

# Chapter 1

## Introduction: Governing the Provision of Ecosystem Services

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Knowledge of ecological systems, biological diversity, and environmental degradation has progressed substantially over the last three decades and, with it, attempts to integrate ecology with economics. Economists interested in understanding the causes of environmental problems, as well as the economic value of the goods and services provided by ecological systems, have elaborated a range of innovative concepts and methods. Various schools of economic thought have sought to assist the decision-making process by addressing market failures and their negative impact on both the natural world and the welfare of societies. The call to value nature when making development decisions and to treat the world's ecosystems as capital assets in order to prevent their continued degradation and depletion is at the origin of current concern with 'greening' the economy (Panayotou 1993; Daily et al. 2000).

Despite inherent problems in measuring natural capital and assigning a monetary value to biological diversity and the services we may derive from it (market prices do not reflect the full social costs of production, nor do they reveal clearly societal values), 'green markets' have emerged and expanded in response to the ecological crisis. Although a utilitarian framing of ecosystem functions as providing numerous benefits, goods, and services to society is not new (Gómez-Baggethun et al. 2010), the growing consensus that conserving nature enhances human well-being (MA 2005), helps reduce poverty (Sachs et al. 2009), and promotes resilience in the face of climate change (Chapin et al. 2009) has led to new international initiatives such as The Economics of Ecosystems and Biodiversity report (Kumar 2010) and the

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creation of the IPBES (Intergovernmental Platform on Biodiversity and Ecosystem Services). As a result, the interest in market-based policy instruments such as PES (payments for ecosystem services) has spread very quickly, especially in regions rich in biodiversity (Pattanayak et al. 2010; Bateman et al. 2011). The growing popularity of PES has meant that ‘what started as a humble metaphor to help us think about our relation to nature has become integral to how we are addressing the future of humanity’ (Norgaard 2010: 1227). There is considerable debate as to whether PES amount to a particularly reductionist form of free market fundamentalism, and whether they are causing the unnecessary commodification of ecosystem services (Engel et al. 2008; Muradian et al. 2010; Farley and Costanza 2010; Gómez-Baggethun and Ruiz-Pérez 2011). The latter refers to the incorporation into a trading system of ecosystem services that hitherto were outside the market domain. Though in a matter of few years market-oriented tools have gained considerable leverage in the environmental policy agenda worldwide, market approaches are still far from being the dominant policy strategies for environmental protection and biodiversity conservation. In practice, environmental governance is implemented through a wide variety of models and instruments, and more often than expected, the management of natural resources depends on a combination of governmental command-and-control, market tools, and community-based institutional arrangements, as some of the cases studied in this book illustrate.

Now that the concept of ecosystems services (ES) has been introduced to address the fact that human activities affect earth’s life support systems so profoundly as to threaten many of the biological functions of ecosystems, including those that are essential to human survival and key economic processes, its increased use in policy and decision-making reopens many of the value debates that have marked the recent evolution of economic theory (Kosoy and Corbera 2010; O’Neill 2007). More specifically, the ES paradigm has revived the debate about the relationship of industrialised societies with the natural world. It has also renewed the critique by a wide range of social scientists, social theorists, and philosophers of the theoretical and methodological contributions of environmental and ecological economics. Many authors now agree on the need to value nature according to a broad range of considerations and variables. Recent contributions to *Ecological Economics* and *Environmental Values*, to take just two examples, have vigorously debated the legitimacy of treating living things as exchangeable commodities or the validity of placing monetary values on parts of nature (Spash 2011). They have argued that the relationship of humankind with nature should not be reduced to narrow self-interest or cost-benefit calculations (Hourdequin 2010; Ojala and Lidskog 2011). There have also been discussions about the compatibility of ecological and economic rationality, the need to refine the definition of what counts as natural capital (and the extent to which this is an appropriate concept), or the value of ecological wealth (Dasgupta 2011).

While academic debate about the economic value of ecological wealth continues to unfold among economists and between economists and other social scientists, an increasing number of policy-makers, economic agents, and social and political actors have decided to include ecosystem resources and services in their decisions. These decisions have resulted in a multitude of trade-offs and economic transactions,

including those documented in this book. Studying actually functioning ‘markets’ for environmental goods, resources, and services empirically is the best way to form a real understanding of their effectiveness in delivering environmental protection and a more equitable distribution of resources worldwide and between social groups at the local and national levels.

