Divergence and conflicts in landscape planning across spatial scales in Slovakia: An opportunity for an ecosystem services-based approach?

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Abstract
This paper provides a detailed analysis of environmental policy implementation in national, regional and local landscape planning in Slovakia. The policy and strategic documents are assessed from the perspective of the ecosystem services (ES) concept, which integrates environmental and economic objectives of the landscape planning. This paper builds on three main empirical elements: (1) review of key national policies in respect to landscape planning, (2) review of local planning, strategic and assessment documents, and (3) stakeholder interviews and focus groups. Our results indicate that spatial planning and assessment processes in Slovakia based on legislation and regulations for individual sectors are mainly contradictory in some cases, rather than encompassing integrated (landscape) planning procedures. The ES concept has not been considered in any planning tools across scales. These results were found to be similar with respective EU policies, in which the limited uptake of the ES concept was also observed. Finally, the paper presents recommendations which can enhance spatial planning processes in Slovakia; using an ES-inspired integrated framework for landscape assessment and decision-making. Such improvement of planning and decision-making procedures can be exploited in real-world solutions, and provide long-term benefits for human well-being while still retaining links to ecosystem functions and processes.

1. Introduction

The Millennium Ecosystem Assessment (MEA 2003) defines landscapes as areas of land that contain a mosaic of ecosystems, including human-dominated ecosystems. In contrast, mosaic constellations and ecosystem spatial interactions between forests, agricultural land, wetlands and human settlements considerably determine landscape character. The multiple ecosystems that form landscapes provide a great variety of goods and services that constitute human well-being, and the links between natural ecosystems and community benefits and values in a particular landscape are expressed in the concept of ecosystem services (ES) (Liu & Opdam 2014). Landscapes are the most relevant research and planning objects for local practitioners, and landscape scale is a visible and understandable arena for the socioecological processes strongly shaped by planning outcomes (Bastian et al. 2006).

Landscape planning processes are often independent of national policies and strategies while they have considerable direct decision-making power. They also form an integrative approach to natural resource management in a particular region/landscape with very different regional ecosystem components, management forms and stakeholder interests. Implementing the ES concept in a systematic and holistic manner in landscape planning processes fosters integration between the environmental, social and economic aspects of ecosystem utilisation (Hauck et al. 2013; Albert et al. 2014). Although the holistic aspect includes all available knowledge on ecosystem functions and the assessment of all relevant ES categories and respective trade-offs (Schaich et al. 2010; Hauck et al. 2013), application of the ES concept in actual landscape planning processes is still rare (Schaich et al. 2010); largely restricted to pilot projects and specific ecosystems such as wetlands, or focused on very few ES such as carbon sequestration (Ghaley et al. 2014). Therefore, a broad range of issues related to the application of the ES concept in landscape planning has been discussed in research over the last couple of years. These include planners and other stakeholder knowledge requirements and objectives, the pros and cons of different participatory approaches and addressing potential impacts of integrating the ES concept in policy and decision-making processes (Cowling et al. 2008; Albert et al. 2014). This latter issue of standard implementation of the ES concept in policy and decision-making contexts has been particularly emphasised by Guerry et al. (2015).
Failure to implement the ES concept at the EU level is highlighted by Schleyer et al.'s (2015) contention that this is barely introduced in EU policies, and remains confined to policy arenas addressing natural ecosystems, forestry and agriculture. There are only four EU policy documents which reflect the ES concept in the design of measures; the Biodiversity Strategy, the Green Infrastructure Strategy, the Forest Strategy and the Invasive Species Regulation (Bouwma et al. 2017). This is an important finding because policy documents ‘inspire’ and ‘frame’ landscape planning processes. These EU policies, and the national and regional policies they induce, are therefore often crucial in implementing the results of landscape planning processes. Schleyer et al. (2015) discuss the potential reasons for the limited uptake of this ES concept in EU policies, while Maes et al. (2013) focus on the practical challenges involved in policy-induced mapping and assessment requirements.

‘Urban and territorial planning’ in Slovakia is one of the main regulatory instruments for settlement and regional spatial development. Here, the main competencies and responsibilities rest with the affected municipalities, supervised by the national Ministry of Construction and Regional Development; and the major aim of this territorial planning is to ensure balanced social, economic and environmental development in the respective areas concerned. Despite landscape planning processes being the most important element of this ‘urban and territorial planning’, they do not function as integrating planning procedures.

The current situation in Slovak landscape planning involves persistent inconsistency in individual landscape types. A major example is the several and often contradictory approaches and tools employed in management of competing landscape aims, such as forest management vs. nature and landscape protection. These differing approaches are based on sector assessments and decision-making processes, and different planning documents based on sector legislation are implemented in parallel instead of one integrative, landscape-oriented spatial planning concept (Table 1) (Miklós 2011b). This ‘fragmentation’ of planning documents, however, is only one aspect characterising the current situation in landscape planning, because a further critical issue lies in the distribution of competencies in these planning processes between the different sectors.

One reason for the differences and the persistence of sector planning approaches is the different spatial and temporal scales used in planning for the respective sectors. Although their objectives are similar, many differences and contradictions become obvious when the results and recommendations of these sector-based planning processes are compared. Although these inconsistencies are recognised at the national level and there are ‘intra-sectoral negotiations’ which cross-check the goals, priorities and measures of many national sector plan documents, no similar ‘intra-sectoral coordination’ or cross-check of planning tools, procedures and outputs occurs in local and regional situations. The main reason for this omission is the lack of reliable regional control mechanisms. Furthermore, directives and recommendations from national-level planning are often only formally implemented at the local level, without their full understanding by local planners and clear top-down communication of the main principles and

