. Firstly, the strategic aims are often too vague, contradictory and burdened by huge uncertainty and conflicts of interest [19] and disregard some parts of a selected problem [1]. Secondly, the synergy of vague goals and measures lead to conflicts between interacting sectoral policies [20]. Thirdly, policies from different sectors, governance, and spatial levels bring poorly integrated approaches for proposing solutions for too many environmental issues [21]. Effective and sufficient environmental policy is highlighted as one of the spatial planning challenges for (post)industrial [22] and shrinking cities [23,24] and their suburban and peri-urban contexts [25].

The livability of cities has become a widely discussed topic concerning the issues of a city's resilience, ecosystem services [26], urban wilderness [27], and also landscape connectivity [28]. The latter might provide a great opportunity for establishing green networks in environmentally burdened regions [29–31]. Landscape fragmentation is a serious threat to the European landscape in general [32] and it can also be used as an example of a complex cross-sectoral environmental issue, where the process of EPI can be demonstrated.

Czechia ranks among the ten European countries with the most fragmented landscape [32], yet Czech policy provides only limited administrative tools (cf. [9] for classification) to strengthen EPI. It lacks clear and legally binding instruments to support the internal consistency or even the mutual compatibility of strategic policy documents [33]. Moreover, politicians have very vague ideas about the aims and goals of strategic policy documents and do not specify any criteria that should be followed by them. The Czech government does not provide any instructions on how the strategic policy documents should be structured and how to secure their mutual compatibility and support EPI.

The aim of this study was to design a methodological framework revealing the formulation flaws of strategic policy documents, which are one of the aspects complicating EPI. The study was applied to the example of landscape fragmentation. We analyzed Czech strategic policy documents from the environmental and planning domains, both at the national and regional governance levels. In doing so, we addressed the two key aspects of strategic policy document formulations: (i) driving factors, which focus on how the environmental issue (in our case, landscape fragmentation) is understood by

environmental and spatial planning strategic policy documents and (ii) internal consistency, describing how the issue is formulated and coherent within strategic policy documents, based on a set of criteria.

2. Environmental Policy Integration: Theoretical Background

EPI is a politically constructed term without a clear interpretation [11]. Policy integration is often perceived as a complex policy process [34], but it may focus only on the application of proper instruments to improve the poor state of the environment [35] or it might be a matter of understanding the problem itself [36]. It can be associated with the coordination and applicability of a certain policy [16,37,38], or observing a bargaining process and struggle between different interests [11]. However, the key message of EPI persists. It is a holistic consideration of environmental issues in non-environmental policy domains for the purpose of their practical applicability, as the environmental sector cannot achieve this by itself [39]. The integration of environmental concerns into planning sectors is believed to improve environmental protection, reduce and prevent conflicts of interest in land-use development, promote synergy between and within different policy areas, help to reveal misunderstandings in policymaking [16], and aid in achieving outcomes associated with jointly agreed policy objectives [20].

For the purpose of this article, we applied a strategic approach to EPI according to Simeonova and van der Valk [16], which is focused on the integration of diverse policy objectives into strategic policy documents. EPI is understood as a top-down process where the strategic policy documents represent communicative instruments for the achievement of environmental objectives. Generally, two main types of EPI are identified. Horizontal integration (HEPI) secures integration across policy domains at the same governance level [39]. The effective implementation of national policies into practice is secured by vertical integration (VEPI) between different governance levels [39–42]. VEPI dictates to lower governance levels and ensures governmental self-regulation [9]. Therefore, both vertical and horizontal EPI need to be analyzed for a thorough understanding of if, and how, environmental issues are integrated into strategic policy documents at a certain governance level.

The prerequisite for both horizontal and vertical cooperation of the policy domains is the internal consistency of strategic policy documents [20], corresponding to the formulation homogeneity of the environmental issue. The particular understanding of landscape fragmentation is demonstrated by the designation of driving factors to which landscape fragmentation is linked in a specific strategic policy document.

2.1. Driving Factors of Environmental Issues

Environmental issues, in general, are characterized by a high degree of complexity and uncertainty. Therefore, politicians tend to reduce such complex issues to a range of compliant variables [1,43,44]. The specification of driving factors in strategic policy documents helps to reveal how certain issues are understood and to what aspects they are linked [5,45,46]. By not doing this, and reducing the importance of the driving factors, it causes misunderstandings and leads to mutual inconsistencies between documents [47] and a biased perception of the issue [5]. Identifying and understanding the issue significantly influences the perception of certain environmental aspects by decision makers and other actors [48]. The issue's thematic content reduction may also be defined as the insufficient integration of the environmental issue between strategic policy domains and determines possible future failures and contradictions [49–52]. Therefore, the specification of driving factors related to landscape fragmentation is becoming an important part of the analysis of internal consistency and further EPI evaluation [53–55].

2.2. Internal Consistency of Strategic Policy Documents

Internal consistency is, for the purpose of this study, defined in accordance with Brigham et al. [56] and Norton [57] as an indicator of the coherence between a strategic policy document's articulated facts, goals, and measures. It examines whether the goals stated by the policy document are mutually

consistent and supportive of one another, or if they provide a series of platitudes not applicable for policy-making. Any inconsistency suggests a failure of coordination either between ministries or across governance levels [58]. The internal consistency of strategic policy documents is essential for their comprehensibility and clarity [59], enabling them to be applied and fulfilled in practice.

The assessment approaches for internal consistency vary. Brigham et al. [56] used the quantification of internal consistency, based on the fulfillment of specified criteria (questions) implemented in species recovery plans. In our case, we approached the issue from the discussion of the formulation needs for strategic policy documents to specify the internal consistency evaluation criteria.