As the case studies collected in this book show, in practice, very different types of monetary transfers have emerged in response to the ecological crisis, including trading schemes for carbon credits, direct payments for compensating landholders for the adoption of more environmentally friendly practices, certification schemes, and contracts for potential future commercial use of biodiversity, among others. They also show how these monetary transfers are directly related to international commitments, particularly those of reducing emissions of carbon dioxide (and to a lesser extent other greenhouse gases) and of protecting and conserving the diversity of life, especially in tropical rainforest areas. Although carbon emission reductions can take two different forms (i.e. emission reduction and the production of additional carbon absorption capacity), emerging markets have mainly involved the latter under the guise of international carbon offset deals. The relationship between biodiversity conservation and markets has essentially involved the development of financial mechanisms to cover the costs of protecting nature and—to a lesser degree—address the social development needs of local communities. This approach has given rise to ‘conservation concessions’ based on the international willingness to pay for the conservation of valued ecosystems and aimed at compensating owners for the loss of alternative economic uses. Since 1990, there have also been agreements (e.g. bioprospecting contracts) for the use of knowledge from local groups living in developing countries in exchange for part of the revenues to be obtained by pharmaceutical or seed companies in case of successful patenting. Two additional market-oriented types of policy instrument have seen the light: negotiated agreements between downstream beneficiaries and upstream providers in watershed contexts and certified markets for biodiversity-friendly products. In forest areas, biodiversity, watershed, and carbon services are strongly linked, and countries such as Costa Rica have ‘bundled’ them together in a national PES programme.

The book contains examples of all these types of market-based policy instruments, as well as other policy tools for environmental governance. Seven contributions discuss Latin American cases, including Costa Rica (Chap. 12 by Le Coq et al.), Nicaragua (Chap. 18 by van Hecken et al.), Peru (Chap. 21 by Rojas and Berger), and Brazil (Chap. 16 by May and Vinha, Chap. 17 by Schmitt, Farley et al., Chap. 20 by Ribeiro et al., Chap. 19 by Andrade et al., and Chap. 2 by Börner and Vosti); three discuss African ones: Ghana (Chap. 22 by Insaïdoo et al.), Ethiopia (Chap. 15 by Wiersum and Belay), and Madagascar (Chap. 11 by Bidaud et al.). There are five cases from Asia and the Pacific: India (Chap. 7 by Ananda), Java (Chap. 6 by Lukas), Japan (Chap. 10 by Yashiro et al.), Australia (Chap. 9 by Concu and Chap. 14 by Concu and May), and the Philippines (Chap. 8 by Toribio et al.). Finally, one case discusses France and its overseas territories (Chap. 13 by Maury et al.). These studies provide rich empirical data on the unique problems posed by the incorporation of ecosystems as natural capital (i.e. supplier of services) in economic decisions in

both the developing and the developed world. They illustrate some of the dilemmas and conflicts involved in making the values of nature an integral part of collective choice and decision-making. We show that actors attempting to maximise the benefits derived from ecosystem goods and services adopt social constraints on production possibilities, whether these are self-imposed or imposed by others. The book thus illustrates the complexity and the cost of creating economic incentives for environmental improvement and poverty alleviation.

Although the market logic is simple (an economic agent deriving monetary benefits from the provision of ecosystem services will incorporate such services into her land-use decisions), calculations intended to bring ecosystem functions and ecological wealth into development decisions are marred with difficulties. As our contributors demonstrate, these difficulties are due to the fact that institutions and social values condition how monetary transfers and other policy tools work in practice. Markets and policies are embedded in structures of property rights, social relations, and cultural frameworks. Institutions, information flow, and cultural features thus play a critical role in conditioning the ways in which they operate. They also determine to a large extent how costs and benefits are allocated among different social groups. A central aim of the book, therefore, is to discuss the ways in which local institutions and cultural traits affect the performance of different combinations of policy instruments (particularly market-based ones) for enhancing the supply of ecosystem goods and services. As we argue below, this requires that we assess the role the state plays, or could play, in governing the provision of ecosystem services.

## 1.1 Rethinking Environmental Governance

The contemporary conception of environmental governance is closely related to the emerging scientific understanding of society and nature as forming complex and dynamic interrelations known as ‘social and ecological systems’ (Chapin et al. 2009), which in turn form the ‘human-earth system’ (Chapin et al. 2011). The concept of ecosystem service thus signals ‘fundamental changes in society’s approach to the environment’ (Nicholson et al. 2009: 1143), which require the study of (a) financial organisations and their role in governance at various scales (either as facilitators of new institutional arrangements or as negative forces); (b) the state as the central locus of regulation and enforcement at multiple levels; (c) the interplay between governance, scales, and institutions; and (d) new market-based instruments for managing the provision of ecosystem services.