### Table 1. Scope, plans, competencies and scale of spatial planning in Slovakia.

| Planning scope | Related binding plans | Competency | Time scale | Spatial scale (map scale) |
|----------------|-----------------------|------------|------------|--------------------------|
| Land consolidation and agricultural planning (for cadastre areas) | Functional arrangement of landscape | Ministry of Agriculture and Rural Development | One-off elaboration | Local (1:5,000) |
| Forest management and planning (for forest management units) | Forest Management Plan | | Every 10 years | Local (1:10,000) |
| Water management and planning (for watersheds) | Watershed Management Plan | Ministry of Environment | Every 6 years | Regional (1:50,000) |
| Nature protection: … for cadastre areas, regions | Territorial System of Ecological Stability Management Plan (protected area) | Not specified not specified | | Local (1:10,000) Mostly regional (1:50,000) |
| … for protected areas | Territorial Plan | Ministry of Construction and Regional Development | Every 15–20 years (irregular amendments) | Local (1:10,000) Regional (1:50,000) |
| Urban and territorial planning (for municipalities and regions) | Landscape-Ecological Plan | Not specified (connected to territorial plan) | | Local (1:10,000) Regional (1:50,000) |
| Landscape planning (special part of territorial planning) | Strategic Environmental Assessment (SEA) | Ministry of Environment | One-off elaboration | Not specified (from detailed to regional) |
objectives involved. Thus, integrated national goals and priorities are largely ignored for the sake of sector goals and local interests. This is particularly obvious and creates problems when natural resources and environmental issues are incorporated in planning processes; and the importance of these issues is therefore often underestimated (Izakovičová 2004).

Table 1 highlights that the Landscape-Ecological Plan and the Plan of Territorial System of Ecological Stability integrate spatial and functional land-use assessments; harmonising the area’s landscape-ecological, culture-historical and socio-economic conditions (Izakovičová 2000; Míklös 2009). The Landscape-Ecological Plan was legally established in 2000 as an amendment to the Act on Territorial Planning and Building Order. This amendment also defines the Territorial System of Ecological Stability as the baseline document for the Landscape-Ecological Plan, and this document is legally binding in land consolidation processes (Moyzeová & Kenderessy 2015; Muchová et al. 2016). However, it must be stressed that the content, quality and implementation of such integrated documents are often limited due to their complexity. Although complexity creates greater demand for experts, this remedy is negated by insufficient planning of financial resources. In addition, poor understanding and interest in land-ecological targets in the decision-making sphere are reflected in little willingness to overcome these regional barriers (Izakovičová 2004).

Strategic Environment Assessments (SEA) are an integral part of Environmental Impact Assessments (EIA) in Slovakia. These are suitable tools for the evaluation – and to some extent, also the coordination – of landscape planning processes (Bečákrová 2012). SEAs evaluate implementation of development concepts, planning documents and valid directives and also their effect on environmental quality. Unlike landscape planning processes, SEAs are supervised by the Ministry of Environment and based on EU regulation implementation in national legislation.

The ES conceptual framework has been widely discussed in various scientific communities (as in De Groot et al. 2010; MAES 2014). Despite some minor differences in definitions, they usually illustrate transdisciplinary nature of the ES paradigm, by using service concept to link biophysical structures and processes to human values, benefits and well-being (Potschin & Haines-Young 2013). Although ES are contributions that natural or semi-natural ecosystems make to human well-being while still retaining links to ecosystem functions and processes, significant challenges exist for successful operation of the ES concept in real-world situations (Primmer & Furman 2012; Costanza 2016; Daily 2016). The ES concept is often criticised due to its inconsistency and impracticality (Nahlík et al. 2012), missing ethical position (Jax et al. 2013) or not considering complexity and dynamics of socioecological systems (Reyers et al. 2013). The study of Schröter et al. (2014) summarised critical voices to the ES concept into seven bundles: environmental ethics, human-nature relationships, biodiversity conflicts, ES valuation, commodification and Payments for Ecosystem Services (PES), vagueness and optimistic assumptions/normative aims. At the same time, the authors provided counter-arguments and the way forward.

Our article presents research in the EU OpenNESS research project (http://www.openness-project.eu/) which aims to translate natural capital and ES concepts into operational frameworks, and thus contribute to ES integration in land, water and urban management decision-making. The concepts and methods developed and refined in the project are applied in 27 concrete case studies based on a range of social-ecological systems with stakeholders (Dick et al. 2017); and the case study in urban and suburban Trnava town areas in Slovakia is presented herein. The main objective of this case study is to evaluate the current state of ES concept implementation in Slovakia; focusing on landscape and spatial planning from local to national level.

The OpenNESS research includes the analysis of current planning policy and strategic documents and their implementation in Slovakia. This is particularly relevant in the case study area covered by this paper. In addition, ES assessments are investigated using selected biophysical models and ES valuations. These are examined in participatory approaches and other non-economic valuation methods in the study area, but not covered by this paper.

The major research questions in this article are: how can the ES concept enable integrated and more sustainable land-use choices in the real world, and how can it fulfill multipurpose objectives in landscape planning. In answering these questions, our paper provides a detailed analysis of recent policy implementation in landscape planning in Slovakia. This covers national, regional and local levels, where related legislative tools and strategic documents are assessed from the ES concept perspective. Finally, the paper presents recommendations which will enhance planning processes in Slovakia; employing an ES-inspired integrated framework for landscape assessment and decision-making.

2. Empirical and analytical methods

This paper builds on the following three elements: Review of key national legislative instruments; Review of key local planning and strategic and assessment documents and Stakeholder interviews and focus groups.
2.1. Review of key national legislative instruments

2.1.1. Policy documents
Although development and implementation of ES assessments in Slovakia are supervised by the Ministry of Environment, further analysis of policy documents is required in other sectors. As argued earlier, landscape planning in Slovakia needs to integrate policy agenda, planning processes and results in many sectors. Here, we selected the most relevant policy landscape planning documents in Slovakia which affect either single landscape components or the main landscape processes. A total of 12 policy documents were analysed; divided into 2 main groups (Table 2): Primary interest policies assume that the policy explicitly features ES and other relevant policies assume that the policy implicitly features ES.

Simple ranking on the level of implementation of EU policies into selected national policy documents is then presented in Table 3.

2.1.2. Data analysis
Criteria for assessing policy documents were grounded in evaluation of EU policies towards the ES concept in the OpenNESS project (Bouwma et al. 2017). The selected binding and non-binding EU policy documents were checked for their coherence in addressing and incorporating the ES concept. The methods comprised internal coherence in assessing the link between objectives and implementation in particular EU policy, and external coherence in analysing goals and their implementation across different policy fields. While we covered the mentioned criteria for the research in our case study, data analysis was also shaped by the Slovak landscape and spatial planning focus. We therefore used the lens of an integrative landscape-oriented concept in fine-tuning our selection criteria.