At the EU level, Fergusson et al. [17] criticized the Cardiff strategies and identified 10 criteria, which should be contained in complex national strategies. Similar criteria were also adopted for the process of environmental assessments given by the EU Directive 2011/92/EU (known as the Environmental Impact Assessment—EIA Directive) and Directive 2001/42/EC (known as the Strategic Environmental Assessment—SEA Directive). The content of strategic policy documents is, however, rarely evaluated and if so, its evaluation is only in terms of the attainment of goals and measures, [1,38]. Even if this is one of the most common approaches, it is insufficient [60–64].

Several attributes can be used for the evaluation of the internal consistency of strategic policy documents. An overview of similarly oriented studies specifying criteria for strategic policy documents is summarized in Table 1 and is organized in accordance with the SMART framework [65], which specifies that the reachable objectives must be specific, measurable, attainable, realistic and time-related. The concept of “SMARTness” was applied to many fields of policy, such as water quality [66], policy planning and evaluation [67], healthcare [68,69], and global plant conservation [70,71].

Table 1. Evaluation criteria of the internal consistency of strategic policy documents [Source: the authors].

Criteria	Sub-Criteria	Definition	Reference
1st Level	2nd Level		
SPECIFIC	S1—Definition	Definition of the term “Fragmentation”	[5,17,19,64,72,73]
	S2—Context	Main causes and consequences of fragmentation	
	S3—Vision	Description of the desired target state of the landscape	
	S4—Goal	Goals fulfilling the vision and solving the issue	
MEASURABLE	M1—Indicator	Measurability of goals/measures achievement	[9,16,74–76]
	M2—Responsibility	Institutions, plans, documents responsible for fulfillment of goals/measures	
ATTAINABLE	A1—Constraints	Designation of goals/measures fulfillment obstructions	[17,64,77]
	A2—Measure	Determining measures reaching the goals	
REALISTIC	R1—Localization	Location of the issue or proposed goals/measures in the space	[73,78]
	R2—Instrument	Tools supporting solution of the issue (legislative, financial, etc.)	
TIME-BOUND	T1—Time frame	Time frame for implementation of the goals/measures	[17,72,79]
	T2—Prioritization	Prioritization of implementation of the goals/measures	

SMART criteria create the 1st level which is further enriched by the 2nd level of sub-criteria derived from a literature review (Table 1). Each environmental issue is specified by the 3rd level enumerating the driving factors related to the environmental issue, in this case, landscape fragmentation.

3. Landscape Fragmentation

Landscape fragmentation is a typical example of a complex environmental issue, where the main constraints in achieving EPI can be observed. Despite the long term efforts to establish ecological networks [80], Czechia certainly falls within the countries where landscape fragmentation should represent a focal environmental concern. Czechia ranks among the 10 European countries with the most fragmented landscapes [32]. The National Environmental Policy of the Czech Republic [81] considers landscape fragmentation as the 10th most serious environmental issue, as one half of the total

area of the country is significantly fragmented [82]. It is a serious form of human-induced environmental degradation [77] representing a major threat to ecological stability and biological diversity. It affects populations, communities, and ecosystems, as well as ecosystem services [83,84]. Landscape fragmentation is resulting from uncoordinated land development and poses a challenge for (post)industrial urban agglomerations with extremely low connectivity of green and blue infrastructure. The most important driving factors causing landscape fragmentation in Czechia are related to human activities such as land use changes, urbanization, infrastructure development, and the building of water structures, etc. [85–87].

Czechia has a system of multi-level governance, where the spatial planning policies are organized hierarchically at the national, regional, and local administrative levels. Spatial planning and environmental policies are the most appropriate approaches to mitigate landscape fragmentation [88,89], because they may directly define and support practices to prevent landscape fragmentation in the first place. Additionally, they improve the connectivity of fragmented land cover and identify areas that should be protected against fragmentation [90]. They also provide the framework for policies at lower levels [18], formulate statements, and define strategic policy solutions for the prevention of unexpected and undesirable future events [7,91].

4. Methods

We proposed a new approach to the evaluation of EPI across strategic policy documents, integrating an analysis of internal consistency, which is based on a set of internal consistency criteria derived from the literature review. The approach consists of several steps: (i) selection of strategic policy documents addressing the landscape fragmentation issue (4.1); (ii) identification of the driving factors related to landscape fragmentation specified by each strategic policy document (4.2); (iii) formulation of the internal consistency criteria priority (ICP) adopting the driving factors from the previous step (4.3); and (iv) analysis of the internal consistency of strategic policy documents accommodating the driving factors (4.3). The HEPI and VEPI calculations come from (v) the formation of the valuation matrix and (vi) the formulation of meaningful HEPI and VEPI scenarios. The combination of these approaches brings (vii) an overview of the information regarding the degree of VEPI and HEPI (4.4) into environmental and spatial planning strategic policy documents in the Czech Republic (Figure 1).