The case studies presented in the book shed new light on the institutionalisation of mechanisms for collective decision-making and collective action with respect to natural resource management. Their comparative analysis highlights the central importance of the formal and informal ways in which the provisioning of ecosystem goods and services is organised and managed. Each chapter refers to aspects of what has come to be known as ‘environmental governance’. Like other scientific terms

widely circulated within policy circles, the concept of ‘environmental governance’ is ambiguous and open to multiple interpretations. This term, however, is often used to evoke a decision-making process by which environmental sustainability and the common good get decided not only by governments but also by a wide range of local, national, and transnational actors operating both ‘below’ and ‘above’ the state. As Lemos and Agrawal (2006) note, the paradigm of environmental governance seeks to expand cooperation among non-state actors that may have been previously outside the policy process, such as corporate interests, social movements, and non-governmental organisations. The governance mechanisms reached by loose networks of institutions and actors, or, in Lemos and Agrawal’s terminology ‘multilevel, non-hierarchical, and information-rich coalitions’, are thought to be more effective than state-centric control and regulation (see also Holling and Meffe 1996).

Panayotou (1993) was one of the first authors to argue systematically that states on their own are not the appropriate agents of environmental decision-making, and that traditional governmental policy-making should leave much more room to self-organisation. He argued that government policies, rather than correcting failures in markets for natural resources, tend to add distortions whether through taxes, subsidies, quotas, regulations, inefficient state enterprises, or public projects with low economic return and high environmental impacts (Panayotou 1993: 58–59). He added that ‘the role of the state in the struggle for sustainable development is critical and fundamental but it is not one of direct management or command and control. The state’s role is rather to establish new rules of the game and create an environment that fosters competition, efficiency and conservation’ (Panayotou 1993: 144). He therefore called for policy reforms which would ensure that the state would remove the distortions that it had introduced in the first place. The role of the state, as he saw it, should be of creating market conditions for environmental resources and services, which, by not being brought within the present configuration of markets, were being undervalued and depleted. This vision depicting private or community arrangements as more efficient, in comparison to the state, has been increasingly challenged, particularly in the case of the management of common-pool resources. Empirical evidence suggests that natural resources are not best governed either by private owners, whose property rights facilitate efficient market regulation of environmental issues, or by the state, on behalf of the people. Rather, both governance structures can be either effective or ineffective, depending on the rules they rely upon and on how these are enforced (Ostrom and Basurto 2011). The public-private dichotomy is overly simplistic (Sikor 2007; Ostrom 2010).

The chapters composing this book corroborate the view that ecosystem service governance defies conventional dichotomies between state and market, public and private, or regulation and incentive. As our contributors show, new modes of environmental governance need to address the fact that while regulating and supporting ecosystem services are public goods (Farley and Costanza 2010), many provisioning and cultural ones are best understood as common-pool resources (Ostrom and Cox 2010; Brondizio et al. 2009). The insights gained in institutional economics during the past three decades suggest that neither hierarchies nor markets can be considered a priori better policy approaches to regulate the provision of such types of goods.

Our book contributes to this emerging understanding of environmental governance by highlighting the hybrid, multilevel, and cross-sectoral nature of decision-making and collective action that together redefine the social boundaries of markets. In this book, we show that environmental governance comprises a wide set of nested regulatory processes, from international governance mechanisms to the very local level, where ecosystems are appropriated by human societies. Although some environmental governance modes emerged during the neoliberal era as a non-state approach, controlling environmental degradation is no longer thought to be a choice between either political agreement resulting in government taxation and regulation or economic forces acting freely through market exchange. The governance of ecosystem service provision requires therefore that we draw attention to the different layers, scales, and dimensions nested through the generation and flow of such services.

## **1.2 PES and Other Emerging Policy Tools for Environmental Governance**

The book is composed of four main parts, which highlight the institutional settings and the normative basis of ecosystem services on the one hand, and the complex and dynamic sociopolitical interactions between private and public stakeholders through which ecosystem services are supplied, on the other. The first part, ‘Keywords and Concepts’, offers a critical analysis of central tenets of the ES paradigm. The second part, ‘Construction and Evolution of Governance Regimes’, traces the conceptual development of the ES paradigm from a historical and institutional perspective. The third part, ‘The social embedding of PES’, includes a range of cases analysing governance schemes making use of payments for managing the provision of ES. The fourth part, ‘The Special Case of Carbon Markets’, contains four chapters dedicated to one particular type of ES, carbon sequestration, as well as the concluding chapter. Given the current ‘carbon obsession’ of the environmental policy agenda, it is necessary to assess critically the extent to which the emerging global governance regime for reducing emissions from forest destruction can actually save the threatened and very valuable—often due to reasons far beyond their carbon content—tropical forests.

### ***1.2.1 Critical Analyses and General Overviews***

Researchers studying the policy process have often remarked that analytical categories inevitably acquire normative connotations with the circulation of scientific concepts and ideas, and their appropriation by actors implicated in the formation of policy discourses (e.g. Gasper and Apthorpe 1996). A change of terminology often signals a change in the way problems are perceived and addressed and questions posed. Terms such as ‘ES’ and ‘PES’ (Chap. 4 by Pesche et al.), ‘partnerships’ (Chap. 3

by Kramarz), ‘incentive’ (Chap. 2 by Börner and Vosti), or ‘bioprospecting’ (Chap. 5 by Stromberg et al.) are all social constructions, which can be used to describe, analyse, conceptualise, or prescribe. Although they are intended to facilitate the making of decisions or the taking of actions, they can also be used as rhetorical tools. The four chapters in Part I present critical analyses and general overviews of each of these terms, which are central to the new environmental governance paradigm.