Our assessment is presented in an analytical framework with the following criteria:

The document considers complexity because integration of economic, environmental, social and cultural aspirations is embedded in ES concept (Millennium Ecosystem Assessment (MEA) 2003, de Groot 2010). In particular, we referred to all main ES categories mentioned/not mentioned in the policy document (Sitas et al. 2014a).

The document considers multisectoral perspectives; its attempt to overcome narrow-minded sectoral views on landscape management by referring to policies from other sectors. Multisectoral plans are considered key drivers in linking ES and spatial development (Sitas et al. 2014b).

The document considers the needs of future generations – and to what extent the policy documents refer to the need for sustainable use of natural resources which is central to the ES concept (MEA, 2003).

The document uses specific economic valuation methods in connection to ES; for example, in the policy’s financial mechanisms (Bouwma et al. 2017).

The evaluator’s additional comments; based on personal knowledge and experience of the practical impact of the document’s implementation on delivering ES.

Analytic methods included; (1) simple scales rated some aspects; for example, ES are considered directly, partly directly/indirectly or not at all (Sitas et al. 2014a); Here, ‘partly’ implies that not the entire spectrum of relevant ES is considered and ‘indirectly’ infers that other terms were used to reflect ES; (2) expert’s judgement on valuation of the potential impact of policy on ES delivery; whether ES provision is positively or negatively affected after implementation of the policy and (3) particular chapters in policy documents were identified where ES issues were considered directly/indirectly, and the impact of policy on ES provision was recognised and assessed positively/negatively.

A detailed assessment template for this task was created by the Slovak OpenNESS project team of researchers dealing with ES. The team evaluated the national policy documents in this case study. Distribution of policy documents to evaluators was based on individual expertise and knowledge in particular policy sectors.

2.2. Review of key local planning and strategic and assessment documents
We reviewed documents important for case study area development on the local level. These were particularly territorial plans and development programmes for the entire Trnava region (NUTS 3), and also those centred on the Trnava township and surrounding villages (Table 2). A total of 11 documents were evaluated for the town and region and over 50 documents for related municipalities; including 25 Territorial Plans and 25 Plans for Economic and Social Development. It was obligatory to produce both documents types for planning processes on the local scale, and we also reviewed the 6 existing Plans of Territorial System of Ecological Stability and Land
### Table 2. List of reviewed documents and their main focus.

| Document | Main goal/scope of document |
|----------|-------------------------------|
| **Slovak republic**<br>Policy of primary interest | 1. National Strategy of Biodiversity Protection in the Slovak Republic 2012–2020<br>Goal: to halt biodiversity loss, to promote ecosystem restoration and support biodiversity and ES maintenance | 2. Act No. 543/2002 on Nature and Landscape Protection<br>Goal: to ensure sustainable nature conservation, protection of life diversity conditions and forms, the protection of natural values and creation of conditions for sustainable use of natural resources | 3. Act No. 50/1976 on Territorial Planning and Building Order (amendment No. 237/2000 on Landscape Planning)<br>Goal: spatial and functional land use in accordance with the principles and criteria for sustainable development, by ensuring compliance of development of individual activities in the country |
| **Other important policies**<br>Rural Development Programme for 2014–2020 | 4. Rural Development Programme for 2014–2020<br>Goal: basis for implementation of the support from the European Agricultural Fund for Rural Development in programming period of 2014–2020 | 5. Act No. 15/2005 on the Protection of Species of Wild Fauna and Flora<br>Goal: regulates the conditions for the protection of species of wild fauna and flora by regulation of trade of species | 6. Act No. 24/2006 on Environmental Impact Assessment<br>Goal: regulates the procedure of expert and public assessment of the effects of strategic documents and proposed activities on the environment, to prevent the negative impacts of newly proposed activities on the environment |
| **Trnava town**<br>Urban planning | 7. Act No. 7/2010 on Flood Protection<br>Goal: the planning, organisation and management of flood protection in order to reduce the adverse consequences of flooding on human health, the environment, cultural heritage and economic activity | 8. Act No. 364/2004 on Waters<br>Goal: comprehensive protection of water, including water ecosystems and ensures efficient, economical and sustainable use of water | 9. Act No. 220/2004 on Protection and Use of Agricultural Land<br>Goal: secures the protection of characteristics and environmental functions of farmland, ensures its sustainable management and agricultural use, as well as the protection of agricultural land from unauthorised requisition for non-agricultural use | 10. Act No. 326/2005 on Forests<br>Goal: preservation, enhancement and security of sustainable forest management to ensure the protection of forests as components of the environment and the preservation of natural wealth of the country in order to fulfil irreplaceable forests functions |
| **Trnava region**<br>Regional planning | 11. Act No. 330/1991 on Land Consolidation<br>Goal: rational arrangement of land ownership in accordance with the terms and conditions of environmental protection, Territorial System of Ecological Stability, agricultural land functions, operational and economic aspects of modern agriculture and forestry and rural development support | 12. Act No. 39/2013 on Integrated Prevention and Control of Environmental Pollution<br>Goal: environmental improvement; regulating the consumption of natural resources and the impact of human activities on the quality and quantity of natural resources, ecosystem functions and services | **Tmnava town**<br>Urban planning | 1. Territorial (Urban) Plan – 2010, Amendments in 2010–2014<br>State of the spatial development of Trnava town – housing, production, social services, nature and environment, proposals for the near future and further outline. | 2. Economic and Social Development Programme – 2006, updated in 2014<br>SWOT analyses, strategic goals, development priorities, action plan – economic investments, social measures, other actions. | 3. Territorial System of Ecological Stability – 2008, updated in 2014<br>Assessment of the state of environment, proposals for ecological network creating, landscape utilisation and environmental measures. |
| **Tmnava region**<br>Regional planning | 4. Energy Policy Programme – 2006<br>Current state of energy consumption and policy, proposals for new energy conception and measures | 5. General Transport Programme – 2008<br>Current state of transport, new conception of public and private transport, measures for car transport and parking. | 6. Housing Development Programme – 2006<br>Current state of housing and infrastructure, proposals for new housing development. |
| **Regional planning** | 7. Air Quality Management Programme – 2004<br>Current state of air quality, polluter inventory, proposals and measures for improvement. | 8. Waste Management Programme – 2002<br>Current state of waste production and management, proposals and measures for improvement. | **Regional planning** | 1. Regional Territorial (Urban) Plan – 2012–2013<br>State of the spatial development of Trnava region – housing, production, social services, nature and environment, proposals for the near future and further outline. | 2. Landscape-Ecological Plan – 2011<br>Assessment of state of the environment and its components, proposals for landscape utilisation, nature protection and environmental measures. | 3. Economic and Social Development Programme – 2009<br>SWOT analyses, strategic goals, development priorities, action plan – economic investments, social measures, other actions. |
| **Other municipalities**<br>Local planning | Economic and Social Development Programme<br>25 municipalities: SWOT analyses, strategic goals, development priorities, action plan – economic investments, social measures, other actions. | Territorial (Urban) Plan<br>25 municipalities: state of the spatial development of municipality – housing, production, social services, nature and environment, proposals for the near future and further outline. | Territorial System of Ecological Stability<br>6 municipalities: assessment of the state of environment, proposals for ecological network creating, landscape utilisation and environmental measures. |
| Land Consolidation Project | 6 municipalities: implementation of results from Territorial System of Ecological Stability in relation to land ownership. |
Consolidation Projects in municipalities with ongoing land consolidation. Here, we used the same assessment criteria template as we did for evaluating national policy documents.