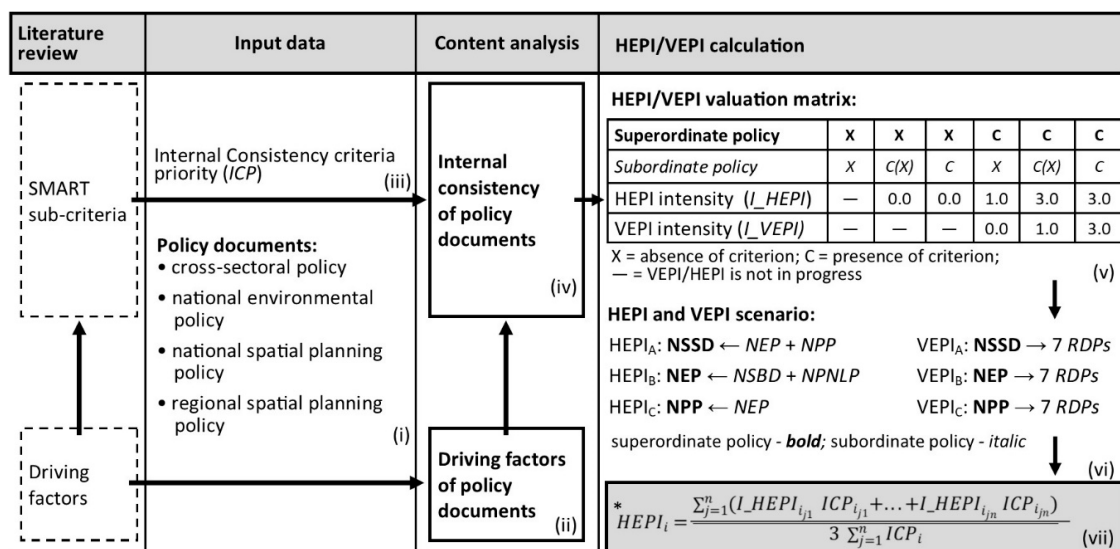


Figure 1. Schematic expression of applied methodological steps (roman numerals) for the horizontal environmental policy integration (HEPI) and vertical environmental policy integration (VEPI) rate calculations. * The $VEPI_i$ is calculated in the same way by replacing the I_{HEPI} to I_{VEPI} [Source: the authors].

4.1. Strategic Policy Document Selection

For the purposes of this study, the main national environmental and spatial planning strategic policy documents addressing landscape fragmentation and providing the strategic framework for lower governance levels were selected (Table 2). The analyzed documents were adopted between 2005 and 2015 and represented all available relevant national strategic policy documents from the Ministry of Environment and the Ministry of Regional Development. The regional governance level is represented by seven regional development plans (RDPs), which represent 50% of all RDPs in Czechia. The regions were selected in accordance with the existence of critical migration barriers [82]. This phase is marked as (i) in Figure 1.

Table 2. Description of the analyzed strategic policy documents [Source: the authors].

Name of the Strategic Policy Document	Responsibility	Level	Character	Description
NSSD —National Strategy for Sustainable Development (CG, 2010)	Czech government	national	mandatory cross-sectoral	forms a basic framework for other strategic policy documents at national, regional, and local governance levels; provides a base for other sectoral policies; irregularly updated
NEP —National Environmental Policy (MoE, 2012)	Ministry of Environment	national	mandatory environmental	provides a plan for effective environmental protection, key sectoral policy; irregularly updated
NSBD —National Strategy of Biological Diversity (MoE, 2005)	Ministry of Environment	national	mandatory environmental	defines the priority for biodiversity protection, relates to the measures specified by NEP; irregularly updated
NPNLP —National Program of Nature and Landscape Protection (MoE, 2009)	Ministry of Environment	national	mandatory environmental	provides goals and measures related to environmental protection for other sectoral policies; irregularly updated
NPP —National Planning Policy (MoRD, 2015)	Ministry of Regional Development	national	legally binding planning	provides a framework for fulfilling the spatial planning tasks; is legally binding for regional and local governance levels and coordinates their spatial planning activities; irregularly updated
RDPs —regional development plans	regional planning authority	regional	legally binding planning	integrates the tasks given by the NPP; coordinates spatial planning activities on the local level; updated every 4 years

4.2. Driving Factors Identifying Landscape Fragmentation

A thematic analysis [92] reveals how the processes of landscape fragmentation is understood in the selected strategic policy documents and which driving factors (causes) are linked to it. In order to explain differing meanings in specific strategic policy documents, the method of quantitative summative content analysis [93–95] was used.

Based on the literature review (Section 3), we selected the driving factors causing landscape fragmentation. The strategic policy documents were read through and their parts—especially context, goals, and measures—were indexed with proper driving factors. The meaning was checked by two coders to prove the objective evaluation of the text [96]. Symbols for the presence of goals and measures were assigned to specific strategic policy documents and recorded in a table with driving factors (Table 3). The driving factors were further used for the specification of the internal consistency criteria. This phase is marked as (ii) in Figure 1.

Table 3. Driving factors and reduction of the thematic frame for landscape fragmentation in national and regional strategic policy documents [Source: the authors].

Driving Factors	Thematic Clusters of Goals and Measures	Goals and Measures of Strategic Policy Documents											
		National Level *					Regional Level **						
		NSSD	NEP	NSBD	NPNLP	NPP	ZLR	VYS	STR	OLR	MSR	LBR	KVR
Technical and transport infrastructure	ordinary landscape protection	✓						✓					
	landscape fragmentation restriction	✓	✓	✓			✓		✓			✓	✓
	ensuring landscape permeability	✓			~	✓	✓	✓	✓	✓		✓	
	increase transport efficiency	✓					✓					✓	✓
	animal mortality reduction			✓									
Urbanization	ordinary landscape protection	✓					✓	✓	✓	✓	✓	✓	✓
	landscape fragmentation restriction	✓	~		✓	✓	✓	✓	✓			✓	
	ensuring landscape permeability				✓		✓	✓	✓			✓	
	efficiency of developed land usage				✓		✓	✓		✓	✓	✓	
Water management structures	landscape fragmentation restriction		✓		✓								
	ensuring landscape permeability			✓	✓				✓	✓	✓		
Tourism	ensuring landscape permeability			~	~								✓
Fencing	no goal stated			~	~								
Mining	ensuring landscape permeability										✓		
Agriculture and forestry intensification	no goal stated	~	~							~			
Energetics (power plants)	landscape fragmentation restriction							✓			✓		
	ensuring landscape permeability			✓							✓		
Factor is not specified	landscape fragmentation restriction						•			•			
	ordinary landscape protection										•		
	ensuring landscape permeability		•	•			•		•	•	•		