Börner and Vosti’s contribution focuses on the many ways ‘incentive’ and ‘disincentive’ are being thought and deployed. Although written as a comprehensive survey of environmental management policies in the Amazon basin, this chapter provides a wide-ranging discussion of policy instruments available to all decision-makers aiming to avoid trade-offs between ecosystem conservation and human welfare through policy integration. The insights Börner and Vosti offer on motivation and behaviour are echoed in many of the book’s case studies.

Kramarz deconstructs the notion of ‘public-private partnership’, which has become a central tenet of the World Bank. She shows how World Bank documents and activities frame co-management (whether collaboration between state agencies and communities, public-private partnerships between market actors and state agencies, or social-private partnerships between market actors and communities) as a necessary innovation to address the complexity of environmental problems and the democratic deficit in global governance. Partnerships are promoted as an efficient way of producing regulatory effects through individualised incentives and other market-based instruments, which, it is hoped, will catalyse the willing participation of a diverse range of actors. As they have become a normative imperative in global environmental governance, we need to ask why their emergence, which amounts to a change in procedural norms, does not correlate with the desired changes in substantive norms. This question is subsequently answered by a number of the book’s empirically informed chapters.

Pesche and his co-authors take a historical approach to the gradual incorporation of ecosystem services into payment schemes and show the seminal role played by the Millennium Ecosystem Assessment in orchestrating the ‘mutual justification’ of ES and PES. They argue that the desire to raise public interest in biological diversity coupled with the imperative to secure funding to protect the natural environment has led to the parallel emergence of two new scientific fields, the science of ecosystem functions and the economics of conservation. While the term PES suggests the existence of well-defined and valued services and of market-based payments that accurately reflect the value of these services, in practice, these payments are really aimed at conservation activities. At the border between knowledge and intervention, the ES/PES paradigm becomes a multi-goal public policy instrument subject to power relations and social embeddedness. Several chapters discussing PES historically in various national contexts (e.g. Bidaud et al. Chap. 11, Le Coq et al. Chap. 12, or Lukas, Chap. 6) further support the contention that the PES concept and its power and generative capacity are best approached from a diachronic perspective.

Stromberg and his co-authors look at bioprospecting through the remits of the Convention on Biological Diversity (CBD), which intends to create strong conservation incentives for both biodiversity holders and external users. Their approach is

both historical and comparative. Their historical reconstruction of the CBD from the 1993 Nagoya protocol to the present (i.e. October 2010), and their comparative examination of 67 cases on three different continents (selected out of a data base comprising 190 case studies) lead them to argue that transaction costs due to contractual uncertainty have deeply influenced the modes of governance of bioprospecting. Their conclusion on access and benefit sharing of genetic resources in bioprospecting projects linking southern providers and northern buyers has wider implications for PES more generally.

### ***1.2.2 Deconstructing PES***

The book builds on the insights of Muradian et al. (2010) regarding the nature of PES. As van Hecken and his colleagues (Chap. 18) explain, the ‘Coasean’ PES approach fails to account for the complex interactions between PES and the broader institutional context. It is therefore more appropriate to define PES as transfers of resources between social actors, which aim at creating incentives that align both individual and collective land-use decisions with broader conservation values and societal goals. It is worth noting that very similar debates about efficiency, equity, and governance structures exist regarding direct cash transfers to the poor, in particular with regard to the nature of incentives promoted by such payments. Discussions of the long-term effects of conditional cash transfers, the social costs associated with economic growth and market imperfections, and the role of the state in economy and society, especially when the need for more demanding institutional reforms is felt (Bastagli 2009; Barrientos et al. 2008), are all very relevant to the debate about PES.

As nature is increasingly being redefined in terms of the benefits humans derive from ecosystem functions, ES provisioning and ES valuation have become inseparable issues (Chap. 4 by Pesche et al. in this volume). Most of the book’s chapters focus on the social relations through which ES are traded and used, rather than on those through which they are ‘produced’. However, given the scientific uncertainty regarding the nature of ES goods and services, and their specific relationship to human welfare (Raudsepp-Hearne et al. 2010), it is important to mention the debates that are shaping the ways in which science co-evolves in society (Norgaard 2010: 1225). The differing conceptualisations of Mace et al. (2011) and Luck et al. (2009) on the roles played by biodiversity in ES processes and services, for example, are indicative of the difficulties scientists encounter when trying to determine the value of biodiversity. Biodiversity could be valued as a regulator of fundamental ES processes, a final ES itself, or a good. Although many policy advisers would underplay such valuation problems on the ground that, in practice, all what we need is an agreement on the need to maintain ES and an estimate of the cost of ES provision, it must be said that the choice of ecological framework to understand ecosystem functioning and ES provisioning and, consequently, the type of valuation and payment largely depends on how biodiversity is valued. As forcefully argued by Norgaard (2010), the ES perspective emerging from the Millennium Ecosystem Assessment