2.3. Stakeholder interviews and focus groups

2.3.1. Stakeholder engagement

We requested feedback from experts on ES and relevant stakeholders at national, regional and local levels about their perception of the usefulness of the ES concept in Slovakia, its recent implementation, its relationship to the various policies, their individual knowledge of the concept and the barriers to accepting the ES concept in landscape planning processes. A range of methods in stakeholder participation for ES assessment has been applied (e.g. Fish et al. 2011; Palomo et al. 2013), our research was bounded with the implementation of the participatory methods proposed under the OpenNESS project (Dick et al. 2017) and the following empirical methods were chosen:

Workshops with the Case Study Advisory Board (CAB): The 10 CAB members represented local and regional governments, the Ministry of Environment, the Ecology and Environmental Sciences Faculty at the Technical University of Zvolen, a land-use planning company, an environmental NGO and representatives from the private business sector. Five meetings were organised between 2013 and 2016 to discuss issues related to the ES concept, its implementation and evaluation methods (Dick et al. 2017).

Focus groups with key stakeholders included 20 representatives from authorities responsible for the management of the study area and from research, education and planning organisations. These participated in all five meetings where the project team presented the ES concept and evaluation methods applied in the OpenNESS project case study. The meetings also covered the perceived importance of ES in the case study area, the relevance of ES assessments for regional and local policies and discussion on individual experience and knowledge of implemented local and national ES legislation.

Semi-structured face-to-face interviews with 25 individual municipal representatives performed in 2014 discussed positive and negative issues relevant to the ES concept and national, regional and local policies. This provided feedback on experience of practical implementation of different scale policies at the local level (see the interview template in the appendix).

2.3.2. Data analysis

Data were provided at the following three knowledge levels; (1) CAB members with the most expertise in ES; (2) stakeholders from focus groups initially unfamiliar with the ES concept gained awareness and knowledge during the iterative process and (3) municipal representatives with little knowledge of ES provided local practitioner viewpoints. Information obtained from these groups was noted, transcribed and further analysed using qualitative content analysis. This included the coding of interest items (Sitas et al. 2014b) which were sorted into categories emphasising different stakeholder groups and their perceived advantages and limits of the ES concept in policy and planning.

3. Results

3.1. National legislative and strategic documents

3.1.1. Objectives and general structure

From the 12 evaluated policy documents, we identified the three documents directly related to the ES concept with their main aim linked to maintenance and support of the respective ES: the National
Strategy of Biodiversity Protection, Act on Nature and Landscape Protection and Act on Integrated Prevention and Control of Environmental Pollution. ES are a central topic especially in the first two documents because they highlight the multivalued economic, social and cultural benefits derived from biodiversity and ecosystems. However, their content does not describe the approaches to be used in direct assessment, and they do not include directives on how ES assessments are to be implemented in practice.

Assessment of the remaining policies emphasises lack of direct connection to the ES concept, and although some ES categories are partly discussed and a few related issues are mentioned, these documents fail to provide a complete overview. The typical indirect reflection of ES is expressed through ‘optimal’ forms of land use; expressing sustainable use of natural resources and optimal ES provision.

3.1.2. Provisioning ecosystem services
The results for provisioning ES and for following paragraphs in this chapter are displayed in Table 4. This table highlights that provisioning services are not considered in half of the evaluated documents and often only marginally assessed in the remainder. The most prominent subjects of interest cover timber, crop biomass and non-drinking water sources. Although these provisioning services are explicitly mentioned, comprehensive assessment is lacking.

3.1.3. Regulating and maintaining ES
Although these are not explicitly discussed, they are implicitly connected to 8 of the 12 policies. Many services are described, but complete assessment is again lacking. The services include soil formation, protection against erosion and floods, filtering, retention and storage of fresh water, regulation of climate conditions and biodiversity enhancement.

3.1.4. Cultural ES
The assessment of this group of services is most distinctive in its explicit inclusion in national policies, that is, they are not mentioned in seven policy documents. The most frequent services mentioned are recreation, landscape beauty inspiration, cultural and historical knowledge and cultural identity linked to biodiversity conservation in rural areas.

3.1.5. Complexity and multi-sector approach
Our Table 4 results indicate that these issues are at least partly applied in the majority of policies, and mentioned in 8 out of the 12. However, this is due to the simple ranking scale applied, where ‘partial’ inclusion of other sectors or topics in the documents is addressed on different information levels. For example, the multi-sector approach is explicitly applied in
the Act on EIA, the Act on Territorial Planning and the Act on Nature and Landscape Protection, but complexity in respect to inclusion of all ES categories was incompletely evaluated. The Act on Waters was assessed as the most comprehensive and this includes evaluation of benefits derived from various ES and it covers all main ES categories and general environmental aspects.

