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The tension between nature conservation and economic valuation of ecosystem services

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Chapter 1

General introduction

1. Overview

The general topic of this thesis is how a strong focus on nature conservation can be maintained in a situation where economic valuation of nature has become a dominant but troubled approach. This valuation approach rests on earlier introduced paradigm of ecosystem services, where nature provides services to society. The ecosystem services idea by now has been integrated and taken up both by nature conservationists and various governmental and non-governmental organizations for various reasons, with either good or bad prospects for nature conservation (Schröter *et al.* 2014). One consequence is that the values and methods underlying nature conservation have shifted (Jax *et al.* 2013), and so has the way in which the virtues of nature conservation are communicated in science and policy (Mace 2014). Just like the introduction of the idea of biodiversity, the ecosystem services and economic valuation of nature approach has created both opportunities and challenges for nature conservation. This thesis puts a focus on some of those challenges where the goals of nature conservation themselves are in danger of being lost, and provides a contribution towards solving these issues.

1.1 Nature conservation's struggle

Conservation biology is a science with a clear mission-driven aspect, which is nature conservation. The mission of nature conservation could be seen as having two parts: protecting nature and, lately, building capacity and policy voice (Meine *et al.* 2006). But the means of accomplishing these things are far from clear. How nature conservation is perceived and how it should be accomplished changes through time. The entire activity of nature conservation is a subject that is constantly evaluated on its means, its goals and effectiveness (Sodhi & Ehrlich 2010). Conservation biology came into being out of a social desire to conserve nature, and it is still this social desire and the peculiarities of this social desire that shape the scientific inquiries. What is crucial about this fact is that the goals of nature conservation are formed by the way we see the relationship between humans and nature (Flint *et al.* 2013). And this vision of a relationship between humans and nature influences how we protect it, and how we try to convince others to assist in this.

Ecosystem services is the current popular approach to express this relationship between humans and nature. Ecosystem services did not arise from nothing, but is a result of long-term trends and phases in the framing of nature conservation. Mace (2014) identified two phases of framing preceding ecosystem services, with ecosystem services being part of a third phase. Before and during the 1960s, nature conservation focused on protected areas, intact natural habitats and wilderness. Species conservation was a strong focus as well as the management of areas (Meine *et al.* 2006). In the 1970s and 1980s, the impact of humanity increased dramatically, leading to greater awareness of the consequences of habitat destruction. The focus of nature conservation shifted to a second phase (*cf.* Mace 2014), a development of protection of nature against the destructiveness of people. This lead to new concepts in nature conservation such as minimum viable population and sustainable harvesting. During the 1990s, it became clear that human pressure on nature was present everywhere and unceasing, and nature conservation adjusted to this by focusing more on ecosystems instead of species, and positioning nature conservation within the economic domain.

Ecosystem services arose to prominence within this third phase of nature conservation. The sequence of phases does not mean, however, that earlier framing of nature conservation disappeared, or was supplanted by new framing. All three discourses on nature conservation exist alongside each other and cause disagreement about ecosystem management practices (see for example Soule (2013) and Kaveira (2014)). Especially the ecosystem services frame causes friction with earlier frames because it involves human well-being as a measure of conservation success, while the frame of protection of nature against people sees humanity increasing its wellbeing as a threat to conservation.

1.2 How ecosystem services got popular

The concept of ecosystem services has gained global attention in recent years in the world of nature conservation and sustainable development. The concept existed for a longer time already, but a number of widely-read scientific publications and international initiatives grabbed hold of it to explore its implications, which catapulted ecosystem services into ubiquitous use. Well-known are the publications by Robert Costanza (Constanza *et al.* 1997) who published a calculation of the economic value of ecosystem services worldwide. Ecosystem services were further codified in classes and explored for various regions around the world in the Millennium Ecosystem Assessment (MEA 2005), which made the concept more accessible and relevant for policy makers on national and international levels.