is too narrowly framed within a stock-and-flow view of ecology, which fits the reductionist approaches favoured by dominant market thinking. Norgaard reminds us that ecological science relies on multiple patterns of reasoning, and that we need all of them to inform governance more fully.

Ecosystem goods and services are often defined in a compartmentalised way. Maury and collaborators (Chap. 13), for instance, differentiate ecosystem services as services provided by ecosystems to society from environmental services, which are produced by actors (see also Fisher et al. 2009). However, efforts to formalise transaction agreements lead to unsolved issues of classification and categorisation, such as those discussed by Stromberg and co-authors in the case of genetic resources (Chap. 5). Börner and Vosti (Chap. 2) similarly remark that if the ecological assessment's classification of ecosystem services into regulating, provisioning, and supporting services is useful to identify the amounts and pathways through which ES benefits flow to specific stakeholder groups, it is problematic from a management point of view, as it groups together ES with very different characteristics. They note, for instance, that managing flood versus climate regulating ES requires entirely different sets of knowledge and policy instruments. Chaytor (2002) similarly argues that, although environmental goods and services represent one of the fastest growing economic sectors, there is no clear-cut difference between 'good' and 'service', or between those that are 'ecosystem', rather than 'environmental' goods and services. As a result, definitions vary widely from country to country and from policy document to policy document.

Some of these issues of definition, categorisation, and relationship between biodiversity and traded ecosystem goods and services are taken up in two of the chapters on Brazil, those by May and Vinha (Chap. 16), and Schmitt and co-authors (Chap. 17). May and Vinha discuss the highly innovative National Plan for the Promotion of Socio-Environmental Chains, which aims to insert agro-extractivism within a 'solidarist economy' framework by guaranteeing minimum prices for the certified forest products of social and community enterprises involving low income groups. These communities depend on the stability of ecosystems that shelter components of Brazilian biodiversity for their livelihood. Schmitt and co-authors explain that if biodiversity is not an ecosystem service itself, it plays an essential role in sustaining *all* ecosystem services. Although all ES result from complex geobiophysical interactions, as Börner and Vosti (Chap. 2) remind us, not all ES are equally 'systemic'. Furthermore, because ecosystems exhibit highly complex, dynamic, and nonlinear behaviour, including the presence of abrupt, irreversible thresholds, excessive conversion of forest to conventional farmland leads to the irreversible loss of essential services. Techniques that combine food production and biodiversity conservation such as agroecology should therefore be encouraged on a large scale. In the Atlantic forest where Schmitt and his colleagues (Chap. 17) carried out field research, as in many other rural parts of the world, the best way to prevent shortages of water, energy, food, or natural resources is by managing ecosystems for services, which requires large upfront public investments. They conclude that biological functioning cannot be protected through market mechanisms, as these fail to reward resource owners for the benefits of conservation. While some services are amenable to market institutions, others require public provision.

In a similar way, Börner and Vosti (Chap. 2) point to government involvement in establishing and articulating demand for ES. Concu (Chap. 9), in a very useful discussion of the actual—as opposed to rhetorical—differences between PES programmes and command-and-control approaches to environmental conservation, contrasts policies that encourage a change in output composition from those that seek to affect the revenue structure or production cost or volume. She also discusses the blurred distinction between PES and subsidies.

The chapter by Schmitt and co-authors (Chap. 17) can also be read as an effort to disambiguate the concept of PES. They stress that there are two general approaches to PES, one based on trying to force ecosystem services into the market model with the goal of increasing economic efficiency, and the other based on adapting economic instruments to the specific characteristics of ecosystem services in order to achieve a variety of goals, such as sustainability, justice, and efficiency, adding that only a minority of ES fit the market model. Schmitt and colleagues remark that it is because they do not take into account the fact that dealing with non-rival or non-excludable resources is inherently more difficult that authors such as Engel or Wunder view private sector PES as more effective and more efficient than public sector ones. They conclude with a proposal to redesign PES ‘as a form of public sector venture capital, in which wealthy countries and national governments that benefit from the ecosystem services agroecology provides transfer resources to less wealthy countries and local governments otherwise unable to fully finance the necessary public sector investments’.