✓ the driving factor designated and the goal/measure stated ~ the driving factor designated in context of document, but no goal/measure stated • the driving factor is not specified, but the goal is stated. * NSSD—National Strategy for Sustainable Development, NEP—National Environmental Policy, NSBD—National Strategy of Biological Diversity, NPNLP—National Programme of Nature and Landscape Protection, NPP—National Planning Policy. ** ZLR—Zlín region, VYS—Vysočina region, STR—Central Bohemian region, OLR—Olomouc region, MSR—Moravian-Silesian region, LBR—Liberec region, KVR—Karlovy Vary region.

4.3. Internal Consistency of Strategic Policy Documents

The internal consistency of strategic policy documents answers the question: if and to what degree is landscape fragmentation comprehensively incorporated throughout and across the individual segments of strategic policy documents? The analysis was based on the set of 12 criteria identified in the literature review and describes the complexity of environmental issue formulation (Table 1). Being aware that the relative importance of the criteria may vary depending on the governance level, the analytic hierarchy process (AHP) was used to assign a weight to each of the criteria. AHP is a multiple decision-making tool, representing a problem-solving framework based on pairwise comparisons made by individuals [97–102]. The priority (importance) of criteria was derived from the individual judgments of 20 experts (only 18 were used due to the admissible consistency ratio of the decision matrix). The experts were represented by academics, the commercial sector, and the public sector, where eight were planners, eight were environmentalists, and four had another specialization.

SMART criteria [65] created the 1st level which was further enriched by the 2nd level of sub-criteria derived from the literature review (Table 1). These criteria can be applied to any type of environmental issue. For the specification of goals and measures related specifically to landscape fragmentation (the 3rd level of the criterion tree in Figure 2), we used the driving factors derived from the literature review (i.e., transportation, urbanization, installation of water structures, and others). The category “Others” multiplies the frequency of occurrence of the other six driving factors (tourists, fencing, mining, agriculture and forestry, energy, and vague stated goals where no driving factor is specified) (Figure 2). The priority of the criterion is expressed as a percentage of importance for the presence of each criterion in the strategic policy document. This phase is marked as (iii) in Figure 1.

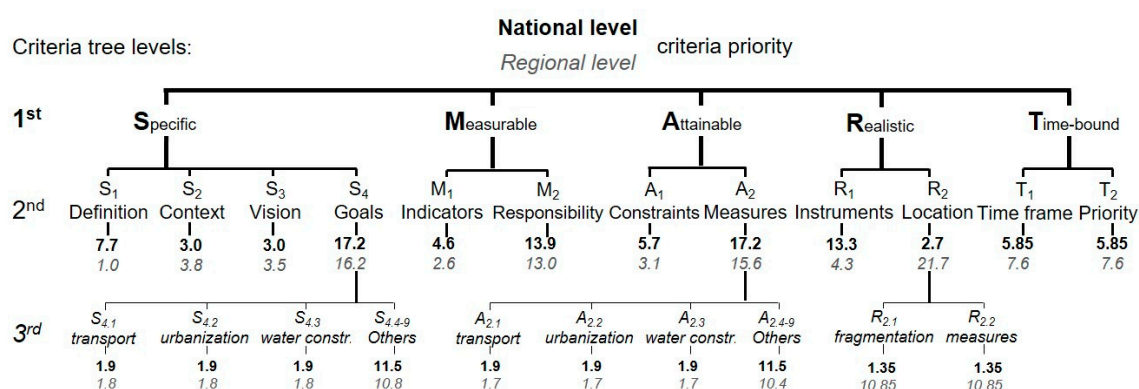


Figure 2. Tree for the priority of the internal consistency criteria for the national (bold) and the regional (italic grey) governance level [Source: the authors].

Parts of the text related to landscape fragmentation were extracted from the strategic policy documents and assigned to one specific sub-criterion, and its priority value (Figure 2) was coded for the internal consistency table (Table 4). The coding process was checked by two independent coders. The sum of acquired values in Table 4 expresses the total percentage for the internal consistency of certain strategic policy documents. The fulfillment (described also as presence/absence) of criterion, was further used for the calculation of the horizontal and vertical EPI. This phase is marked as (iv) in Figure 1.

Table 4. The internal consistency expressed by the presence/absence of criteria in the national and regional strategic policy documents expressed as a percentage (derived from Figure 2) [Source: the authors].

1ST LEVEL	SPECIFIC							MEASURABLE		ATTAINABLE				REALISTIC			TIMED		SUM
2nd level	S1	S2	S3	S4-Goals				M1	M2	A1	A2-Measures			R1	R2-Location		T1	T2	
3rd level	defin.	context	vision	trans.	urban.	water	others	indic.	respons.	constraint	trans.	urban.	water	others	instrum.	measure	fragm.	time	priority
NATIONAL STRATEGIC POLICY DOCUMENTS *																			
NSSD		3.0					1.9		13.9		1.9	1.9							22.6
NEP		3.0					1.9	4.6	13.9		1.9		1.9	1.9	13.3			5.9	5.9
NSBD	7.7	3.0		1.9		1.9	3.8	4.6	13.9		1.9		1.9	1.9					42.6
NPNLP	7.7	3.0			1.9	1.9			13.9	5.7		1.9	1.9		13.3			5.9	57.1
NPP				1.9	1.9				13.9		1.9	1.9							21.5
REGIONAL DEVELOPMENT PLANS **																			
ZLR				1.8	1.8		1.8		13.0		1.7	1.7		1.7					23.5
VYS				1.8	1.8		1.8		13.0		1.7	1.7				10.9			32.7
STR				1.8	1.8				13.0		1.7	1.7		1.7	4.3				26.1
OLR				1.8	1.8	1.8	1.8		13.0		1.7	1.7	1.7	1.7	4.3	10.9			42.3
MSR		3.8		1.8	1.8		5.4		13.0		1.7	1.7	1.7	3.5		10.9			45.3
LBR				1.8	1.8	1.8			13.0		1.7	1.7							21.8
KVR				1.8	1.8		1.8		13.0		1.7	1.7		1.7					23.5

