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Analysis

Application of the ecosystem services concept in environmental policy—A systematic empirical analysis of national level policy documents in Poland

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ABSTRACT

We explore the occurrence of the ecosystem services (ES) concept in public policies in Poland by providing a systematic content analysis of national environmental policies. A detailed analysis of the legal acts, national strategies, and decrees using the Common International Classification of Ecosystem Services codes, which embraces a full range of ES, shows that the ES concept is reflected in the investigated documents. However, it is mainly depicted in an indirect, latent form. We further explore the ES concept occurrence in the Polish legislation with in-depth interviews of experts. From the interviews we identify two general groups of barriers to the ES concept implementation in environmental policy: (a) a limited understanding and acknowledgement of the concept among individuals involved in policy making; and (b) sectoral divisions within environmental governance that hinder the spread of the concept. Analysis reveals that the concept of services for society provided by nature had already been perceived in Polish national environmental policies before the emergence of the ES concept and the implementation of the EU biodiversity policy. However, the concept is referred to mostly in a latent form, before and after its emergence.

1. Introduction

The ecosystem services (ES) concept has received increased attention and has been widely discussed over the last two decades (Costanza et al., 1997; Daily, 1997; de Groot, 1992; de Groot et al., 2010). It has been quickly utilized in various research areas, such as biodiversity conservation (Nelson et al., 2009; Wendland et al., 2010), landscape and spatial planning (Syrbe and Walz, 2012; Vihervaara et al., 2010), environmental governance (Primmer et al., 2015) and environmental management (Ervin et al., 2012; Ingram et al., 2014). However, its application is considered arbitrary and highly diversified in terms of methodology (Seppelt et al., 2011). The concept itself is hard to operationalize in a systematic and consistent way. Thus, it is hard to develop one classification of ES that would be universal for different application contexts (Fisher et al., 2009). Considerable effort has been devoted by academia to the classification of ES. The most widely used, and the most influential results, of these efforts are the following initiatives: the Millennium Ecosystem Assessment (MEA, 2005), the Economics of Ecosystems and Biodiversity (TEEB, 2010), and the Common International Classification of Ecosystem Services (Haines-Young and Potschin, 2013). While there is a growing body of practical and scientific applications of these classifications (Haines-Young and Potschin, 2013), their application in ecosystem assessments usually requires additional efforts at the stage of their operationalization. Despite these challenges, the concept is considered useful as a support for policies aiming at sustainable development (Balvanera et al., 2012), e.g., in the process of Mapping and Assessment of Ecosystems and their Services in the European Union (Maes et al., 2016), and widely applied in international environmental policy recommendations, e.g., within the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) and the goals of the Convention of Biological Diversity for the year 2020 (García-Nieto et al., 2013).

According to the current approach to conservation in 'people and nature' framing (Mace, 2014), public policy, expressed in policy

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documents records, is an influential factor creating a feedback loop between ecosystems and human welfare (Díaz et al., 2015). Therefore, it is believed that official institutions, operating through policy documents such as strategic plans or national legislation (Mace, 2014) affect not only the environment but also the flow of ES that citizens benefit from.

Within European Union (EU) policies, the ES approach has been incorporated into several strategic documents. It is becoming one of the guiding and crucial design concepts, e.g., water efficiency measures in A Blueprint to Safeguard Europe's Water Resources. The ES concept is also present in other EU policy areas: biodiversity—Our life insurance, our natural capital: an EU biodiversity strategy to 2020; agriculture—Common Agricultural Policy towards 2020; marine management—Marine Strategy Framework Directive; forests—the new EU forest strategy; invasive alien species—EU Regulation 1143/2014 on Invasive Alien Species. Regardless of the coordination framework of the EU, the implementation of these policies is strongly dependent on the individual approach of EU member states (ARCADIS, 2011). Therefore, there are significant differences between member states in the implementation of the ES concept in their national policies, the development of national strategic frameworks for ecosystem restoration, and funding schemes (e.g., in forestry and agriculture) (Prager et al., 2012; Reed et al., 2014).