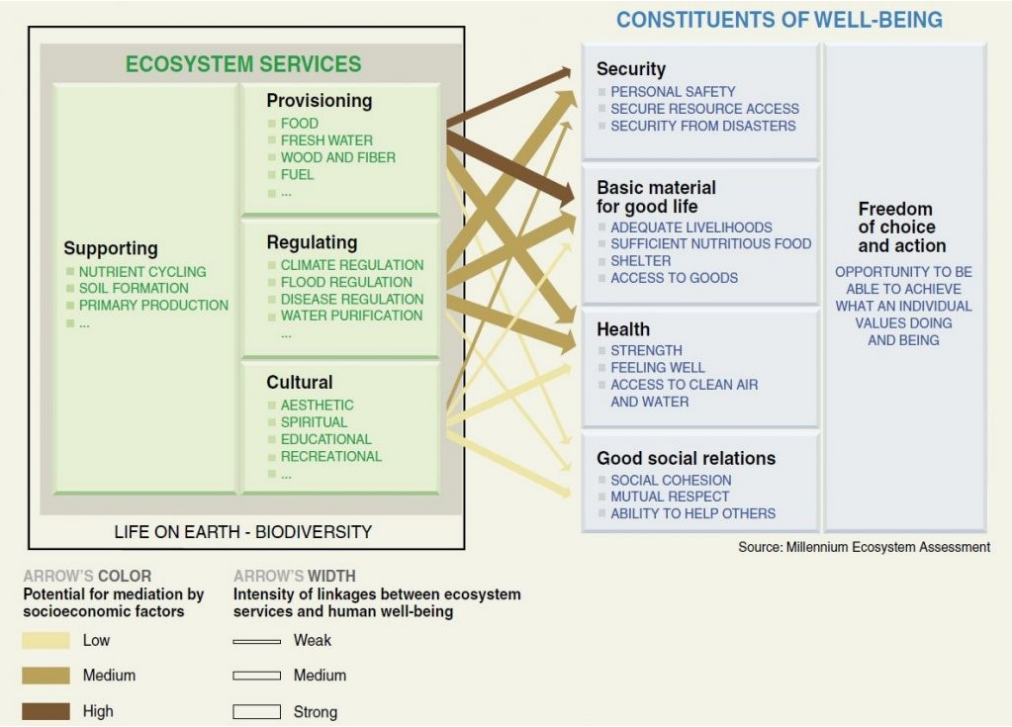

Figure 1: Ecosystem services explained for policy makers. Source: MEA (2005).

To understand why ecosystem services gained popular usage, it is important to clarify that it is useful for different people for different reasons. Many nature conservationists viewed the ecosystem services

concept and the additional step of monetization of services as a promising development in the battle to prevent biodiversity degradation (Daily 2000). After decades of stressing the wonders of nature and showing doomsday messages of acid rain destroying the forests, nature conservation had enchanted some and depressed others, but the degradation of biodiversity had not halted and new strategies were needed to motivate nature conservation against an economic system that encroached upon natural habitats and transformed those habitats to agricultural land and economic capital. The MEA clarified that ecological theory with which conservationists were already familiar, such as theory about ecosystem functions, communities and nutrient cycles, also hinted at human benefits (Fig. 1), and this supplied ready arguments for nature conservation (Armsworth *et al.* 2007), which could be translated to management objectives (Daily 2000; Daily 2009).

In step with these developments came the idea to use this framework to start to clarify what the impact is of ecosystems on the economic systems of people (Common & Perrings 1992). From the perspective of economics, the concept of services flowing out from stocks inside the ecosystems was very useful, because it allowed economists to incorporate the effects of environmental damages and benefits from nature into an updated view of human welfare (Bockstael *et al.* 2000; Jax *et al.* 2013). A new 'green' GDP (Boyd 2007) that could now be calculated would be a closer approximation of the economic health of a state. Ecosystem services translated nature into a vision of natural capital, and environmental economists proposed that if natural capital entered market systems, people would gain a sense of scarcity about natural resources, and the market would regulate its maintenance (Dziegielewska 2009; Bateman *et al.* 2010). With this idea, nature conservationists too were handed a new strategy to involve the worlds of politics and business in nature conservation, for money would give nature a voice in decision making, and they would show that an economic system that consumed ecosystems was actually damaging itself (Norgaard 2010).