* NSSD—National Strategy for Sustainable Development, NEP—National Environmental Policy, NSBD—National Strategy of Biological Diversity, NPNLP—National Program of Nature and Landscape Protection, NPP—National Planning Policy. ** ZLR—Zlín region, VYS—Vysočina region, STR—Central Bohemian region, OLR—Olomouc region, MSR—Moravian-Silesian region, LBR—Liberec region, KVR—Karlovy Vary region.

4.4. Horizontal and Vertical EPI Calculation

EPI is represented by the horizontal (HEPI) and vertical (VEPI) policy integration and their rates were expressed as the relation of two variables: internal consistency criteria priority (ICP) and HEPI/VEPI intensity (marked as I_{HEPI} and I_{VEPI}). The calculation was performed in four stages.

In the first stage, the valuation matrix was formulated (marked as (v) in Figure 1). It presents all possible combinations that may generally exist between the superordinate and subordinate strategic policy documents, based on modalities of the presence/absence of the internal consistency criteria (Figure 2). Within each combination, the superordinate policies are those that guide other strategic policy documents (considered as subordinate).

Secondly, the AHP was used to assign HEPI and VEPI intensity to all identified combinations where EPI was in progress. The maximum intensity rate was set at 3 (see (v) in Figure 1). The HEPI is perceived as a bottom-up approach, where the criteria from the subordinate strategic policy documents are transcribed to the upper level of the superordinate strategic policy documents. Therefore, integration was present only if the subordinate document fulfilled the criterion. If the criterion was missing, integration could not proceed. The only exception was the situation where the subordinate documents do not include the criterion but it does appear in the superordinate document (C–X). This situation was perceived as having the potential for further EPI. In contrast, VEPI is a top-down process, where the criterion from the superordinate strategic policy document must be transcribed to the subordinate level, even if the superordinate strategic policy document is not legally binding for the subordinate one. In contrast to HEPI, if the criterion is not present in the superordinate policy, the integration was not ongoing. Although especially at the regional level, this logic can be influenced by the local specifics of the region (X–C or X–C(X)).

Thirdly, three specific national HEPI and VEPI scenarios were elaborated on and characterized by the expected relationship between the strategic policy documents (marked as (vi) in Figure 1). Within HEPI, the scenarios were defined using the relationship between the subordinate and superordinate documents. $HEPI_A$ indicates the integration of key strategic policy documents from the Ministry of Environment (NEP) and the Ministry of Regional Development (NPP) to the cross-sectoral NSSD. $HEPI_B$ indicates integration at the level of the Ministry of Environment. $HEPI_C$ is focused on integration among the environmental and planning policy domains. Within VEPI, the scenarios represented the guiding role for the three key national strategic policy documents for regional planning policies. $VEPI_A$ observes the integration among cross-sectoral NSSD; $VEPI_B$ among key national environmental policy; and $VEPI_C$ among the key national spatial planning policy and regional development plans.

Finally, the level of specific policy integration within all scenarios was evaluated (marked as (vii) in Figure 1) based on the actual presence/absence of the internal consistency criteria in the respective documents and used the intensity of HEPI/VEPI calculated in the second step (above). Equation (1) represents the $HEPI_i$ calculation. $VEPI_i$ is calculated in the same way, replacing the intensity of HEPI (I_{HEPI}) for the intensity of VEPI (I_{VEPI}). Number 3 in the denominator indicates the maximum possible value of HEPI/VEPI intensity. The rate of HEPI/VEPI for each scenario is expressed as a percentage.

$$HEPI_i = \frac{\sum_{j=1}^n (I_{HEPI_{i_{j1}}} ICP_{i_{j1}} + \dots + I_{HEPI_{i_{jn}}} ICP_{i_{jn}})}{3 \sum_{j=1}^n ICP_i} \quad (1)$$

5. Results

5.1. Driving Factors Identifying Landscape Fragmentation

The literature review revealed eight driving factors (understood as causes) related to landscape fragmentation, relevant in the Czech context. The analysis of strategic policy documents was focused on the context, goals, and proposed measures addressing landscape fragmentation. These goals and measures were grouped according to their similarity to six thematic clusters. The results of the

analyses are shown in Table 3. The results below are structured by policy domains (environmental and non-environmental).

The thematic framework related to a certain environmental issue should be provided by the key environmental strategy—National Environmental Policy (NEP). However, the way landscape fragmentation is addressed in the NEP differs across the other subordinate environmental strategic policy documents (NSBD, NPNLP) (see Table 3). A broader explanation is provided mainly by the National Strategy of Biological Diversity (NSBD). This document specifies goals for avoiding landscape fragmentation derived from the development of transportation and water management structures, and warns of the danger of wind farms for migrating birds. It also mentions issues related to tourism and the fencing off of an opened landscape, but does not specify any goals for them. On the other hand, it omits development and urbanization as being among the listed fragmentation causes. This may have a significant implication as the goals for these specific driving factors are also absent in the NEP, which should provide a road map for the prevention of landscape fragmentation in relation to massive urban or industrial development.

