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Introduction

1.1 WHY A BOOK ON ENVIRONMENTAL LAW AND ECONOMICS?

Sustainability and environmental law have never been more important. If there are new legal toolkits available for building a better, more sustainable world, there is a duty incumbent to explore and learn those new ideas, to transform our legal rules and institutions.

This book presents research drawn from literature on the economic analysis of environmental law.¹ Fundamentally, it presents a case that these methods share the established values and principles of environmental law,² yet they extend the set of legal policy options to address the needs of environmental protection and sustainable development.³ Furthermore, it is shown that beyond the theoretical frameworks developed by environmental Law and Economics researchers, there now exists

¹ The terms ‘economic analysis of environmental law’ and ‘environmental Law and Economics’ are synonymous and interchangeable. The concept of ‘economic analysis of environmental law’ is distinguishable from the similarly named ‘economic analysis of environmental policy’, in that the former focuses on law and legal institutions whereas the latter focuses on economics and economic institutions; also, the latter tend to present a greater amount of mathematical content in their literature. Nevertheless, the two literatures are closely intertwined. Fischman and Barbasch-Riley limited their definition of environmental law to include research on legal issues of pollution, species or habitat conservation, land use, natural resource management, and climate change law (Fischman and Barbasch-Riley 2018, at 772).

² Driesen notes that environmental law still lacks a positive theory of environmental law; thus, it is quite likely that environmental law will continue to evolve much as Law and Economics is evolving (Driesen 2017, at 58).

³ This argument of shared common legal principles was originally presented by Faure and Skogh (2003, at 19–39). The present book honours Professor Skogh’s memory, as it extends and deepens the framework originally introduced by Faure and Skogh and additionally provides empirical case studies on the effectiveness of the models proposed in that earlier work. See De Sadeleer (2002, at 15–18) for the comparative reference to the principles of ‘conventional’ environmental law.

empirical data to evaluate the effectiveness of those models.⁴ This book will demonstrate that the models of environmental Law and Economics have been proven effective in real-world settings.⁵ Thus, there is a new legal toolset available to advance the goals of sustainability and environmental law.

Despite all the progress made in environmental law over the six decades since Rachel Carson's *Silent Spring*,⁶ and then Earth Day 1970,⁷ more is needed; the world needs to expand its environmental law perspective to include sustainability perspectives.⁸ Daniel Esty's call for the inclusion of sustainability strategies in environmental law referred to a range of topics,⁹ including the 'end of externalities',¹⁰ a focus on 'choice' in lieu of mandates,¹¹ a systems approach that acknowledges trade-offs and interconnections of environmental protection efforts,¹² a priority on 'innovation', and the 'capacity to bring new technologies, information

⁴ Fischman and Barbash-Riley quote Diamond's definition for empirical research in their meta-study of empirical environmental law: 'the systematic organization of a series of observations with the method of data collection and analysis made available to the audience' (Fischman and Barbash-Riley 2018, at 771).

⁵ While this might sound normative, and perhaps it is, so too is much of the existing literature of environmental law (Driesen 2017, at 59). He lists the normative goals of environmental law as (i) protecting public health and the environment, (ii) maximizing feasible reduction of pollution, and (iii) restraining disproportionately costly regulation. Id., at 83, 85, and 86. Given this formulation, we see much alignment between environmental law and environmental Law and Economics.

⁶ Carson 1962.

⁷ While presented primarily from the US perspective, the history of the subsequent decades was documented by Lazarus (2003). While it can be difficult to determine when environmental law first began as a school of research, Lazarus reports that the term 'environmental law' was first coined at the 1969 Conference on Law and the Environment, held at the Airlie House in Warrenton, Virginia. Id., at 47.

⁸ Esty (2017, at 3).

⁹ Id., at 5.

¹⁰ Externalities as an economic concept refer to those costs that remain excluded from the costs considered in an economic decision, such as within a firm's decision on maximizing revenue. In the context of environmental Law and Economics, it generally applies to the costs of environmental harms that are not responded to by those parties undertaking the activities causing those environmental harms. The topic is covered in detail in Section 2.3.