3.1.6. Future generation needs
The EIA Act particularly focuses on these needs in ES quality and quantity considerations; by eliminating or limiting negative human intervention impacts on the landscape. This aspect is not fully covered by other policy documents; and it is totally lacking in both the Act on Forests and the Act on Land Consolidation.

3.1.7. Monetary values
While monetary values of the benefits derived from ES are explicitly quantified in three policies, a further four policies provide no economic assessment. Examples here include; (1) the social value of protected plants, animals, habitats of European importance and habitats of national importance covered in the Act on Nature and Landscape Protection; (2) lost income and compensation payments for specific management practices set out in the Rural Development Programme; (3) penalties for soil degradation, incorrect land use and compensation for deprivation of agricultural land imposed by the Act on Protection and Use of Agricultural Land and (4) other economic assessments, including the timber market value applied in the Act on Forests.

3.2. Local and regional planning and strategic documents

3.2.1. Trnava township and region
3.2.1.1. Objectives and general structure. Three of the 11 reviewed documents are implicitly related to the ES concept; the Territorial System of Ecological Stability for Trnava town and the Territorial Plan and Landscape-Ecological Plan for the Trnava region. The main aim of these documents is maintenance and support of natural resources and environmental quality although, contrary to these three national policies, explicit link to the ES concept is lacking. This absence prevents these documents addressing the ES assessment. In particular, these plans define ES categories in a general way without detailed analysis of their multifaceted impacts in landscape and society, thus negating solutions to trade-offs in urban and landscape planning. This lack is consistent with the identical problem encountered in the analysed national policies, and most other documents also relate to the ES concept only to a very limited extent; and mainly from the sector perspective.

3.2.1.2. Provisioning ES. The results for this and the following paragraphs in this chapter are displayed in Table 5; with only 1 of the 11 evaluated Trnava town documents insufficiently assessed in provisioning services. While urban planning documents are mainly expressed by existent fertile soils and drinking water natural resources which are considered limitations for town spatial development, their capacity has never been assessed. Apart from renewable energy resources, provisioning ES are barely mentioned although there is potential for their use. However, the regional territorial and landscape plans contain more complex assessments and other provisioning ES; including energy resources, raw materials, timber, fish and game.

3.2.1.3. Regulating and maintaining ES. In contrast to provisioning ES, this category is covered by fewer documents, and is implicitly implied in only four. Their assessment is mainly based on landscape structure and function, with indirect consideration of ES provision and the following regulations emphasised; erosion prevention, water run-off and flood control, local climate regulation, vegetation hygiene and biodiversity promotion. These ES are only covered to a limited extent in urban and territorial planning documents, and they are relatively absent in sector plans and programmes.

3.2.1.4. Cultural ES. Cultural ES are included in all assessed landscape and planning documents, but with limited explanation and inadequate analysis. Physical and experiential recreation and cultural-heritage historical values are considered important for both Trnava town and the region, but ES such as entertainment, religious, spiritual and symbolic values are completely absent; and the sector documents lack cultural ES assessment at all.

3.2.1.5. Other assessment criteria. Table 5 highlights differences established in inclusion of all main ES categories and multi-sector perspectives. For example, while it is apparent in document titles such as ‘sector programme’ and ‘socio-economic development programme’ that these analyse only their own sector, the Territorial System of Ecological Stability for Trnava town explicitly expresses comprehensive issues and satisfactorily assesses them. Although sustainability is at least partly discussed in the majority of urban and regional documents, economic assessment is lacking in all documents except for the three key plans covered in Section 2.1.1 of this article.

In analysing interconnection between the main documents for Trnava town and its surrounds, it is clear that the local documents are mainly based on regulations set at regional level, and that the level of
coherence in Trnava township documents is inadequate. As stressed in the multi-sector perspective above, the urban area sectoral programmes lack general context and do not conform to comprehensive planning processes. Although relative compliance is noted between the Trnava town Territorial System of Ecological Stability and Territorial Plan documents; where proposed ecological measures in the first document provide input for the urban plan proposal, the probability of converting these measures into functional operation appears ambitious and already lags far behind planning expectations (see Discussion). While the regional planning documents are relatively well interconnected and there are no major discrepancies in priorities, the Regional Landscape-Ecological Plan is only a background document for territorial and development plans, lacking mandatory implementation of its regulations and measures.

3.2.2. Surrounding municipalities

3.2.2.1. Objectives and general structure. Results from all assessed municipal local strategy documents clearly illustrate that the Plans of Territorial System of Ecological Stability conform at least partly with the main purpose of the ES concept. Although they are largely limited to regulating and maintaining services, these plans consider protection and maintenance of suggested ecological networks, features of ecological stability and initiations to eliminate environmental threats.

While basic documents for local spatial planning in villages are generally not directly connected to the ES concept and the Territorial Plan and Economic and Social Development Programmes do not mention ES, indirect links to the ES concept are formulated in the established principles of sustainable development, protection of natural resources, nature conservation and the protection of landscape cultural values. It is important here that connection between the local plan and ES concepts depends entirely on the document’s author, and this creates doubt whether the Territorial Plan or the Economic and Social Development Programme is more closely linked to ES concept implementation.

3.2.2.2. Provisioning ES. Provisioning ES are assessed implicitly and often in a very marginal and formal manner. The most common assessment is analysis of the natural conditions evaluated as resources and potentials for development of various socio-economic activities. Preference is given to the provision of food and drinking water, with less attention paid to materials and energy production. However, these are only superficially described; referring to the potential of local conditions and especially land use to provide biomass and water. Other provisioning services are not considered.
3.2.2.3. Regulating and maintaining ES. These services are included in assessed documents more often than other ES categories. Their inclusion is based on the assessment of ecosystems and landscape required for implementation of the Plan of Territorial System of Ecological Stability, or for planning other green and blue municipal areas. The most typical ES are: the presence of suitable habitats for the preservation and reproduction of wild plants and animals, protection against erosion, floods and droughts, insulation against odour and noise, visual isolation and the regulation of local climate conditions.