Piwowarczyk et al. (2013) analysed 63 strategic documents for the 10 largest Polish seaside cities to test how marine ES are perceived in urban planning and long-term management. The authors argue that although marine ES are acknowledged, their recognition in the strategic documents is partial and limited to the services which are already captured by the market mechanisms. The study of documents on urban green space planning in Berlin (Kabisch, 2015) showed that only the very recently developed informal strategies (e.g., Urban Development Concept 2030) explicitly relate to the ES framework. However, the stakeholders are aware of the ES term. Therefore, although policies including the ES concept have already been introduced at the European level, little is known about how the concept can be implemented in national environmental policies. In this study, we further explore the occurrence of the ES concept in policy documents (i.e., national strategies, legal acts, and decrees) using Poland as an example. We explore public policy in the form of principles, guidelines, and procedures developed by governmental bodies and officials following the approach, among others, of Anderson (1975), through the analysis of policy documents. Documents were treated as an initial component of public policy as they illustrate intentions and indicate purposive courses of action within the environmental governance domain (Hill and Hupe, 2014).

Poland constitutes an interesting example for analysing the adjustment of environmental policies because of the rapid socioeconomic transition in the last 25 years. As with other Central and Eastern European countries, Poland's environmental policies have undergone substantial changes (Cent et al., 2014; Kluvánková-Oravská et al., 2009; Niedziałkowski et al., 2015, 2013; Sasse et al., 2006). Poland's adjustment of its legal and administrative framework after the fall of Communism in 1989 and the EU accession in 2004 resulted in a transposition and implementation of the EU regulations. This has had an impact on the current shape of Polish environmental policy and governance (Grodzinska-Jurczak and Cent, 2011; Guttenbrunner, 2009). The concept of ES has entered scientific discussions in Poland relatively recently, mainly after 2000 (Kronenberg, 2014; Mizgajski, 2010; Rosin et al., 2011; Żylicz, 2010). However, the extent to which the ES concept has been applied in Polish policy documents has not been studied. While scientific debate is focused on the potential contribution of the ES concept to nature conservation, little is known about its actual influence on the policy making processes. This concerns not only the practical significance of the ES concept, but also poses a challenge at the point where science and policy overlap in their efforts to mainstream innovation and theoretical development. The aim of this paper is to contribute to the international debate on the application of the ES concept in environmental policies at the national level by providing answers to the following questions:

1. To what extent is the ES concept implemented in the Polish policy documents and what categories of ES are applied?
2. What are the barriers to, and the potential for, the application of the ES concept in Poland?

2. Material and Methods

Our research comprises two parts: content analysis and in-depth interviews of experts. The quantitative content analysis (Graneheim and Lundman, 2004; Hsieh and Shannon, 2005; Krippendorff, 2004) was used for the analysis of Polish environmental policies. This research technique was implemented in a few previous studies on ES (Kabisch, 2015; Piwowarczyk et al., 2013), where it proved useful in providing detailed information on the concept analysed. However, the interpretation of these results required broader knowledge on the specific context of the studied cases. In order to provide a deeper explanation of the results and to complement the quantitative results of content analysis we conducted in-depth interviews with experts engaged in the development and implementation of the analysed policies.

2.1. Content Analysis of Polish Environmental Policy Documents

The subject of the analysis was Polish environmental policies comprising: (1) legal acts (a legal document issued by the legislature—in Poland by the parliament—which sets out broad outlines and principles in, for example, environmental protection); (2) national strategies (a long term plan issued by, for example, a ministry which sets out the direction of a policy for a sector such as forestry or spatial management); and (3) decrees (a legal document issued by the executive—in Poland this could be the Prime Minister—which specifies regulations for implementing acts). We selected major policy documents in the environmental domain and followed the snowball sampling procedure, adding other documents referred to in those already identified. In total, 46 documents relevant to the environmental policies in Poland were identified: 25 decrees, 11 strategies, and 10 legal acts.

The content analysis of the documents was conducted using deductive (Elo and Kyngäs, 2008) and interpretative (Ahuvia, 2001) approaches in quantitative data analysis. For developing coding categories, we used the categorization of ES provided by the Common International Classification of Ecosystem Services (CICES). It is the most detailed categorization available, defining 80 ES at five levels of generality, from the broadest one (sections: provisioning, regulating and maintenance and cultural ES) through divisions, and groups and classes within each section. Both the manifest (exact appearance of the ES term) and the latent references (parts of the text expressing the ES concept—conveying the understanding of environment using the concept of ES without using the exact term 'ecosystem services') to ES were coded. The smallest meaningful parts of texts, where basic meaning could be understood without reading a larger part of the text, were chosen to be the coding units. NVivo software was used for coding and retrieval of the coded text to support the analysis (Cong et al., 2014). A list of 30 keywords relevant to the ES concept was built in order to identify both manifest and latent references to the ES concept. In the first stage of the coding process, all 46 documents were analysed in NVivo for the occurrence of the keywords in order to localize all parts of the content that were relevant to the ES concept. As a result of the first content verification, all the irrelevant parts (i.e., specific names such as titles of documents or meta-language parts such as citations or descriptions of other documents) were removed from further analysis. The remaining phrases were coded, with the use of a five-level, CICES-based list of codes. The most detailed level possible was used to code each phrase. One unit of text could be coded with more than one coding category.