¹¹ The technical term in the environmental Law and Economics literature is 'decentralisation', which refers to an alternative regulatory approach that avoids the use of a universal, central rule applied equally to all parties. Decentralised regulatory approaches provide responsive feedback to parties to enable them to find their own pathways to compliance with regulatory goals, thus enabling them to make the best use of their skills and resources in supporting the community's regulatory aspirations.

¹² The technical terms in the environmental Law and Economics literature for 'trade-offs' include 'opportunity costs analysis' and 'cost-benefit analysis'. Opportunity costs analysis examines what must be given up to obtain a targeted goal or good. Cost-benefit analysis frames the same question from a more overtly financial perspective, to determine the ratio of what costs must be incurred to obtain how much benefit. The interconnectedness approach reflects well on the holographic model of information in the environmental Law and Economics method of analysis; this insight was noted by F. A. Hayek and is discussed in Section 2.4.1.

and learning to bear',¹³ and an increased focus on proven results. As this book will evidence, these sustainability approaches are closely related to the ideas found in the literature of environmental Law and Economics. Indeed, many of those approaches were first developed in environmental Law and Economics research.

Thus, the need for a text such as *Environmental Law and Economics: Theory and Practice* is predicated on several observations.

First, environmental law and its sibling international environmental law have moved forward as critical and timely topics. Not only does the world face a global challenge from anthropogenic climate change, but the world is also facing novel environmental challenges from increasing levels of industrial pollution in developing economies, from advancing technologies such as carbon-fibre nano-technologies and genetic modification techniques, and from other large scale anthropogenic environmental events, such as the loss of the Aral Sea and the ongoing efforts to restore water flow to the lower Colorado River Basin. While the community of environmental lawyers has accomplished much in recent decades, new vital work continues to emerge, and the need for sound theoretical foundations for environmental law remains. The economic analysis of environmental law provides a theoretical core that enables novel responses to these emerging challenges.

Second, the literature of Law and Economics provides a solid theoretical foundation for environmental law, one that strongly supports the UN's 2030 Agenda for Sustainable Development and its seventeen Sustainable Development Goals. An extensive body of literature has emerged to support legal reasoning and jurisprudential decision making with tools based on models from environmental Law and Economics. Many of these tools have opened up new legal approaches for environmental regulators, such as EIAs, cost-benefit analysis, and hedonic measurement analysis. More importantly, the literature of Law and Economics enables models that inform on the flow and exchange of information and how to enable the production and distribution of that information on environmental policies to stakeholders and decision makers alike, facilitating environmental justice and equity.

Third, the models resulting from the economic analysis of environmental law enable ground-breaking pathways to opening interdisciplinary policy discussions on environmental issues. The issues raised in environmental problems are not merely legal problems but complex multifaceted challenges. The economic analysis of environmental law brings tools from both Law and Economics, but it is also informed by tools from political science, public choice theory, game theory, and

¹³ The quote itself is from Esty (2017, at 5). The point on innovation and the avoidance of locked-in environmental standards reflects a substantial component of the body of literature in environmental Law and Economics. It will be addressed extensively in this book, but key lessons drawn from the economic analysis of law re-encourages the use of civil liability rules to support flexibility, the use of information revealing mechanisms (especially private regulatory mechanisms), and the use of smart regulatory mixes. See the discussions in Chapters 2, 7, and 9.

other schools of social science. By bringing these new tools to environmental legal analysis, policymakers and legal researchers can provide more robust answers.

Finally, the ability to work with theoretical models enables environmental lawyers and policymakers to more readily discover deeper symmetries and affinities in otherwise disparate environmental concerns, enabling solutions from one set of concerns to be mapped into new application for a second set of environmental concerns. This reflects the underlying paradigm of interconnectedness in sustainability.

In conclusion, the goal of this book is to enable environmental lawyers and policymakers to acquire familiarity and comfort with the literature of Law and Economics as applied to questions of environmental law. It covers a range of topics, beginning with explanations of the theory and its applications to environmental law, moving on to practical and historical applications of the same ideas. The book covers how this approach endeavours to minimise environmental harms and how this approach provides efficient compensation for those remaining harms. Discussions on democracy, federalism, and on the application of these tools in developing economies complete the book's coverage of environmental Law and Economics.