3.2.2.4. Cultural ES. Consideration of cultural ES is rare; usually focused on physical and experiential interaction in ecosystems, and often linked to traditional landscape structures. Scientific and educational benefits are assessed in only two villages as a result of research projects implemented by institutes and universities residing outside the study area, and spiritual, symbolic and other cultural ES are not mentioned.

3.2.2.5. Other assessment criteria. Regional planning documents reveal that the criteria of inclusion of all related ES and multisectoral perspectives are not met in local development and planning documents, except where the comprehensive Plan of Territorial System of Ecological Stability is developed. Sustainability factors are indirectly covered by proposed land use or intended measures, but there is no sustainability target in the documents and economic assessment is not applied. The level of compliance of the Economic and Social Development Programmes and Territorial Plans for municipalities also varies greatly depending on both document author and time of development. Coherence between these documents is generally low, with emphasis on housing, spatial development and other economic sectors at the municipal level rather than focus on environmental issues.

3.3. Perception by experts and stakeholders on the relevance and implementation of the ES concept

3.3.1. The ES concept and planning

The ES concept is unknown, except to a few experts at universities, the Ministry of Environment and NGO’s; and even then it is mostly perceived as a tool for environmental protection or nature conservation.

Our project prompted ES awareness and knowledge, and all key stakeholders who attended the project meetings agreed to include the ES concept in spatial planning as an integral part of future planning procedures. However, they argued for better reflection of measures from existing territorial plans and similar documents when using the ES concept, and this issue was directly highlighted by university ES expert during the final workshop: ‘the planning documents should consider trade-offs between the different ES on the same spatial and temporal scale’. This fact was accepted by participating Trnava and regional planners; with the proviso to also include experts on economic and social issues in ES evaluation. They considered this essential because regional-scale economic evaluation is inevitable in providing solutions to competing nature-based and private sector investment options. The stakeholders then agreed that this should increase transparency in land-use trade-offs. During the final workshop, a regional decision maker proposed that ‘multi-criteria assessments are required to assess the current state of the environment, its real potential to deliver ES and the priorities of stakeholders’.

Public authorities and two ‘freelance’ planners argued that current conditions are unsuitable for including the ES concept in planning procedures because there is insufficient support from national policies and financial resources to develop the documentation. They therefore appealed for inclusion of the ES concept in national policy documents, with simple methods to assess ES; ‘methods which are understandable and easily implemented by planners and decision-makers’. Planners from Trnava township then suggested using the ES concept in relation to climate change adaptation – this issue was recently discussed and calls for project proposals have been launched by the town office.

3.3.2. The ES concept and local implementation

Interviewed mayors with their ‘local-practitioner views’ often think environmental legislation an obstacle to rural development. They consider the Landscape-Ecological Plan and documents for ecological networks unnecessary, irrelevant and barriers to local planning. They invariably preferred investment focused on environment-related technical infrastructure and services connected with agricultural production in the favourable local conditions of relief, soil and climate. The mayors and other planners who participated in the meetings perceived that actual implementation of environmental/ecological measures is limited because of insufficient funds, and while these are often performed on a voluntary basis, the nature-based solutions are considered complementary and only activated when budget is in surplus.

The statement that ‘the implementation of the ES concept largely depends on land ownership’ was highlighted by an urban planner during the workshop, and also supported in mayoral interviews. They advocate that dealing with this issue in all planning processes should be considered in both the public and private interest of land owners so that suitable negotiations are settled in advance; especially when it is in the best ES interest that spatial areas are created on private land.
The planners agreed that ‘these issues take forever to settle’, because of complex land ownership structures in Slovakia where many owners are unknown and some private properties have many owners.

The above results gained from qualitative analysis of the many national and regional policy documents and from stakeholder and expert feedback have provided very useful and in-depth information on the recent and current situation in Slovak environmental policy and its links to the ES concept. We discovered notable divergence and conflicts in landscape planning; especially serious mismatches and opposing ideas in landscape-related disciplines, particularly in spatial scale. This highlighted hotspots where the ES concept can improve planning and decision-making procedures and finally provide long-term benefits for society. These ideas are now drafted in the following discussion.

4. Discussion

The limited uptake of the ES concept in Slovak planning processes and documents described herein is also observed in EU policy frameworks (Schleifer et al. 2015). Policies that explicitly mention ES usually refer to all three main ES categories, that is, provisioning, regulating and cultural ES, but regulating ES policies are mentioned in much greater detail than the other ES categories in all ES policies. The policies that only mention ES indirectly tend to refer to only a small selection of regulating ES, such as carbon storage or water quality, and the relatively few references to cultural ES generally focus on tourism and recreation. In addition, most of the addressed direct drivers relate to the main objectives pursued; including biodiversity maintenance (Biodiversity Strategy) and water quality improvement (Water Framework Directive), thus reflecting the sector nature of most policies, and this sector-dominance features prominently in the Slovak approach to landscape planning. Further, only very few EU policies require Member States to report on the stock/flow of a particular ES, and not all policies account for environmental impacts, or they focus only on very specific ecosystems such as the Water Framework Directive (Bouwma et al. 2017).

The ES concept encourages and provides comprehensive assessment of the quality and quantity of natural resources and their functions and benefits for both nature and people. It therefore has great potential as an appropriate framework for landscape and spatial planning processes and for Environmental Impact Assessment (IA) (De Groot et al. 2010; Gómez-Baggethun & Barton 2013; Mascarenhas et al. 2015; Rosa & Sánchez 2015; Geneletti 2016). Although policy appraisals such as IA appear crucial venues to embed the ES concept in policy and practice, or at least to implement ES thinking, other countries in addition to Slovakia have been very reluctant to implement the ES concept in their policy instruments (Baker et al. 2013). For example, despite UK policymakers and practitioners’ lengthy experience in applying the ES concept, they still encounter significant obstacles to ES systematic inclusion in practice. Turnpenny et al. (2014) made an extended review of 75 national-level IAs between 2008 and 2012. Their results showed that 17 of the IAs targeted environmental policies, 36 focused on environment-related policies such as agriculture, land and housing, energy, natural resources and transport, and the remaining 22 concentrated on non-environmental policies including social security, sport and criminal law. This study highlighted that only 12% included the ES concept; with environmental terms mentioned most of the time and ES only rarely. One reason for this lack of ES concept recognition may be that the ES concept is mainly acknowledged by scientists; and then only since the 1990’s. Moreover, the diffusion of scientific knowledge into policymaking and practice can be extremely slow because of institutional inertia, policy constraints and the time required by agents to accept and disseminate new ideas (Owen 2012). Finally, the integrative effects of the ES concept are not considered because of separation of planning systems into spatial-economic planning and ecosystem-related landscape planning.