Table 1
Number of references to ES in the analysed documents: legal acts (dark grey), policy strategies and programmes (light grey), and decrees (white). The name of the document, the number of both latent and explicit references to ES (column 'Ref.'), the number of pages of the document, and the year of the document amendment are provided.

No.	Document name, abbreviated where necessary	Ref.	Number of pages	Year (as amended)
1	Act on the protection of nature	264	106	2004 (2013)
2	Water Act	171	94	2001
3	National Programme for Increasing Forest Cover	154	55	2003
4	National Forest Policy	115	29	1997
5	National Strategy for Conservation and Sustainable Use of Biodiversity	115	136	2007
6	National Spatial Development Policy	112	240	2011
7	Strategy for Energy Security and the Environment	48	85	2012
8	Announcement on the publication of the consolidated text of the Law on Forests	46	34	1991 (2011)
9	Water-Environmental Programme	36	98	2010
10	Environmental Protection Act	31	165	2001
11	Decree on the preparation of the protection plan for national parks, nature reserves,and landscape parks	23	11	2005
12	State Environmental Monitoring Programme	23	115	2012
13	Act on the protection of agricultural and forest land	22	9	1995
14	The Operational Programme Infrastructure and Environment	22	247	2013
15	National Environmental Policy	19	56	2008
16	Climate Policy of Poland	17	44	2003
17	Act on preventing damage to the environment and its repair	14	21	2007
18	Spatial Planning and Land Development Act	12	39	2003
19	Strategic plan for the adaptation of sectors and areas vulnerable to climate change	11	60	2013
20	Regulation on criteria for evaluation of occurrence of damage in the environment	10	2	2008
21	Decree on activities which may have significant influence on environment	8	11	2010
22	Regulation on the natural habitats and species of the habitat of species of Community interest, and criteria for selection of areas eligible for recognition or designation as Natura 2000 sites	8	45	2010
23	Regulation on the protection of animal species	7	18	2011
24	National Strategy for Environmental Education	6	30	2001
25	Decree on preparation of the protection plan proposal for Nature 2000 area (b)	5	5	2010
26	Act on providing information on the environment and its protection	4	100	2008
27	Decree on types of restoration activities and conditions and methods of their realization	4	2	2008
28	Decree on preparation of protection plan proposal for Nature 2000 area (a)	3	5	2010
29	Decree on plant protection activity	2	27	2012
30	Decree on the list of invasive plant and animal species	2	3	2011
31	Decree on special protection areas for birds	1	13	2011
32	Act on organic agriculture	0	21	2009
33	Act on the spatial information infrastructure	0	16	2010
34	Announcement on payment rates for trees and bushes removal and fine rates for greenery devastation	0	2	2012
35	Decree on animal species dangerous for people's life and health	0	22	2011
36	Decree on bird ringing	0	16	2006
37	Decree on detailed methods and forms of submitting information about natural compensation	0	1	2010
38	Decree on detailed information on conducted assessments of impact of a venture on the environment and strategic environmental impact assessment	0	3	2012
39	Decree on environmental and conservational information available to the public	0	2	2010
40	Decree on functioning of the National and Regional Environmental Impact Assessment Commission	0	3	2010
41	Decree on the procedure of imposing administrative fines for removing trees or bushes without the required permission	0	2	2004
42	Decree on kinds, types, and subtypes of nature reserves	0	4	2005
43	Decree on the method and frequency of environmental information updating	0	3	2010
44	Decree on the payment rates for different types and species of trees	0	2	2004
45	Decree on the payment for providing environmental information	0	1	2010
46	Decree on the protected species of wild mushrooms	0	6	2004
	Total	1315	2009	

An intersubjective interpretation (Lombard et al., 2002) was applied to identified examples of latent content. The material was initially coded by two members of the research team with a social sciences background. Then, a four-member group with an environmental sciences background verified the coding process. All the ambiguous cases were discussed and clarified.