A significant reduction in the understanding and importance of addressing landscape fragmentation is noticeable in the cross-sectoral policy (NSSD) and in the planning policy (NPP). Both strategic policy documents link landscape fragmentation with two prevailing driving factors—transportation and urbanization. This limited trend is repeated at the regional governance level (RDPs) due to the legally binding character of the NPP.

The analysis of driving factors also points to a misunderstanding of landscape fragmentation due to the absence of a clear definition of the issue at the national level. While the environmental policy describes and frames the issue as a negative phenomenon influencing ecosystems and biodiversity, the planning policy describes and frames fragmentation as a desirable phenomenon allowing people to move through the landscape. Therefore, the goals and measures provided by those two policy domains are contradictory.

5.2. Internal Consistency of Strategic Policy Documents

The internal consistency of all the analyzed strategic policy documents did not exceed 50% of its potential (except for two environmental policies, which only slightly exceeded this level). The internal consistency of the non-environmental strategic policy documents reached about 25% (Table 4). The most neglected criteria were vision and threats, but of greater importance was the omission of the issue definition, which caused a significant discrepancy between the environmental and planning domains (5.1). Missing indicators do not allow future comparisons for the evolution of the phenomenon. The results below are structured by governance level (environmental and non-environmental national policy first, then regional level).

The highest rate of internal consistency among environmental policies was achieved by the NPNLP (57.1%), which is understood as an action plan for the NSBD (42.6%). The specification of goals and measures within the same policy domain was mutually inconsistent. The main inconsistencies with respect to landscape fragmentation were a missing vision, omitted potential threats, and, above all, an unspecified location of the issue and its priority setting.

The strategic policy documents for non-environmental domains were even more incoherent. The cross-sectoral National Strategy for Sustainable Development (NSSD) and the key spatial planning policy (NPP) reached significantly lower values (around 22%) for internal consistency compared to the environmental domain (Table 4). Landscape fragmentation was not explicitly defined and was only linked with transportation and urbanization as being driving factors. The NSSD and NPP did not have any instruments relating to specific policies that would help fulfill the proposed measures, and the goals were poorly linked with these measures. Responsibility at the national governance level is present, because it came from the legal obligation of the related planning jurisdiction (Planning Act No. 183/2006).

Regional development plans (RDPs) provided a slightly better specification for the landscape fragmentation issue than the non-environmental national policies. They were determined by the local specifics of each region that may face profound environmental concerns. Yet, the absent definition of landscape fragmentation in national policies filtered down to regional governance levels, finally causing a different understanding of this issue and often creating contradictory goals. The goals, on the other hand, were strongly linked with measures, although, due to the missing information for issue occurrence, this may cause the ineffective allocation of instruments. Generally, the internal consistency of regional development plans related to landscape fragmentation was unequal and very low (the average value of consistency was 30.7%). The planning documents were a typical example of strictly goals- and measures-oriented strategic policy documents. They had no clear vision and prioritization, did not evaluate or implement threats, and did not set any monitoring indicators.

The results of the internal consistency assessment revealed formulation flaws in the non-environmental strategic policy documents, especially at the national level. However, even the internal consistency for environmental policies was around 50%. These results might be understood as an overall indicator of low cross-sectoral intelligibility for strategic policy documents in general.

5.3. Horizontal and Vertical EPI Rate

The results of the analysis of driving factors (5.1) and the internal consistency (5.2) provided a base for the EPI evaluation. The levels of both HEPI and VEPI, especially non-environmental policies, were very low and fluctuated around 19%. The only exception was HEPI for environmental policies reaching 50% of the possible maximum integration (Table 5). The results below are structured by policy domains.

Table 5. Result rates of HEPI and VEPI for the scenarios (Figure 1) [Source: the authors].

Scenario	HEPI	VEPI
A (cross-sectoral)	20.7	17.7
B (environmental)	50.2	19.1
C (planning)	17.7	20.0

Environmental documents (NEP, NSBD, NPNLP) administrated by the Ministry of Environment were not obligatory for any other policy domains or governance levels, but the NEP is perceived as a key environmental policy in Czechia. The NEP was poorly linked with the other environmental documents ($HEPI_B = 50.2\%$). However, the low $VEPI_B$ (19.1%) proved a weak connection between regional planning documents and environmental national policy. In essence, insufficient cross-sectoral communication was further deepened by the missing hierarchical structure of environmental policies where VEPI cannot be secured. The environmental strategic policy documents were not accepted by other policy domains.

The cross-sectoral NSSD is the hierarchically superordinate document which is prepared by the representatives of all the ministers of the Czech government. Therefore, all the sectoral documents should be mutually coherent. However, the horizontal EPI ($HEPI_A$) was only about 20.7%, meaning that the NSSD rarely integrated the key national environmental and planning policies. It significantly avoided the integration of landscape fragmentation into other policy domains. The NPP and also NEP were missing a large number of criteria and therefore in terms of $VEPI_A$ there were only a few aspects of landscape fragmentation which were integrated ($VEPI_A = 17.7\%$) at the regional governance level (RDPs). On the other hand, 87.5% of the criteria present in the cross-sectoral NSSD relating to landscape fragmentation were taken over by the regional RDPs. This indicated huge potential for applying vertical EPI.