Spatial-economic rather than ecosystem planning is also documented in our case study. While provisioning services are usually individual private interests, the regulating and maintaining ES and some parts of cultural ES are more often public and common pool resources. Even when landscape planning is well prepared by respective authorities in the delivery of public goods, these plans are open to many amendments where individual or interest-group goals are given priority. An example of this is the Urban Plan for Trnava town with its 21 amendments in 2010–2014. This exemplifies the lack of relational values in environmental policy which are derivative of relationships and responsibilities (Chan et al. 2016), and it requires the knowledge co-production of multiple disciplines, sectors and stakeholders to jointly produce the knowledge needed in managing this complex system in a sustainable manner (Reyers et al. 2015; Clark et al. 2016).

4.1. Integrated framework in landscape planning

Landscape-scale analysis of ES is a particular challenge due to the complex interplay between the multiple features, processes, benefits and values in cultural landscapes (Plieninger et al. 2013). This challenge can be exacerbated, because integrating ES information in regional landscape planning facilitates trade-offs and
multifunctionality in decision-making (Galler et al. 2016), although consequent effects are not overtly apparent at either local and regional levels (Baránková et al. 2011) or in general European planning practice (von Haaren & Albert 2011).

Many integration efforts in ES literature have been initiated by the MEA (Millennium Ecosystem Assessment (MEA) 2003) and The Economics of Ecosystems and Biodiversity (TEEB 2010). While the MEA basic conceptual ES framework links socio-economic systems with ecosystems through the ‘flow of ES’ and ‘drivers of human pressures on ecosystems’, TEEB provides similar linking of ecosystems and human well-being; emphasising combined values for decision support through ‘trade-off analysis and accounting systems’ in the ES evaluation.

Further literary integration includes; Partidario and Gomes (2013) incorporate ES in a ‘strategic-based and collaborative-oriented approach’ in their strategic impact assessment, and Geneletti (UNEP 2014) proposes a four-stage approach for integrating ES in SEA. Other authors also stress the importance of stakeholder consultation as a vital component of SEA in all stages where, for example, Geneletti (2016) summarises ‘innovative methods and challenges’ for improving the IA process and decision-making by utilising the ES concept as a ‘framing device’; Siew and Döll (2012) emphasise the role of ‘transdisciplinary research’ and stakeholder involvement in integrating ES in land and water management and Crossman et al. (2013) propose and test a ‘blueprint for mapping and modelling ES’ based on an extended literature review which considers this implementation could reduce uncertainty associated with quantifying ES and help to close the gap between theory and practice.

Gómez-Tagsethun et al. (2014) and Braat et al. (2015) discuss and propose the ‘framework for integration of ES valuation methods’. They define integrated valuation as an activity of assessing, which may include any or several of the following: identifying, characterising, mapping, eliciting social preferences, ranking, quantifying, monetising, and which is done in the context of informing economic and environmental policy and planning at various spatial and temporal scales. Integrated valuation should endorse the pluralism of economic sociocultural and ecological values; where its valuation techniques can range from awareness raising to accounting, priority setting, instrument design and litigation.

Maes et al. (2016) elaborate on the MEA basic conceptual framework for EU level by proposing an ‘indicator framework’ consisting of ecosystem typology (based on Coordination of Information on the Environment and The European Nature Information System classifications), ES typology (CICES framework), and finally selecting and testing the set of indicators for mapping and assessment of ES on both national and continental scales.

For landscape planning in the Slovak context, we envisage an integrated framework with the following main features (Figure 1);

An integrated framework for landscape planning and management (Miklós 2011b) based on field data and biophysical methods, but with strong social input and involvement of experts and stakeholder groups;

These groups will include municipalities, landscape planners, economists, social and business developers, environmentalists, farmers and other land users;

There will be a participatory approach of all concerned stakeholder groups combined with active lead by the responsible authorities in more solid and reliable planning instruments and outcomes;

Outcomes will combat current multi-sector complexity and inconsistency.

These objectives highlight that the ES concept must be presented in a manner which influences the Ministry of the Environment and increases relevance for regional and local stakeholders.

The proposed integrated framework combines several basic ‘research’ steps (ES assessment, spatial planning and impact assessment) and ‘deliberative’ steps (initial assessment, regulations and recommendations for planning, inputs into the IA process and decision-making). The scientific reputation of the entire process is preserved by using a variety of widely accepted biophysical, social and economic methods initiated by researchers through the ES concept, and results of scientific research are expected to be salient, credible and legitimate (Cash et al. 2003; Cvitanovic et al. 2015). As indicated above, this requires strong focus on knowledge co-production and exchange (Reed et al. 2014) by involving actors mentioned in point 2 above. Although there are many examples of successful participative processes in biodiversity conservation policy even at the EU level (as in Rauschmayer et al. 2009; Evans et al. 2013), multi-sectoral purposes of landscape planning create much higher demands in the participatory approach. This is particularly challenging in attracting the private business sector, and we were unable to achieve this in our OpenNESS project case study. One option to make the participative process more effective involves knowledge brokers and boundary organisations (Cvitanovic et al. 2015; Reyers et al. 2015) which can fill the gap between science and decision-making. Concurrently, scientists themselves require better understanding and engage more strongly in the policy process (Guldin 2003), to translate and communicate research results into policy; especially when uncertainty surrounds issues (Bradshaw & Borchers 2000).

The main purpose of initial assessment is appropriate framing of the entire planning and management process, leading to proper selection of ES for...
assessment and setting evaluation criteria. ES assessment is a major ‘scientific’ step in this framework, using selected methods for determining and evaluating the main nature benefits. This process and knowledge co-production enables setting the main regulations and recommendations for further spatial planning processes. All predefined settings and research outputs must be confronted by urban, territorial and landscape planning to achieve trade-offs in public vs. private interests and competing sectors. The effort of all knowledge brokers and organisations must be associated in this part of the integrative process to achieve the required results.