The chapter by Maury and co-authors (Chap. 13), which reframes subsidies paid by the French government to farmers as a kind of PES scheme, offers a fascinating complement to the chapters by Concu (Chap. 9) and by Schmitt and co-authors (Chap. 17). They too argue that the broader understanding of PES offered by Muradian et al. (2010) is needed to describe and analyse agri-environmental contracts. This position is echoed in other chapters, particularly those by van Hecken et al. (Chap. 18), Yashiro et al. (Chap. 10), Ananda (Chap. 7), and Wiersum and Belay (Chap. 15). The chapter by Maury and co-authors (Chap. 13) illustrates two points made by Börner and Vosti (Chap. 2) and echoed throughout the book. First, that we urgently need to develop ‘methods to measure the benefits (though not always necessarily the monetary value) associated with particular ES or bundles of ES’. Second, that ‘humans simultaneously adapt to and change ES provision through activities that alter natural, temporal, and spatial dynamics’. As Maury et al. show so well in the context of French agriculture, one way of adapting and changing is by arguing about what motivates us, humans, to act.

### ***1.2.3 Rethinking the Role of the State in Governance Structures***

As repeatedly argued by Elinor Ostrom, if natural resource systems are governed by complex local and national institutional arrangements, commons institutions evolve with the expansion of spatial and temporal scales. Therefore, our common challenge

in the twenty-first century is to agree on a supportive legal structure at macro-levels that would facilitate the self-organising capacity of local groups and communities, who would be free to craft their own rules (e.g. Ostrom 2001). Common-pool resource thinkers have stressed the importance of self-organisation and the need to design a supranational level of governance consistent with the eight design principles they have identified. This has led them to focus on ensuring that the supranational level complements, rather than replaces, the essential national, regional, and local institutions. As a result, they have tended to neglect the role of the state in governance arrangements. Equally, and as argued by Eckersley (2004), there has been an unfortunate tendency among green scholars and environmentalists to characterise the sovereign state as ineffectual at best and ecologically destructive at worst. However, there is a need to rethink the state in light of the principles of ecological democracy, as a facilitator of transboundary democracy and a steward of the Earth System (see also Backstrand et al. 2010). Several of the book chapters acknowledge and discuss the new roles of governments in multi-centric governance structures. They envision the state as a core political institution capable of facilitating socially progressive environmental change and true sustainability and discuss initiatives and innovative paradigms of regulation that aim to tame the environmentally destructive potential of the state, while enhancing its emancipatory potential.

Re-engaging the state in structures of environmental governance advances the policy debate on how to combine incentive and control beyond the recognised shift in natural resource management from the polluter pays principle to the beneficiary pays approach. Many of the environmental governance structures discussed in the book make use of both regulation and incentive in hybrid systems or ‘policy mixes’. Together, they illustrate the need for command and control to overcome the legal and institutional barriers that prevent the good functioning of incentives. States and intergovernmental agreements are needed to provide the necessary underpinnings for markets to work. Today, neither market actors nor non-governmental organisations (or public-private partnerships for that matter) have the political power to set up or regulate the evolving carbon market structures (Lederer 2010), for example. The four chapters in the last section of the book on carbon markets exemplify the coordination role of central governments, across both regions and sectors of the national economy. They show that governments are essential coordinating/integrating mechanisms, which help create functional interdependencies and strategic alliances.

As Börner and Vosti note, incentives often need to be part of a wider policy mix involving various measures, including actions to enable local economic development, given that ‘trade-off relations between ES objectives and other development objectives are the rule rather than the exception’. May and Vinha stress another important role for governments beyond creating the conditions for partnerships and other private initiatives to be successful. If only the Brazilian government would implement green procurement policies, the market share of sustainably produced products would increase automatically. The three other chapters on Brazil (Schmitt et al. Chap. 17, Andrade et al. Chap. 19, and Ribeiro et al. Chap. 20) mention the enforcement of environmental laws through the supervision and monitoring of municipal, state, and federal agencies as a key issue. They also discuss the creation of conservation areas

by either the federal state or sub-national levels of government, which fulfil the government's responsibility to ensure that the forests under its custody are protected or used sustainably. In regions where the gap between law and practice is wide and where regulatory policies are not implemented, enabling policies are not sufficient to protect ecosystems or biodiversity. In other words, these authors show that there is still a place for the classic role of governments, whose exclusive responsibility regarding land-use planning and law enforcement is crucial in the fight against biodiversity loss and environmental degradation.