In addition, financial mechanisms and policy instruments could be devised that would help nature conservation on the ground (Pirard 2012). The perspectives of this vision of economic valuation of ecosystem services in service to nature conservation and sustainable development were set down in the reports of The Economic of Ecosystems and Biodiversity (TEEB 2013), which, just as the MEA aimed to, made the concept more accessible and relevant for policy makers.

However, precisely because ecosystem services and economic valuation speak to those involved in business and politics, it is important to remember that these concepts are useful for people for different reasons. Nature conservation is only one of those reasons and may not always be present as a motivating factor while talking about ecosystem services. The concept arose to speak to the concerns of economists, business leaders and politicians, to create so called policy relevant conservation science (Rose 2014). They may be concerned with wealth creation for humans and distribution of wealth to humans on limited scales of time and space. Ecosystem services and economic valuation offers a vision of nature that aligns itself with these concerns.

Studying these developments is important because of two main reasons that together create a sense of urgency to explore matters further: (I) an enthusiastic and ongoing adoption of the concepts by organizations, and (II) an increasingly passionate concern about the consequences and implications.

1.3 The institutionalization of ecosystem services

The use of ecosystem services is being increasingly institutionalized in policy declarations, conservation goals and practical applications. National governments, for example, integrate ecosystem services into their goals in environmental policy and development. China (Bennett 2008), Mexico (Muñoz-Piña *et al.* 2008), Costa Rica (Pagiola 2008) and many other developing and developed countries have financial schemes to pay landholders to manage and maintain the provision of ecosystem services, such as pharmaceutical compounds or hydrological services. Also in Europe, national visions about nature conservation and environmental policy are expressed through ecosystem services and natural capital. Some examples are the UK State of Natural Capital Report (NCC 2013) and the Dutch Natural Capital Report (PBL 2016). The green GDP or other forms of green national accounting use ecosystem services, and so do international initiatives in policymaking, such as REDD, Reducing Emissions from Deforestation and Degradation (Corbera 2012).

Various non-governmental conservation agencies also shifted their focus towards ecosystem services. The Nature Conservancy, the World Wildlife Fund, IUCN and Conservation International use the idea of ecosystem services to explain their goals. The Nature Conservancy and the World Wildlife Fund are involved around the world in projects that use financial instruments in which the maintenance of ecosystem services is set as a goal (Kazakova *et al.* 2007; The Nature Conservancy 2014). Not only nature conservation organizations but other influential transnational organizations such as the United Nations Environment Programme (UNEP 2008) and the World Bank's Wealth Accounting and the Valuation of Ecosystem Services partnership (WAVES 2015) take ecosystem services and economic valuation of natural capital as a starting point.

Both governmental and non-governmental organizations support the setup of so-called payment-for-ecosystems-services (PES) schemes (Wunder *et al.* 2008). These are practical on-ground applications in which a market for certain services is set up within predefined boundaries of space and participants. As the Millennium Ecosystem Assessment already clarified, ecosystem services come in a couple of categories, and only a few already have market values, such as timber. Values of other services can be elicited, and depend on the particular consumers, particular providers and particular services in demand. PES schemes are a way to actualize a market that did not arise on its own for such services, for a selection of stakeholders (Vatn 2010). Although these local characteristics of society and nature make PES schemes hard to export or duplicate (Norgaard 2010), and prices for ecosystem services hard to generalize, the flowering of a great number of PES schemes worldwide further underlines the popularity as a concept. The development can be seen as a great practical experiment to explore the promises of economic valuation of ecosystem services, with so far inconclusive results (Bartkowski *et al.* 2015; Silvertown 2015).

From the breadth of organizations – from governmental to non-governmental organizations, either involved with nature conservation, environmental policy or development – it becomes clear that the applicability and flexibility of ecosystem services is broad, and that the potential use of the concept partly depends on the institutional context of the organization. It is no wonder that each organization gives a slightly different definition of the idea, sometimes stressing the conservation aspects, other times the quantifiable services. It is clear by now, and was always the strength behind it, that the myriad advantages of ecosystem services go beyond the communication of nature conservation. It can be a decision-making tool for policy guidance and planning in the form of cost-benefit analyses, damage assessments, the identification of stakeholders and even holding people liable for environmental damages.