2.2. Individual, In-Depth Interviews with Experts on Environmental Protection and Nature Conservation

To explore the potential and the constraints of ES application in the Polish legal and administrative framework, and to provide the context for the interpretation of the content analysis results, nine in-depth semi-structured interviews were conducted with high profile Polish experts in the field of environmental protection and nature conservation. The experts were chosen by reviewing scientific papers, legal documents, and NGO reports. The experts represented the most important stakeholders and professionals in the area of environmental protection and nature conservation policy making: public administration (the Ministry of the Environment, the State Forest Holding, and the National Fund for Environmental Protection and Water Management), researchers (a leader of a research centre and university professors), NGOs (an association for nature conservation), and a politician (a member of the Senate working in the environmental protection commission). The interview guidelines included five groups of questions concerning: comprehension of the ES term and concept within institutional level, application of the ES concept in Polish environmental policies, a comment on the content analysis results, barriers to and potential for the application of the ES concept, and a comparison between Poland and other countries. The interviews were conducted from May 2014 to July 2014 and each interview lasted 30 to 40 min. Each interview was recorded following the consent of the respondent. The recordings were analysed using audio coding in NVivo. The analysis of the interviews focused on the potential application of the ES concept and on the existing obstacles, barriers, and opportunities for its application that have been indicated by research conducted thus far.

3. Results

3.1. To What Extent Is the ES Concept Implemented in Polish Environmental Policies?

Within the 46 analysed documents (2009 pages in total) we coded 1315 parts of text that referred to ES (those parts of the text which contain the exact term 'ecosystem services' or a formulation that uses an understanding of the environment in the ES concept without using the exact term 'ecosystem services'). References to ES were found in 31 documents (12 decrees, 11 strategies, and 8 acts). Both manifest and latent references to the ES concept were not identified in 15 documents, of which 13 were decrees and 2 were acts (Table 1). The coded phrases that were relevant to the ES concept and contained the exact term 'ecosystem services' (manifest content) appeared only 18 times in four documents: the National Spatial Management Policy (7 references), the Strategy for Energy Security and the Environment (7 references), the National Strategy for Conservation and Sustainable Use of Biodiversity (2 references), and the Strategic Plan for the Adaptation of the Sectors and Areas Vulnerable to Climate Change (2 references). The majority of the coded text contained latent references to the ES concept.

Although the ES concept appears in the majority of the documents, its use is particularly visible in specific sectors. The concept appears most frequently in the following sectors: nature protection (documents 1, 5, 10, 11—over 530 references of ES), forestry (documents 3, 4, 8, 13—over 315 references) and water management (documents 2 and 9—over 200 references).

The most represented ES category is 'Regulation and maintenance', followed by 'Provisioning', while 'Cultural' is the least frequent section among the 46 analysed documents (Table 2).

Regarding particular ES concept references (codes) in the documents, the distribution is highly unequal (Fig. 1).

Table 2
Frequency of the ES codes representing cultural, provisioning, and regulation and maintenance services, appearing in the Polish legal documents related to environmental protection.

Section	References in documents (total)	%	Most frequent example within each section
Regulation and maintenance	482	42	lifecycle maintenance, habitat and gene pool protection
Provisioning	428	38	water (as material)
Cultural	226	20	cultural heritage
Total	1136	100	

3.2. What Are the Barriers and the Potential of the ES Concept Application?

Based on the exploration of the appearance of the ES concept in documents, the barriers and the potential of the ES concept application in Poland were further explored by the means of in-depth interviews with the experts. Based on this, two groups of obstacles for the ES concept application in Polish environmental public policy documents were identified (Table 3): (1) comprehension and acknowledgement of the term; and (2) sectoral functioning of administration and allocation of responsibilities.