Four additional aspects of the government's key role in environmental governance are underlined in various contributions to the book: its capacity to absorb and domesticate exogenous policies, its role in channelling investments, its responsibility in setting policy priorities, and, finally, its custodian obligations towards local knowledge, values, and institutions. Concu (Chap. 9), Concu and May (Chap. 14), Yashiro et al. (Chap. 10), Andrade et al. (Chap. 19), Ribeiro et al. (Chap. 20), and Rojas and Berger (Chap. 21), all mention the responsibilities of national governments as signatories to international treaties fostering the conservation of biodiversity and the protection of tropical rainforests. Stromberg et al. (Chap. 5) mention the key role of states in relation to the CBD, particularly in relation to sovereignty issues. Bidaud et al. (Chap. 11) discuss these international treaties in the context of dependency and postcolonial state building. Although in Madagascar environmental policy was initially imposed by donors, PES got gradually integrated within domestic agenda. Le Coq et al. (Chap. 12) similarly show that PES were pushed on Costa Rica by donors, but this did not prevent local appropriation over time. Moreover, payments to landowners would not have been possible without the state, which finances the scheme through a range of taxes. Maury et al. (Chap. 13) mention that if initially the highly centralised French state had to adjust to European policies favouring the neoliberal preference for greater use of self-regulatory markets and less public intervention, PES nevertheless became a mix policy tool that evolved not so much out of the pressure exercised by the Europe Union on France but, rather, from tensions between various ministries, which took different positions vis-à-vis European directives.

Schmitt et al. (Chap. 17), Toribio et al. (Chap. 8), Andrade et al. (Chap. 19), Ribeiro et al. (Chap. 20), Insaído et al. (Chap. 22), Ananda (Chap. 7), and Yashiro et al. (Chap. 10) show that decentralisation does not necessarily mean a lesser role for the national government, which retains the responsibility of assigning governance functions across scales. And where new levels of governance have been artificially inserted in compliance with donor demand or expectation, it often falls to the central government to readjust governance structures to improve efficiency and fairness. In addition, they show that implementing enabling management structures requires long-term coordination and the establishment and maintenance of legal regulating frameworks that require coordinated fund raising, as well as the ability to cover substantial upfront costs, all activities that are best undertaken by central governments. This is well illustrated by Ananda (Chap. 7), who discusses the problems of vertical control and horizontal coordination across different branches in watershed management in India. He concludes that national governments have an important role to play in determining how to achieve optimal delegation.

Several authors mention that resolving conflicts and deciding on trade-offs between development and conservation require the active involvement of the state. Andrade et al. (Chap. 19) mention the importance of conciliation and the creation of public arenas in which conflicts can be aired. Controversial laws need to be discussed in public hearings if they are to win politically where powerful actors remain unconvinced of their benefits. Le Coq et al. (Chap. 12) explain how Costa Rica's national PES programme gradually evolved, as the balance of power and resources between forestry stakeholders and environmentalists changed over time.

### ***1.2.4 Land-Use Change and State Protection of Place-Based Knowledge***

The ways in which the state can protect and promote place-based knowledge, rather than undermine it, are powerfully discussed by Concu and May (Chap. 14) and to a lesser extent by Wiersum and Belay (Chap. 15), Lukas (Chap. 6), May and Vinha (Chap. 16), Schmitt et al. (Chap. 17), and Maury et al. (Chap. 13), Concu and May's chapter focuses on indigenous protected areas (IPAs) in Australia. They analyse IPAs as resulting from international institutions and frameworks and their selective adoption by both the Australian federal government and indigenous people in pursuit of their own environmental, cultural, and economic interests. As a result, 'by incorporating and integrating non-indigenous institutional elements within indigenous land ownership, culture, and management systems', IPAs have come to occupy 'a unique intercultural space' in the Australian nation-state. May and Concu show how IPAs have been shaped by unequal relations of power between very different kinds of actors. These conservation spaces are defined according to non-indigenous concepts, principles, and practices, such as, for instance, the legal separation of land ownership and rights over marine resources. More significantly, IPAs are the products of convergence, as well as of tensions, between indigenous and non-indigenous values, interests, and knowledge. May and Concu argue that the state has a key role to play in ensuring that convergence overcomes tensions. This is demonstrated, for instance, in the 2008 Australian High Court ruling which extended indigenous rights over intertidal zones in the Northern Territory, and, which, by doing so, acknowledged the validity of indigenous conceptualisations and meanings of space.

Wiersum and Belay's fine discussion of forest beekeeping in southwest Ethiopia illustrates the fit between traditional beekeeping and biodiversity conservation. Trees are actively protected from pests and fire, while beekeeping favours pollination, which, in turn, improves the regeneration of rare tree species. The *kobo* system, like the Aboriginal Australian estate formally recognised as IPA, has been incorporated within more formal forest governance arrangements. These may strengthen the traditional management system, or, instead, weaken it, depending on how successful the government is in curbing commercial interests and priorities. Wiersum and Belay (Chap. 15) describe four different types of tenure arrangements for hive hanging trees and show their flexible application to a wide and diverse range of local specificities.

