



# Legal aspects of ecosystem services: An introduction and an overview

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## ABSTRACT

This introductory contribution to a Special Issue (SI) titled “Legal Aspects of Ecosystem Services” intends to provide both a short introduction on the SI-topic as well as a brief overview on the content of each paper therein. The introduction aims to provide an overall entry point into the topic from a legal as well as an interdisciplinary perspective. It first offers initial insights into the relationship between the rule of law as one socially constructed normative framework and ecosystem services. Furthermore, it also points out interrelations among rule-focused, economic-focused and information-focused incentives, all with the potential to influence human behaviour with regard to ecosystem services.

The overview delivers as a sort of short-cut a table of authors, levels of the geopolitical scale addressed, types of analysis implemented and themes focused upon within the Special Issue. It further provides an overview of the main direction of each contribution to this SI.

The conclusions strive to provide a brief summary of the “why”, the “when”, the “where”, the “how” and the “what” of current and future research on legal aspect of ecosystem services.

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## 1. Introduction

Legal aspects of ecosystem services (ES) are multifaceted. They spread especially alongside numerous temporal, spatial, jurisdictional and institutional scales and related levels (on these terms see e.g. [Cash et al., 2006](#)). Temporally, they can be analysed based on a snapshot view, often mixed with forward or backward perspective, or based on a certain period as assessment frame. Spatial scales do usually refer to geographic areas delineated by means of natural characteristics observed in nature. When it comes to the interplay among law and ecosystem services, spatial and jurisdictional scales are commonly interwoven themselves as well as with different stakeholders. Legislators, administrators, judges and further stakeholders acting therein as organizational and/or individual “players of the game” while institutions such as the law constitute the “rules of the game” ([North, 1990](#); [Faundez, 2016](#)). The institutional scale for legally assessing ecosystem services deals with all aforementioned scales. It often provides, by means of norms, the preconditions for a – durable or time-limited – legal creation of 1) ES as “socially relevant constructs” as well as of 2) totally new actors as “legal persons” (enterprises, agencies, associations etc.), in contrast to individual humans as “natural persons”. However, the latter are the rulemakers also for “legal persons” and represent them, also in interactions with ecosystem

services. Ecosystems and their biotic and abiotic constituents are usually – for whatever reasons – not considered “legal persons” (see e.g. [Stone, 2010](#)), similar to future generations ([Hubacek and Mauerhofer, 2008](#)). Legal rules are usually based upon, as well as include, formal, written and binding norms. This stands in contrast to purely ethical, social or informal norms, but which – value-driven – often back legal norms. Legal norms can be prescriptive through laying down duties and rights (see in general e.g. [Fisher, 2013](#) p. 5ff). They can mutually apply among legal and natural persons, but also towards ecosystems and their services, such as duties to protect or rights to extract them.

Apart from duties and rights, legal norms can also have enabling functions to support voluntary behaviour (see also [Schneidewind and Zarnt, 2014](#) p. 159). This usually happens by publically established, economic-focused incentives, often without creating a right of people to receive them or a duty of the authority to provide them to every applicant. Examples would be public subsidies that aim to support a more sustainable use of ecosystem services (sometimes also called Payments for Ecosystem Services – PES) or subsidies which are removed in order not to furthermore foster unsustainable use of such services (see in general from the legal perspective e.g. [Ruhl et al., 2007](#); [Mertens et al., 2012](#)). More in general concerning PES, law has also been used to circumscribe and accompany this past development of the economic-political logic from polluter pays to provider gets ([van Hecken and Bastiaensen, 2010](#), [Mauerhofer et al., 2013](#)).

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## 2. The role of law related to ecosystem services

Law is usually seen a tool of response when it comes to challenges related to ecosystem services. It can address underlying causes, driving forces, pressures, status and impacts (see on these aspects e.g. [Stanners et al., 2007](#)) of potential or actual threats and harms of ecosystem services. This should not lead to the assumption that law is the silver bullet to provide solutions for all challenges related to ecosystem services. But law can develop, through the official – legislative, administrative and/or judicial – authorities, a rule-focused incentive to addressees of the rule to show a certain action/inaction ([Mauerhofer and Essl, 2016](#)) benign to ecosystems services.

Law as – democratically or even autocratically – introduced tool usually adopted and implemented by supranational, national or sub-national official units is unique; because it is in general not available to other kinds of stakeholders. No matter how the legislation is formulated and introduced, the resulting effects – also regarding ES – are also crucially dependent on the shape of its implementation and therein by the organizational and substantial compliance and enforcement mechanisms ([UNEP, 2007](#)) and their practical application.

Rule-focused incentives such as the law can introduce and support also the application of economic-focused incentives or information-focused incentives in order to change behaviour that affects ecosystem services. These three sets of instruments are often simply referred to as “sticks”, “carrots” and “sermons” ([Vedung, 1998](#); [Serbruyns and Luysaert, 2006](#); [Rogge and Reichardt, 2016](#)). Economic-focused incentives and information-focused incentives are also available to other stakeholders than public authorities. Each of the three instrument sets can be applied by themselves. Public authorities are the only ones capable to combine all of them. Information-focused incentives can be considered the least costly among the three sets of instruments, despite e.g. the potential high financial input into an information campaign about ecosystem services in comparison to a simple talk to the neighbour providing convincing arguments to protect certain ecosystem services. The interrelation among the three sets and actors is however not straightforward as the three different sets of incentives can interact in various manners (for norm-focused and economic-focused ones see e.g. [Mauerhofer, 2016](#)).