1.2 READERSHIP

This book is written both for academics and for students of social sciences interested in environmental policy. The book should be of interest especially for lawyers and economists.

Lawyers may find this book of interest to see how an economic analysis of environmental problems may lead to a better understanding of the rationales behind existing legal rules. In addition, economic analysis can be used as a useful tool to test current legislation. Economic analysis may not only lead to conclusions with respect to the efficiency of certain existing legal rules; it can also be used to test the effectiveness of legislative action. This means that economic analysis can show whether a certain set of legal rules can effectively lead to the result that the legislator claims the particular legal rule should have.

An economist might find some of the descriptions of economic notions, which are especially addressed towards the legal audience, too simplistic. However, some of the parts of this book may appeal to an economist, e.g. because the wide application possibilities of economic concepts to various social problems can, once more, be demonstrated.¹⁴ In addition, it may well be new and interesting for environmental economists to read about e.g. the importance of liability rules and insurance in controlling environmental risks,¹⁵ the similarities and differences

¹⁴ On the expanding domain of economics, see Hirshleifer (1985).

¹⁵ On the appeal of Law and Economics to both lawyers and economists, see Faure and Van den Bergh (1989b, at 21–22).

between safety regulation and taxes, and the economics of criminal sanctions for the protection of the environment.

The target audience for *Environmental Law and Economics: Theory and Practice* are thus environmental lawyers and policymakers who would like to deepen their toolkits by learning how to practically apply the principles of environmental Law and Economics to their arguments and proposals. It is hoped that this book will serve as both a handbook and a textbook for them; useful for practical litigators assembling and testing their arguments, for policymakers exploring their environmental options, and for lecturers and students exploring the intellectual frameworks enabling effective environmental policies.

Thus, *Environmental Law and Economics* is a book written for environmentalists who would like to benefit from several decades' worth of real-world environmental policy successes built from the theoretical models of environmental Law and Economics literature. The book provides both accessible introductions to the theoretical models and practical illustrations drawn from historical enactments.

It is hoped that this approach will enable lawyers and policymakers to build stronger environmental policies, based on a toolkit of environmental policy ideas that have been proven to be effective in a range of political and environmental settings.

1.3 METHODOLOGY

The economic analysis of law (also referred to as 'Law and Economics') methodology will be used. This method has known a rapid growth in the USA since the beginning of the 1970s and is also widely recognised in Europe now.¹⁶ Significant is the foundation of a European Association for Law and Economics in 1984 in Lund, the existence of several academic reviews on this topic in Europe,¹⁷ and the existence of several book series in many countries, including general handbooks on Law and Economics. Hence, we will not repeat general questions such as the usefulness of economic tools and more particularly the efficiency criterion to analyse legal rules, nor will we go into differences between economic methodology and legal theory. We can refer to a large body of literature on the topic.¹⁸

¹⁶ In 1973, the first edition of Posner's seminal *Economic Analysis of Law* was published.

¹⁷ More particularly the *International Review for Law and Economics* and the *European Journal of Law and Economics*.

¹⁸ A reader interested in general books on Law and Economics can consult for example the latest edition from Posner (2014), Cooter and Ulen (2012), and Shavell (2004). An overview of literature per topic can also be found in the *New Palgrave Dictionary of Economics and the Law* (Newman 1998) and in the various editions of the *Encyclopedia of Law and Economics* (De Geest 2012).

The economic analysis we will use in this book belongs to what is sometimes referred to as ‘new Law and Economics’.¹⁹ The old economic analysis of law was still traditionally linked with taxation, regulation of markets, or competition law. Here lawyers used economists to help them to answer the questions lawyers had previously defined.

The new Law and Economics fits into the view that economics is a behavioural science that more generally analyses human behaviour, even if this is not strictly market oriented.²⁰ It reflects Hayek’s perspective that markets are organs of information, enabling each participant the potential insight of the whole.