The Ministry of Regional Development is responsible for the preparation of the National Planning Policy (NPP). The low value of $HEPI_C$ (17.7%) proved the previous claims about the critically weak

cross-sectoral coordination between the planning and environmental domains. In contrast to the Ministry of Environment, the Ministry of Regional Development secures a hierarchical structure of followed-up policies at the different governance levels. NPP is legally binding for regional (RDPs) and local development plans, which must be mutually consistent. The legally binding character and hierarchical structure of planning policy provides huge potential for the VEPI, which was actually only 20% due to the very low HEPI_C at the national governance level. However, 100% of the criteria present in the NPP relating to landscape fragmentation were taken over by the regional RDPs due to the legally binding character of planning policies. Although, the low interest in the landscape fragmentation issue in planning policies was proven.

6. Discussion

Environmental issues tend to be complex and burdened by a high degree of uncertainty. To secure their integration instead of a topic reduction, the policies must be well integrated at the local governance levels. This process must be gradual through the regional, national, and international governance levels, integrating the knowledge and aims of other policy domains [10,103–105].

The aim of this study was to design a methodological framework determining the formulation flaws of strategic policy documents between the environmental and planning domains at the national and regional governance levels. We choose the issue of landscape fragmentation as an example of a complex interdisciplinary environmental issue, which is present in the Czech landscape as a result of uncoordinated land development.

6.1. Causes and Impacts of Formulation Failure

In terms of the designation of driving factors, the results of this study showed that environmental strategic policy documents effectively specified the driving factors recognized by scientific literature, but their application persisted in being arbitrary and uncoordinated. This was especially true with regard to the non-environmental strategic policy documents which linked landscape fragmentation solely with transportation and urbanization. In addition, Semančíková et al. [89] point out that the Czech national environmental policy prefer biocentric focus (structural landscape connectivity), whereas planning policy tends to have an anthropocentric focus (accessibility of humans). In other words, the public administration provides opposite formal frames of landscape fragmentation. Turnhout et al. [106] point out that such a reduction signals low awareness of the issue by the public administration and the insufficient implementation of scientific research into strategic policy documents. This seems to have not been a problem in the environmental policy domain, but rather was an issue of insufficient coordination of the strategic policy documents by the Ministry of Environment. The result of this thematic fragmentation caused a thematic reduction in non-environmental policy domains and weakened the full integration of landscape fragmentation into strategic policy documents. The separate sectoral environmental authority has a very limited ability to insert environmental concerns into the decision-making processes of other sectoral authorities, therefore environmental issues must be integrated into all key sectoral strategic policy documents in the same way [39,107,108] and must be mutually coherent [3,20,61]. This coherence is significantly supported by the internal consistency of strategic policy documents.

To assess the internal consistency of the documents, we identified 12 criteria (Table 1) which should be used and incorporated by every document for any type of environmental issue. In terms of landscape fragmentation, the results showed that non-environmental strategic policy documents were less internally consistent than the environmental ones. The predominant criteria related to landscape fragmentation were context and measures, which were occasionally linked to the goals. This corresponds with the prevailing orientation on goals and measures of any policy document and also with the most often applied policy evaluation approaches [60–63,109]. Even if the high importance of the criteria for goals and measures was proven by the experts' valuation in this study (Figure 2),

a more complex formulation of the environmental issues must be provided to prevent cross-sectoral misunderstandings [7,17,110].

The experts' valuation also revealed that the value of certain criteria varied at the national and regional governance levels (Figure 2). The national documents should set a rigid thematic framework based firstly on the definition of the environmental issue. The identification of instruments is also important, because it may determine the policy tools (i.e., legislation or future funds allocation) [49,50,52]. Missing constraints are causing misunderstandings [110] and are important mainly at the national level. Their importance is even higher than that of the context criterion.

Regional policies, on the other hand, should be formed with special respect to the occurrence (an understanding of the location) of the environmental issue. Even if there is a wide database related to landscape fragmentation (unfragmented areas by traffic polygons, migration permeability of migration barriers for large mammals, or the legally binding Territorial System of Ecological Stability) in Czechia, the location of measures was only given by three RDPs. The absence of the criteria of occurrence and location for proposed measures were serious deficits of all RDPs, which may result in a low and ineffective application of the measures and financial costs allocated to them, as discussed above. A statement of responsibility secures the fulfillment of the policy goals [15,39] and the experts assigned the same importance to it at both governance levels. Except for the Ministry of Development, the responsibility is not mandatory and has a practically formal character.

We can conclude that the goals- and measures-oriented approach in environmental and spatial planning strategic policy documents prevail in Czechia. The low internal consistency in both domains points to the fact that the need for the formulation of strategic policy documents was not reflected by any guidelines from the Czech government [7].

6.2. How to Make the Strategic Policy Documents More Efficient

The results of the EPI analyses revealed that the integration of the landscape fragmentation of non-environmental strategic policy documents was lower than for environmental ones, but not fundamentally (Table 5). The environmental policies were better coordinated in terms of landscape fragmentation, but corresponded only to half of their potential. The vertical integration for environmental and non-environmental policies was almost the same and ranged below 20%. When evaluating particular HEPI/VEPI, it was difficult to determine what level of EPI to expect and what was to be acknowledged as a high or low level. Each strategic policy document had its own specifics and the value of 100% internal consistency for each environmental issue in the strategic policy document was not supposed to be achieved. The level of EPI should be perceived as an indicator of the clear intelligibility and specification of the environmental issue in strategic policy documents and should motivate policy-makers to improve their formulation and cross-sectoral communication. A deeper explanation of results is given below and is organized according to the following policy domains: environmental, cross-sectoral, and planning.