Figure 2: Ecosystem services apparently addresses everyone's problems. Source: US EPA (2015).

1.4 Implications for nature conservation

What also becomes clear by now is that using the concept of ecosystem services is relatively vague in its intentions. 'Nature conservation' as a concept is much clearer in its intended goals and direction of action, whereas the intention behind supporting ecosystem services depends on the context in which it

is used. In the vaguest sense, it can be a buzzword to mean that we take into account nature conservation, human happiness and economic development in one package, and hence everyone has had their concerns listened to (Fig. 2). However, once maintaining ecosystem services starts to substitute notions of nature conservation, all sorts of problems start to emerge for nature conservation (Redford & Adams 2009; Norgaard 2010; Adams 2014).

From the perspective of nature conservation, the main problem that the ecosystem services frame of mind poses is that the justification of nature conservation changes to a strongly anthropocentric outlook (Jax *et al.* 2013). The more classical strategies of identifying rare species and biodiversity hotspots for conservation find their basis in ecological science and a stated goal of preserving a diversity of genes, species and ecosystems. In a world of limited funding and a scramble for surface area, nature conservation is necessarily selective, and the selection of nature to be protected needs justification. The argument of protecting diversity is rather loose and entangles researchers into a debate in which diversity is either protected for ecological stability, or stability is protected for diversity, but at the basis are a number of moral judgments about humanity as an instigator of extinctions and biodiversity as a source of wonder, function and even its own moral agency (Kals *et al.* 1999; Lockwood 1999; Nisbet *et al.* 2009; Gosling & Williams 2010). What ecosystem services does is specifically naming the function and use of nature for humans as the justification for conservation (Jax *et al.* 2013). This makes it considerably more difficult to justify the protection of rare species, and diversity itself.

Building on the anthropocentric view of nature as a service, the relationship between humanity and nature is reframed to that of a consumer and (an uncontrolled) producer (Nyborg 2000), while other forms of relationships such as stewardship of nature or participant in nature are discarded, alongside with what those words entail. Guilt about the extinction of a rare species will have little meaning if that species did not have a producer role for a service. The follow-up step of economic valuation of ecosystem services further narrows the justification of nature conservation, and rare species hardly ever carry the greatest monetary values. The shift of nature conservation to ecosystem services and then economic valuation thus caused first a blurring of the end goal of protection, and then a refocusing on anthropocentric use (McCauley 2006). If environmental policy then aims at safeguarding the production of ecosystem services, and economic ways of thinking lead to an optimization of that production, nature conservation itself has been removed as a central concern and may even be in direct conflict with maintaining ecosystem services and may be in competition for space and resources.