What makes the *kobo* system so amenable to modern conditions is that it includes a transferable tree tenure system. Conflict resolution mechanisms to deal with disputes over honey colonies, honey trees, or forests where beekeeping is practised facilitate the adaptation of traditional beekeeping to modern conditions. With the gradual integration of beekeeping forests within coffee plantations, however, the *kobo* system weakens, even if government regulations and the official promotion of agroforestry protect it to some extent from commercial agriculture. The chapter shows very well how the tension between sustainable and unsustainable farming practices has resulted in formal forest governance arrangements gradually supplementing the traditional system, until they start competing with it, leading to the gradual erosion of *kobo* rights. Wiersum and Belay (Chap. 15) end their chapter by mentioning what the government could do to ensure that formal forest governance arrangements and the *kobo* system mutually reinforce each other.

Schmitt et al. (Chap. 17) describe similar attempts to create a regulatory regime to support the use of traditional techniques combining agriculture and nature conservation. Interestingly, in this case, traditional techniques had to be introduced (or reintroduced) to help local farmers develop agroforestry and agroecology food production systems. May and Vinha, who discuss the setting up of new commercial chains for non-timber forest products that generate sufficient revenues for producers without undermining forest conservation, explain how forest dwellers involved in these chains have come to be recognised by the government as culturally traditional rural dwellers. Yashiro et al. show the appropriateness of the traditional Japanese landscape management system *satoyama* for the design of a modern governance system in which the state could play an active role. Both Maury et al. (Chap. 13) and Lukas (Chap. 6) discuss conflicts between small farmers and government authorities over the best way of combining biodiversity conservation and agricultural production. What makes the French case discussed by Maury et al. so interesting is that the state could, through better ministerial coordination, reframe subsidies to grow food as payments for ecosystem services. This would facilitate the recovery by French farmers of their forebears' traditions, which, in turn, would help them think about the land they work in new ways. A growing number of young farmers already understand farming as place-based knowledge. Like in the Japanese case, the state would then play a key role in enabling the materialisation of a *satoyama* holistic vision of the rural landscape, organised according to the intersecting spatial and temporal spans of ecological processes.

### 1.3 The Challenges of Multilayered Governance

Together, the book's empirical chapters show that PES are best understood as influential governance tools actively promoted by both international agencies and national governments. They contribute to renew the discussion on how to reshape administrative boundaries and political regions in a way that allows for the provisioning of ES. We argue that the state has an important role to play in reconciling ecology,

economy, and the social and cultural processes of local inhabitants, while resolving conflicts generated by overlapping jurisdictions and competing land management agencies. As Concu and May (Chap. 14) argue, environmental management that relies solely on political or administrative boundaries is unlikely to be effective for conservation landscape. Moreover, as shown by Schmitt et al. (Chap. 17) the emerging multilevel approach based on the vertical and horizontal integration of institutions and actors, and on local traditions and knowledge systems, requires that we think about ES in terms of public or common-pool goods.

One of the main insights emerging from our collection is that successful institutional innovations have treated the state as an important actor in the holistic management of social-ecological systems. Multilevel governance systems entail a complex architecture involving a multiplicity of actors and many interrelations between the 'local' and the 'global'. The resulting problems of regulation and enforcement at different levels have been even more challenging than in the past. This challenge requires that we move from thinking in terms of single, ideal managerial approaches (e.g. command-and-control, markets, or community-based management) to combining governance structures, scales, and tools. Management decisions regarding public goods (and most ecosystem services are public or common-pool goods) require that higher-level institutions and organisations be recognised as having other purposes and functions than just establishing the rules within which decision-making processes operate or simply defining the metarules for local resource users (Eckersley 2004). Nonetheless, without appropriate incentives or local engagement in rule making, there is abundant evidence that state policies might be ineffective. As McGinnis (2000) has argued, governance does not require a single centre of power, and governments should not claim an exclusive responsibility for resolving political issues. If politically the goal is to establish and sustain the capacities for self-governance, that is, the structured ways by which communities organise themselves to solve collective problems, achieve common aspirations, and resolve conflicts, then it may be time to move from thinking in terms of governing the commons to thinking in terms of greening the state.

The recent rise in the policy agenda of market-based mechanisms for environmental governance has shifted the emphasis from getting the right governmental regulation for conservation to getting the right price for ecosystem services. Our book, however, calls for moving away from this false dichotomy and to pay attention to getting the right set of rules and instruments, along multiple governance layers. Nested (polycentric) institutions have had a role to play in all the complex environmental governance systems discussed in this book, and central governments have been shown to be increasingly called upon to engage with other social actors to ensure the provision of ecosystem services.

Clearly, a number of issues are in need of further elaboration, and we end by mentioning two, which we develop in greater depth in the concluding chapter. First, ES governance, especially through PES, has proven far more difficult than anticipated. Second, there is yet insufficient conceptual and empirical clarity about what set of institutions are the most appropriate for the governance of ecosystem services.

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