The subsequent impact assessment step (mainly SEA) evaluates planning process results, including the ES and the final decision-making step is managed by mutual collaboration of concerned stakeholders – to confirm the legitimacy of the entire process, validate results and to propose adjustments to the planning and assessment process where required. This feedback is an essential part of the integrated approach.

Practical steps in operating the integrated framework in the Slovak context include: (1) defining the main agents/stakeholders to promote the ES concept, (2) developing a national strategy for the ES concept with contribution of the National Biodiversity Strategy and MAES mapping in Slovakia, (3) incorporating the ES concept in environmental policy in greater detail; especially directives for implementing ES assessments, trade-offs and their down-scaling to regional and local level funding schemes, (4) harmonising sector policies by including the main features of the ES concept in each related national policy document, (5) defining the main agents/stakeholders/authorities and their roles at the local/regional level to overcome gaps in top-down implementation and (6) implementing the ES concept in urban/spatial planning, especially in the local strategic documents which are obligatory for municipalities applying for national/EU funding (Economic and Social Development Plans).

We expect resistance from national policy practitioners in changing their accustomed routine planning procedures. This is grounded in the lack of available methodology in ES assessment and communication strategy aimed at raising policymaker’s and public awareness that was emphasised by participating experts and stakeholders. This is preconditioned by unsuitable inclusion of the territorial planning agenda under the auspices of the Ministry of Transport, Construction and Regional Development of the Slovak Republic. Their agenda considers environmental issues marginal to the development of transport infrastructure and industrial parks (Miklós 2011a).

Schleyer et al. (2016) drafted similar recommendations to consider the ES concept in planning processes both in general and at the EU level. In addition to establishing a clear framework at national and EU levels covering competencies, responsibilities and integrated sector policies, these authors stressed the importance of landscape planning which covers multiple ES and develops integrated concepts for different landscape types.
We argue that the suggested integrated framework can be used as an initial tool to demonstrate that integration of environmental and economic objectives is enhanced by the ES concept.

5. Conclusion

Provisioning ES are usually considered the most easily comprehensible ES, and are highly valued by both Slovak experts and the public (Bezák & Bezáková 2014). Surprisingly, regulating and maintaining ES are covered more broadly in the assessed policies than provisioning ES. However, when we consider the cost-effectiveness of their implementation based on practical experience, the situation is reversed. Although regulating and maintaining ES are relatively robust in their planning, they lack links to other ES; and this especially applies to links with provisioning services. Further, implementation is easier for those services where ‘costs’ can be determined by economic valuation and they can directly compete with other investments desired in the landscape planning. This is much more difficult for regulating and maintaining ES; and this fact was emphasised by some interviewed stakeholders, especially decision makers and planners.

Cultural ES intangible benefits have been recorded in many studies (Plieninger et al. 2013; Bark et al. 2015). However, a significant gap in capturing their effects in the investigated planning instruments was expected, and our analysis of policies at national and local levels confirmed that mention of these services is restricted to physical experiences in nature. ‘Measurable’ recreational services have higher likelihood of being considered in the planning documents, thus reflecting better public understanding and direct relationship to economic profit.

The above-mentioned missing links between ecological ES and other ES, weak development of economic valuation and assessment of cultural ES in strategic and planning documents create conflicts in the landscape planning practice. The integrated ES framework in the landscape planning, as described in the previous chapter, would fully cover biophysical, social and economic issues, while the related landscape values are already discussed during several stages of the integrated planning procedure.

Analysis of the national policies highlighted that the more developed documents which consider the ES concept better and account for the integrated assessment and trade-offs in landscape planning decisions are those driven by EU legislation; especially the Rural Development Programme (implementation of EU CAP), and the Slovak Act on Waters which is driven by the EU Water Framework Directive. These are positively evaluated because they consider the complexity of ecosystems and they feature a multi-sector approach and/or economic assessment. In contrast, other EU key environmental policies, such as the Thematic Strategy on the Urban Development, Soil Framework Directive and Forest Strategy are poorly implemented.

The introduction in this paper highlights that certain gaps are recognised in top-down transferability of the general measures to the practical place-based solutions of primary interest to local communities and land users. This problem is also connected with the documents most relevant to the ES concept at local and regional levels not being binding for most municipalities. These documents are the Plan of Territorial System of Ecological Stability and the Landscape-Ecological Plan; and the complex solutions they propose are often inaccessible because of limited municipal budgets. Effective implementation which reflects the ES integrated framework occurs only occasionally and it is not fully exploited in real-world solutions. Moreover, even when the measures are implemented, their ex post monitoring and assessment are not considered.

Although ES with good public features are defined in the planning documents and methods for their assessment have been developed, – or at least indirect/part assessment is prepared – direct prior comparison of all components for trade-offs is difficult to achieve. The planning tools lack the ES integrated framework methods for identifying and assessing trade-offs, especially between provisioning and regulating/cultural ES, sectoral planning objectives, private and public interests and national policies and local needs. These methods require a strong participative process which is often the most demanding part of the integrated planning.

Our results indicate that landscape planning and assessment processes in Slovakia are mainly based on legislation and regulations for individual sectors. They are contradictory in some cases and create mismatches across spatial scales, which we refer to in this paper, rather than encompassing integrated planning procedures and national policies. In contrast, the established sector approach and competencies in landscape planning provide the opportunity to promote the presented integrated ES framework to cope more effectively with environmental problems.

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Appendix

Semi-structured interview questions

(1) Have you ever heard of the concept of ecosystem services, if so, how would you define it?
(2) What development documents have you draw up in your municipality?
(3) Which document is considered in terms of municipality development as the most important?
(4) How is the concept of ecosystem services incorporated in the individual documents? What are the main pros and cons of the ES concept?
(5) How do you appraise environmental legislation in the Slovak Republic in terms of the implementation of the ES concept?
(6) Where do you see the main barriers to the failed implementation of the ES concept?
What would you suggest to improve the situation?