**Table 1**

Authors, geopolitical levels, types of analysis and themes of the SI.

Authors	Geopolitical level	Type of analysis	Theme
<a href="#">Mauerhofer (2017)</a>	Supranational: global	Review	Historic Use of ES-term; delineation
<a href="#">Prip (2017)</a>	Supranational: global	Review	ES & Convention on Biological Diversity
<a href="#">Sirakaya et al. (2017)</a>	Supranational: global	Review	Legal implementation of urban ES
<a href="#">Bouwma et al. (2017)</a>	Supranational: EU-region	Review	Implementation of ES in EU policies
<a href="#">Kistenkas and Bouwma (2017)</a>	Supranational: EU-region	Cases study	ES-jurisdiction in EU water/conservation
<a href="#">Abcede and Gera, (2017)</a>	Supranational: ASEAN-region	Review	Implementation of ES in mining sector
<a href="#">Pastén et al. (2017)</a>	Supranational: Canada-Chile	Cases-comparison	Common/continental ES-jurisdiction
<a href="#">Khalid et al. (2017)</a>	Supranational: Malaysia-EU/Scotland	Cases-comparison	Subsidiary approach for water basin ES
<a href="#">Mauerhofer and Laza (2017)</a>	Supranational: EU, Austria-Romania	Review & comparison	ES in <i>hard</i> EU-law & federal/central state
<a href="#">Stepniewska (2017)</a>	National: Poland	Review	Extent of legal implementation of ES
<a href="#">Altmann and Stanton (2017)</a>	National: Brazil	Review	Extent of legal implementation of ES
<a href="#">Schetke et al. (2017)</a>	National: Germany	Review	ES-Implementat.in climate & planning law
<a href="#">de Graaf et al. (2017)</a>	National: Netherlands	Review	ES-Implementation in new planning law
<a href="#">Chaudhary et al. (2017)</a>	National: Nepal	Case study	Environmental justice and local forest ES
<a href="#">Jones and DiPinto (2017)</a>	National: United States of America	Review	ES in restoration & liability procedures
<a href="#">Toledo et al. (2017)</a>	National: Columbia	Case study	ES economic valuation & legal restoration
<a href="#">Loc et al. (2017)</a>	National: Vietnam	Case study	Agricult. ES valuat. complementing law
<a href="#">Prevost and Rivaud (2017)</a>	Supranational: global	Review & case study	World Bank PES Policy & institut.theory
<a href="#">Verbitzky (2017)</a>	Supranational: Antarctica region	Case study	PES as potential tourism regulatory tool
<a href="#">de la Varga Pastor and Pons (2017)</a>	National: Spain, Region: Catalonia	Case study	PES & tax incentives in land stewardship
<a href="#">Martin (2017)</a>	Supranational: global	Review	Risks of ES-Valuation

## 3. The content of this Special Issue

### 3.1. Overview

This Special Issue (SI) brings together 61 co-authorships within 21 contributions. All of the contributions have been submitted in reaction to an open call by this Journal and constitute original research papers.

In terms of continents, chapters in particular address North- and Latin America ([Pastén et al., 2017](#); [Altmann and Stanton, 2017](#); [Jones and DiPinto 2017](#), [Toledo et al., 2017](#)), Europe ([Bouwma et al., 2017](#), [Kistenkas and Bouwma, 2017](#), [Mauerhofer and Laza, 2017](#), [Stepniewska, 2017](#), [Schetke et al., 2017](#), [de Graaf et al., 2017](#); [de la Varga Pastor and Pons, 2017](#)), Asia ([Abcede and Gera, 2017](#), [Khalid et al., 2017](#); [Chaudhary et al., 2017](#); [Loc et al., 2017](#)) and Antarctica ([Verbitzky, 2017](#)). The SI also includes more globally oriented papers ([Mauerhofer, 2017](#), [Prip, 2017](#), [Sirakaya et al., 2017](#), [Martin, 2017](#); [Prevost and Rivaud, 2017](#)), some of them with a thematic focus and also directly dealing with situations in Africa and Oceania. Some of the papers are clearly comparatively oriented, also among continents.

Each paper touches several of the scales mentioned above and addresses one or various topics. Despite, a main distinction is tried in the following as the contributions to this Special Issue appear to spread alongside all these legal vectors highlighted here and many more ([Table 1](#)).

In the following, the main direction of each of the papers will be described more in detail in the order previously listed.

### 3.2. Short paper descriptions

The contributions of this Special Issue are structured along various lines regarding geopolitical levels and thematic issues.

#### 3.2.1. Supranational (global) broad implementation focus

[Mauerhofer \(2017\)](#) first assesses in an historical review in how law has implicitly covered since millennia main different ecosystem services, while not explicitly using this term. Furthermore it is analyzed whether law is addressing structures and functions of

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