The first group of obstacles is connected with an ambiguous definition of ES—experts claim that the concept has not been defined clearly in any of the existing definitions. The respondents emphasized the abstract character of the term as a general barrier to the practical application of the ES concept. The term is seen as imprecise and having no specific and defined criteria of measurement. Therefore, there is a flexibility of interpretation, which may lead to contradictory understandings. Lack of clear definitions of ES categories was identified as a reason for the limited use of the concept in executive legal documents. Experts explained that the absence of the ES approach in decrees was because these are detailed and executive documents, whereas the ES concept is more easily applicable in general terms and has no common and well-grounded best practices governing its practical and measurable implementation. Moreover, there are, according to the respondents, deficits in competencies of policy makers that make it difficult to apply the ES concept in daily practice or use it for implementing a more bottom-up, evidence-based policy, where the 'evidence' is defined by identification of ES.

The second identified group of barriers has structural origins. The experts mentioned fragmented, sectoral administrative operations in Poland and referred to generally poor environmental policy integration. There are many institutions which deal with environmental protection but they have a relatively low impact on creating policies in this area. Moreover, since the distribution of responsibilities between numerous institutions is unclear, each of them has relatively low overall impact on policy implementation. Consequently, even if new approaches or concepts are used by a particular institution, they do not easily infiltrate to others.

However, having identified the barriers to the implementation of the ES concept in environmental policy, the experts anticipated that the concept is likely to expand in its application and will gradually increase in appearance in the legal documents. Poland, as the EU member state, will have to fully transpose the European regulations into the national legislation (Table 4).

Considerable effort is being applied to mainstream the ES concept at the European level. Our interviewees therefore expected more detailed and better defined regulations on ES, in particular within the national assessments of ES, in each member state. The experts noted the potential of applying the ES concept in public policies, but most of them highlighted the risk stemming from the shift from communicating the need for sustainable natural resources management to mostly economic and monetary rhetoric. This shift may strengthen the anthropocentric approach, implying that the use of the ES concept leads to protecting only those elements of nature that have an explicit or accountable economic value. Conversely, some of the respondents emphasized the educational and promotional potential of the ES concept. They pointed out that the Polish Ministry of the Environment and some NGOs already use the concept in environmental education and campaigns promoting environmentally-

friendly behaviour. The concept is used as an argument for the need for protecting nature but also as an argument that, for instance, can improve the promotion of local products. According to the respondents, the concept may improve communication and dialogue between stakeholders in nature conservation, potentially contributing to mitigation of conflicts occurring, e.g., during the implementation and management of Natura 2000 sites (Zaharia et al., 2014)or other protected areas. Explicitly, the approach can help in finding a compromise between development and conservation and can help to promote better solutions during decision making processes.

No.	Ecosystem Services category	CICES level					Example quotations from documents analysed in content analysis
		General	Section	Division	Group	Class	
1	Ecosystem services	■					"functions of environmental elements, understood as usefulness of protected species, habitats, water or surface of the earth to other environmental elements or people" (Act on Preventing and Repairing Environmental Damage)
2	Lifecycle maintenance, habitat and gene pool protection				■		"ecological (protective) functions providing the following: water cycle stabilization, protection against floods, avalanches, landslides, […] creating conditions for protecting the biological potential of an impressive amount of species, ecosystems and genetic qualities of organisms, providing people with better living conditions, as well as health and agricultural protection, which enhances biodiversity and landscape variation" (National Forest Policy)
3	Provisioning		■				"Owing to it, we gain control over the protection of mineral resources, including those ground waters which are treated as mineral, i.e., curative, thermal waters and salt springs, against non-rational, wasteful and damaging exploitation" (National Environmental Policy)
4	Maintenance of physical, chemical, biological conditions			■			"A national park is created in order to preserve biological diversity, resources, creations and elements of inanimate nature and landscapes, and to restore the proper state of resources and natural elements, as well as to recreate deformed natural animal and fungi habitats" (Act on Protection of Nature)
5	Regulation and maintenance		■				"A natural reserve covers the areas preserved in their natural or almost unaltered state, ecosystems, natural refuges and habitats, plant, animal, fungi habitats, as well as creations and elements of inanimate nature, which can be distinguished by their special ecological, scientific, cultural and landscape qualities and values" (Act on Protection of Nature)
6	Water (ecosystem services/provisioning/materials)				■		"For the purposes of farmland and forest land ground water irrigation" (Environmental Protection Act)
7	Water (ecosystem services/provisioning/nutrition)				■		"Rational water management for the purpose of water provisioning in inhabited areas and for economic development should provide balance of water consumption and regeneration of resources while providing high quality of waste water treatment" (National Spatial Management Policy)
8	Cultural		■				"Access to a national park or a natural reserve – an entrance to an area which is under strict or active protection for scientific, educational, tourist and recreational purposes" (Act on Protection of Nature)
9	Wild animals and their outputs					■	"Capturing, hunting or collecting protected species or their parts and derivative products for economic purposes" (Act on Protection of Nature)
10	Hydrological cycle and water flow maintenance					■	"Protection against flooding and drought" (Water Act)

Fig. 1. Ten most frequently represented categories of ecosystem services in the Polish policy documents. The code of the ES most general category comes out at the top, followed by lifecycle maintenance and habitat and gene pool protection.