In addition to the economic analysis, also other social science theories will be used to explain the contents of legal rules, where appropriate. This is especially the case for theories related to public choice and rent seeking that attempt to explain legislation as a product of demand by powerful interest groups and supply by wealth maximising politicians.²¹ Also in the environmental area it is highly useful to combine traditional Law and Economics with interest group theory.²² This can provide useful insights if the positive analysis has shown that the legal system does not comply with the predictions of the model.

For many years now the traditional economic approach to law has been challenged by insights from cognitive psychology, showing that in many cases individuals are subject to a variety of heuristics and biases, limiting their ability to make rational choices. This domain of behavioural economics has also been translated to Law and Economics, creating the new domain of behavioural Law and Economics, where Cass Sunstein has played a prominent role.²³ These insights of behavioural Law and Economics are also quite important for the domain of environmental law and policy, for example pointing at the importance of specific differences between policy instruments as far as their ability is concerned to stimulate intrinsic motivation towards environmental protection.²⁴ These important insights will therefore also be incorporated in this book.

As far as the legal analysis is concerned, we will pay attention to principles of international environmental law and to European environmental legislation.²⁵

¹⁹ This concept has been introduced by Richard Posner and was used by Cento G. Veljanovski as title for a book, *The New Law-and-Economics: A Research Review*, to explain the difference between ‘old’ and ‘new’ Law and Economics (Veljanovski 1982).

²⁰ A classic book on this topic is by Becker (1976). Shavell wrote, ‘As will become obvious to the reader, “economic” analysis of the law is not restricted to conventionally understood economic factors but also includes all manners of non-economic ones’ (Shavell 2004, at xix).

²¹ See Buchanan and Tullock (1962); see also Olson (1971).

²² See inter alia Maloney and McCormick (1982).

²³ See Sunstein (2000); see also Sunstein (1997, 1999).

²⁴ See Frey (1992); see also Frey (1997).

²⁵ For general reference, see Birnie, Boyle, and Redgwell (2009); see Sands and Peel (2012); see also Jans and Vedder (2012).

In addition, examples from legislation and case law of some European Union Member States, the USA, and other legal systems will be provided as well.

The Law and Economics methodology will be combined with the comparative environmental legal analysis. This has a great advantage, since one will be confronted with the fact that solutions in various legal systems may inevitably differ. Law and Economics has the advantage that the solutions in the various legal systems can be looked at on a more principal level, without having the need to discuss the state of the law in a particular country in too much detail. When one addresses general problems such as the question what kind of legal instruments can be used to control a form of environmental risk, which could have manifested different solutions in various countries, we'll find that Law and Economics allows for a more general approach.

By starting from an analytical look at a specific problem that is provided by the economic analysis, we will then turn to the legal solutions in particular legal systems, when possibly also indicating whether an economic explanation for some of the established differences can be provided. Thus, we shall also try to apply the so-called comparative Law and Economics methodology, as has been advocated by Mattei and Siems.²⁶

We previously indicated that the book is written both for lawyers and for economists and for all others interested in environmental law and policy. This inevitably has consequences for the depth both of the legal and of the economic analyses.

Solutions in the law will preferably be described in a global way, focusing on the essence of the legal solutions and eliminating legal details that have no importance for the value of the analysis itself and can only confuse the non-legal reader. For those interested in the details of the law, we shall provide references for further reading in footnotes. Not only do we try to present the law in such a way that economists can understand it. The same will be attempted as far as the economic analysis is concerned. Mathematical proof of certain statements will most often not be provided in this book and the economic analysis will be presented in a verbal way, easily understandable for lawyers. Once more, references in footnotes will help the interested reader to discover and explore further details.