The environmental domain, represented by the Ministry of Environment, did not even integrate its own sectoral policies (HEPI). The National Environmental Policy (the key environmental policy) lacked features from the sectoral bottom-up approach, where the objectives related to landscape fragmentation were transcribed from the lower sectoral levels (NSSBD and NPNLP). The issue was internalized from the beginning and was not given by an external will or a new political declaration. The synergy of vague statements and the missing link between goals and measures led to conflicts between interacting sectoral policies [20]. This was represented by a weak horizontal integration of NPNLP and NSBD into NEP, where the goals were not linked with proposed measures and the definition provided by the subordinate policies was not integrated into the superior one. This is crucial for understanding the landscape fragmentation issue by non-environmental domains.

The lack of coordination within the environmental domain can be illustrated by the case of the Territorial System of Ecological Stability (TSES), designated as the main instrument securing structural connectivity of the landscape. This was enshrined in the Nature and Landscape Protection

Act (No. 114/1992) and Spatial Planning Act (No. 183/2006). Only the NPNLP linked the TSES with landscape fragmentation. The other policies completely omitted this instrument [89]. Lafferty and Hovden [39] state that the judicial support of environmental issues against societal and other objectives is a crucial aspect of the horizontal EPI. However, Veselý and Nekola [7] warn that legally binding instruments can only be fulfilled formally, without the desired impact in practice, as represented by the case of TSES.

The aforementioned gains of strong environmental governance are further significant when considering the challenges of the negative impacts of peri-urbanization, climate change, and an overall decrease in the provision of ecosystem services in urban areas. This is especially true for (post)industrial or structurally burdened regions, characterized by a significant amount of neglected urban space [111]. They could benefit from the establishment of the city's connectivity via green networks, increasing the livability of cities and the quality of life of urban citizens and mitigating the negative aspects of peri-urbanization [112].

Our results revealed that the cross-sectoral National Strategy for Sustainable Development (NSSD), mandatory for other key sectoral policies, in terms of HEPI, significantly reduced the complexity of the landscape fragmentation issue. This is particularly evident at the regional level, where the vertical coordination reaches the lowest level. Meanwhile, the cross-sectoral strategic policy documents have the potential to disseminate new visions, scientific knowledge, and approaches across domains [9] and provide a platform for transcending difficult goal conflicts [113].

The planning domain, unlike the others, is supported by judicial bases, which creates huge potential for sufficient VEPI [114]. However, the planning domain reached the lowest level of horizontal EPI from all domains, and therefore contributed to a similarly low VEPI. The measures provided by the RDPs were driven rather by the local knowledge base, unrelated to the occurrence of the landscape fragmentation phenomenon. The RDPs lacked many of the internal consistency criteria, and they were an example of ineffective goals- and measures-oriented strategic policy documents, where the measures related to landscape fragmentation were vaguely specified.

Despite the robustness of its results, the methodological approach of this work also had some limitations that must be considered. Firstly, the calculation of EPI was used as an indicator of the mutual coordination between different policy domains; it did not imply the overall quality of the document. To avoid these shortcomings, an in-depth discourse analysis will be beneficial to provide a broader understanding of the obtained data. The better formulation of strategic policy documents also does not guarantee their implementation in practice but increases the potential to do so [34]. Nevertheless, even if the organizational set-up and new policy-making principles were formally established, the success of EPI initiatives would still be dependent on many other external and internal factors influencing the different stages of the policy process (cf. [2] for classification). We mention only several key aspects: (i) the improvement of communication processes among the policy actors with a strong leadership securing the fulfilment and implementation of the policy goals [114], (ii) integration of departments and functions through the actors' network, (iii) establishment of new institutions or a statement of new mandates, responsibility and accountability [10,16,37,40,115], and, (iv) the most fundamental, the political will and public awareness [16,34]. The coordination, harmonization, and prioritization of environmental objectives should be secured as a part of the substantive dimension of EPI [2].

We would also like to emphasize that the exact relationship between internal consistency and the EPI is unclear; we focused on overall trends in the data and what they indicated about policy coordination. Finally, the calculation can be influenced by the experts' judgement relating to the importance of internal consistency criteria. However, the need for different formulation approaches to national and regional strategic policy documents is indisputable. Despite these uncertainties, the proposed method revealed many generally applicable insights into strategic policy documents' dispositions, reflecting some areas for improvement. The vertical coordination between governance levels was influenced by the level of internal consistency of the superordinate strategic policy document.

Therefore, particular attention should be paid to the formulation of the key policies of the individual policy domains.

7. Conclusions

The aim of this study was to assess the formulation inconsistencies in relation to landscape fragmentation in Czech strategic policy documents for the environmental and planning policy domains on national and regional governance levels. Landscape fragmentation has become a serious threat expressed both in the open and urbanized landscape, causing a degradation of the of quality of life, especially in structurally burdened regions.

The results revealed horizontal and vertical inconsistencies of both policy domains and governance levels, and identified a significant thematic reduction with the issue of landscape fragmentation. This reduction was most noticeable in the planning policy domain, primarily caused by an absent definition for the issue. The difference in the internal consistency prioritization criteria, highlighted a current gap in practice, where there are no methodological recommendations concerning how strategic policy documents should be formulated at a certain governance level.

We concluded that EPI within strategic policy documents related to landscape fragmentation might be understood as indirect, where the process is unplanned and the environmental benefits occur as side-effects. The non-obligatory character and absence of a hierarchical structure for environmental policies creates one of the most important obstacles to EPI in Czechia.

Further research should explore the applicability of the internally consistent strategic policy documents at different administrative levels to determine the importance of strategic policy formulation for EPI. Even though the consistency of strategic policy documents is an important part of cross-sectoral policy coordination, the most significant impact is that of the political will combined with the political culture and desire to communicate. Despite these uncertainties, the proposed method revealed many generally applicable insights into the disposition of strategic policy documents, highlighting some areas for improvement.

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