Table 3
Obstacles in the ES concept application in Polish policies on the basis of IDI of experts.

Type of obstacle	Quote example	Expert
Poor comprehension and acknowledgement of the term	"Naturalists cannot agree with economists. The reason is that economics is a scientific discipline concerned with how people make choices. This definition has been applied for at least eighty years. Economics is not a science of the salvation of the world. Conversely, if an economist is talking with a naturalist, a misunderstanding immediately appears because the naturalist says that a natural resource (e.g., oxygen) is priceless. But what does it mean priceless?"	Head of a research centre
	"An obstacle is that it is a vague concept"	Head of a research centre
	"Probably there is a lack of sufficient knowledge on evidence based policy"	Expert of the Ministry of the Environment
Sectoral functioning of administration and responsibility allocations	"We may say that the ES concept is used in <<environmental>> sectors, Undoubtedly, it is connected with a higher level of education among officials at this level of administration (who undergo a very restrictive selection). At the local level, this concept is used rarely or not at all. It results from the fact that this concept is not very common at lower levels of administration and local officials are often not very well-educated."	University professor
	"The decision making power is fragmented. There are too many sectors in administration, and each of them can block the implementation of a new solution."	A member of the Senate

4. Discussion

Our analysis has shown that, in the case of Poland, the concept of ES is reflected in national environmental policy documents. However, the concept is predominantly captured in an indirect, latent form. Nevertheless, a content analysis showed that ecosystems are perceived in the policies as beneficial for human beings. Implementing environmental policies aimed at optimizing the national flow of ES would require incorporation of specialized managerial instruments, e.g., cost–benefit analysis, payments for ES, and biodiversity offsets (Engel et al., 2008; McKenney and Kiesecker, 2010; Muradian and Rival, 2012; Pirard, 2012; Primmer and Furman, 2012). These instruments could not be successfully used without clearly defined terms. The gap between the ES framework and its potential as a policy instrument has also been revealed in our results. We suggest that because of the small number of straightforward references to the ES term in more general policy documents (such as acts and laws) the concept is almost absent in more detailed, executive decrees. This pattern is reinforced by the frequently occurring interdependence between policy and executive documents.

Furthermore, differences in how various sectors referred to the ES concept in documents were proven both in quantitative terms and in the representation of the ES categories used in the texts. This proves that administrative barriers reported by the interviewed experts do exist. This supports the view of Cash et al. (2006) who stress the incorrectness of perceiving the national level of jurisdictional scale as unitary in the discussion on multilevel governance and is another example of the environmental policy integration challenge (Biermann et al., 2009; Lafferty and Hovden, 2003). The ES concept's irregular and incoherent application in documents illustrates one of the important reasons for the lack of internal integration within the environmental policy domain at the national level.

On the one hand, in domains such as forestry and tourism, natural capital is intuitively and automatically perceived as a provider of goods and services. The ES concept in these domains, and hence policy sectors, is not a novel idea. On the other hand, the knowledge of one domain or policy sector about the benefits derived from products provided by ecosystems cannot be easily transferred to another sector. Nevertheless, the use of the ES concept in sectoral documents does provide some guidance in this respect. For instance, forestry policy documents are those where the majority of references to ES concern regulating services, regardless of the widely perceived exploitative (i.e., concentrated on provisioning services) approach of this sector's operation (Blicharska and Angelstam, 2010; Niedziałkowski et al., 2014). This focus on regulative services is reflected both in international discussions on payments for goods and services provided by forests (Chhatre and Agrawal, 2009; Meijaard et al., 2014; Ventrubová and Dvořák, 2012) and in the reflections on the ES tradeoffs, which treat the sustainable flow of environmental products as a condition for the quality of regulating services in forests (Castro et al., 2015; Fisher et al., 2009).