We are not the first to compare legal approaches and economic approaches in environmental law. As Shi-Ling Hsu wrote of 'fair' pie-slicers and 'efficient' pie-bakers:

Lawyers (including members of the legal academy) are educated and trained as pie-slicers, concerning themselves primarily with questions of fairness and justice, and frequently ignoring questions of efficiency. This is unfortunate because economics is a powerful complement to the law. Economists have also been myopic, still working mostly within a framework that routinely assumes that wealth transfers convert Potentially Pareto Superior policies into Pareto Superior policies, without

²⁶ Mattei (2000) and Siems (2014).

laying much attention to whether, in fact, such transfers actually occur. Rather, the focus of most economic analysis is whether proposed policies maximize group utility or group wealth. This is the world of pie-baking.²⁷

We hope that with this book we can add pie-baking skills to environmental lawyers and some pie-slicing skills to environmental economists, so that everyone can better coordinate in the kitchen of environmental policy development.

Finally, we should stress that in principle the book tries to provide a positive theory of environmental law. We do not attempt to use economics as the ‘only value’ for legal rule making. Ultimately, it is finally the legislator or the judge who will have to decide which solution will be chosen. Nevertheless, we shall focus on the policy implications of the analysis so that welfare implications of various legal instruments or solutions are revealed. In that respect, criteria beyond efficiency, such as equity, may play important roles in the analysis. Where possible, we shall also point at distributional consequences of various possible legal solutions.

Of course, this book cannot extensively deal with all problems of economic analysis, nor with all issues of environmental law. For instance, environmental taxes or pollution rights models are only briefly discussed; the same is the case for the law on nuisance.²⁸

This book retains its focus to show that a Law and Economics approach can be a useful method in thinking about environmental law and policy. This is particularly the case if new legal systems are set up, such as is often the case in developing countries. Yet, the quality and effectiveness of environmental policy should not be determined solely through the use of economic methods, as we will demonstrate in the final chapter. As a kind of epilogue, that chapter summarises a number of issues discussed in this book, with special application to the situation of developing countries. One of the central issues will also be how an effective environmental law can be construed which respects the rule of law. These questions, of course, pass the boundaries of economics.

1.4 SYNOPSIS AND STRUCTURE

This book represents a coming of age in environmental law, one that benefits from theoretical models, a building base of enacted laws and case histories, and policies developed from the Law and Economics approach, and a building recognition of those successes in developing economies needing solutions for their own emerging environmental challenges.

In essence, this book uses the well-known Law and Economics methodology and applies it to problems of environmental law. It illustrates its theoretical models with examples drawn from real-world implementations. And this book presents these

²⁷ Hsu (2004, at 303–304).

²⁸ Aspects of nuisance law will only be discussed in relation to the first-use doctrine in Chapter 2.

materials with an international reader in mind, keeping the reading free from colloquial turns of phrase and excessive technical jargon.

The book will provide an introduction to the theory of environmental Law and Economics. The book will start by analysing environmental pollution in economic terms and then look at a variety of legal instruments and remedies that can be used to tackle environmental pollution. It will demonstrate the rational foundations of the theoretical models, show examples of where the models have become adopted into legal realities, and then provide empirical studies that affirm the validity of the environmental Law and Economics approach in solving environmental problems.

Then the book will turn to address the application of environmental Law and Economics. The strengths and limits of property rights, liability rules, and safety regulation will be reviewed, but attention will equally be paid to efficient standard setting. Next, the focus will be on environmental crime in an economic perspective and the compensation of environmental harm will be addressed in more detail, by focusing on insurance, but also alternative legal instruments to deal with environmental pollution. In each subject area, the book will provide examples from real-world acts of environmental legislation, drawn from a variety of countries, to illustrate the theoretical points made in the book; demonstrating that environmental Law and Economics has successfully transitioned from academic theory to practical enactments of environmental policy.

This book will cover environmental federalism, thus addressing the question how an optimal division of tasks between different layers of governance should take place within a federal system. Specific attention is also paid to principles of environmental law whereby the question is asked how these could be put into an economic framework.

Given the importance of environmental law and policy for developing countries, attention will be paid to the role of environmental law in developing countries. This will address the crucial question what type of specific challenges arise when implementing environmental policy in developing countries, but also the relationship between environmental protection and economic growth will be addressed.

Finally, we provide an essay on the overall theme of the book, to find a common thread of hopeful environmental law running through, as illuminated by economics. We hope that the epilogue will provide those readers who have made the journey through this text with us a final look back at the many arguments and ideas raised in the book.