The idea of including benefits and services derived from the environment into policy making has a long history (Kronenberg, 2014). However, a formal (legislative and institutional) and structured implementation of the ES concept is driven by requirements of international agreements or high-level policy goals, such as the EU Biodiversity Strategy to 2020. In contrast, the empirical data presented in this paper emphasize that many of the services society derives from nature had already been perceived and protected in Polish national environmental policy documents before the emergence of the ES concept and the implementation of the EU biodiversity policy. The Polish National Forest Policy is an example of a document, which is treated as a foundation for policy change at the international level (Díaz et al., 2015). Although the Forest Policy ensures a more precise and well-defined implementation of the ES concept than many others, it does not contain a single explicit use of the ES term. This suggests that perspectives from the further implementation of the EU ES policies e.g., the EU Biodiversity Strategy to 2020 are needed, as identified by the experts. However, in certain cases implementation could possibly be limited to assuring common ES terminology in the EU policies.

We argue that the study of the ES concept's presence in policy documents can provide a more comprehensive view of the use of one of the most widely acknowledged paradigms of biodiversity conservation—the socioecological approach—than the current EU recommendations. This addresses the experts' anxieties, parallel to those already identified (Fisher and Brown, 2014), of putting too much focus on financial issues when applying the ES concept in policy-making. Our results have revealed a frequent incorporation of the services that do not function according to financial markets (i.e., lifecycle maintenance, habitat, and gene pool protection), whereas the EU efforts are still directed at quantifying and marketing various services as in e.g., The Economics of Ecosystems and Biodiversity (TEEB, 2010).

Regarding policy making at various governance levels, the national level is the key linking level, ensuring implementation of top-down, international agreements, which can be adapted to the conditions of a particular country (Maes et al., 2012). Based on the results of our study, we suggest that while environmental policies are not ES-driven (Matzdorf and Meyer, 2014), the overall idea and logic behind ES has been inherently included in policy documents. We have shown it is possible to match references to different ES that appear in policy documents with concrete ES categories. This provides a foundation for identifying gaps and, thus, for improving and structuralizing the process of planning and managing natural resources at the national level. Since our study is focused on the Polish case, we postulate that other similar analyses of national environmental policy documents would make it possible to obtain a comprehensive and comparative image of the

Table 4
Barriers and opportunities for expanded application of the ES concept.

No.	Barriers and opportunities for expansion of ES	Quote example	Author
1.	Transposition of EU regulations	"It [many references to lifecycle maintenance, habitat and gene pool protection] might result directly from the fact that Natura 2000 was implemented in Poland or from the Convention of Biodiversity Protection, which also deals with gene pool protection and has been transposed to our law."	Executive of the State Forest Holding
2.	Risk from ES application	"There is a risk of protecting only those things that we are able to count, […] it is not possible to count everything. I think this concept might be as useful tool as many others, but it needs to be applied consciously and moderately."	Leader of an association for nature conservation
3.	Potential of ES application	"This concept is very useful at the level of social communication. It allows to explain many things, e.g., why we should protect biodiversity."	Executive of the Ministry of the Environment

current extent of ES inclusion in national level policies in other countries. This would also address methodological concerns faced during the course of this study, namely a lack of clear and unequivocal reference points to assess the scope of the presence of the ES concept in policy documents.

5. Conclusions and Recommendations

The issue of the presence of the ES concept in environmental policy documents can be seen as the exemplification of complex scale challenges in environmental policy integration. The multi-scale (relating to geographical, ecological, institutional, jurisdictional, managerial, and temporal scales) and multi-level (present across different levels of each scale) character of environmental policy (Cash et al., 2006) challenges the development of a comprehensive and integrated operationalization of ES that could be implemented within various public policies in a synergic way. This would, however, require providing straightforward references and definitions at the executive and operational levels, and in respective legal policy documents for ES, their valuation, management, and potential implementation of payments for ES systems.

Our study has shown that the ES concept could be used for integrating environmental policies from various sectors. However, this opportunity has not yet been used. The ES concept is well embedded, latently, in various environmental policy sectors in Poland. However, without explicit guidance, the ES concept is unlikely to provide a basis for such integration. This guidance could emerge from at least two processes according to the experts interviewed in our study: (1) the implementation of EU recommendations and policies that increasingly refer to and strengthen thinking about nature through the lens of ES; and (2) the stakeholder dialogue on nature conservation and its importance for human development and wellbeing.

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