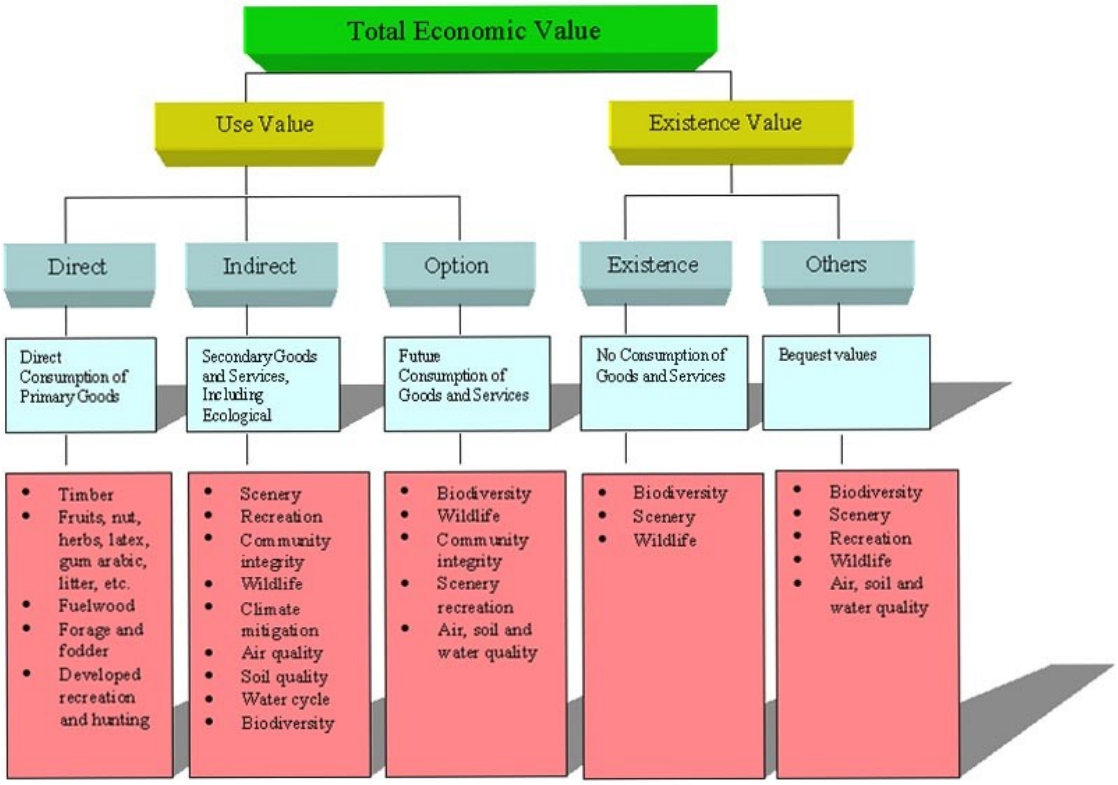

Figure 3: The ecosystem as a producer of economic value. The scheme shows the total economic value of a forest. Source: FAO (Cistulli 2002).

In reaction to this distressing vision, a large number of critiques appeared in scientific literature about ecosystem services and economic valuation (Schröter *et al.* 2014). Not only the practical implications for nature conservation were discussed (Redford & Adams 2009; Nunes & Van den Bergh 2001; Fisher *et al.* 2008; Turner 2010), but ethicists, economists and philosophers discussed the ethical implications on which nature conservation rests (Luck *et al.* 2012; Jax *et al.* 2013), mainly in relation to the application of economic valuation (Knights *et al.* 2014). It is argued that human-nature relationships cannot be adequately expressed through economic valuation (O'Neill & Holland 1999), nor through the metaphor of consumer-producer (Nyborg 2000). A commodification of nature would see ecosystems and individual species as exchangeable with other commodities and land uses, which devalues nature, may create fragmentation of landscapes, and disregards certain values that humans attribute to nature (Hannis & Sullivan 2012; Gomez-Baggethun & Muradian 2015).

In a counter reaction against the critiques, some scientific literature is shockingly confident about the promise of economic valuation. 'The challenge then is to provoke society to acknowledge the value of ecosystem services. Ecosystem services valuation (ESV) is the tool that can tackle such a challenge.', Liu *et al.* (2010), while simultaneously being dismissive of the critiques: 'Much of the debate about the use of ESV has to do with not appreciating [its] range of purposes'. Proponents of the ecosystem services idea attempted to include more values into the ecosystem services framework, in the form of spiritual values, bequest values, existence values and others (Fig. 3) (Nijkamp *et al.* 2008), mainly under the

umbrella of cultural ecosystem services, but economists have found it increasingly difficult to elicit monetary values for these services (Gould *et al.* 2015). Furthermore, the framework itself implies that in cost-benefit analyses, services are measurable by the same standard of money, meaning that the monetary values of provisioning services such as timber and freshwater may add to or compete against the monetary values of spiritual or existence services. So-called protest bids in value elicitation efforts show that people may react negatively to the entire notion (Burgess *et al.* 1995; Irwin 2001).

An institutionalization of ecosystem services and economic valuation may have greater sociocultural impacts as well. There is accumulating evidence that an imposition of monetary rewards as an incentive to get people motivated to act has limits and undesirable consequences (Rode et al, 2015). An external motivation such as a payment seems to cause internal motivations to disappear. This phenomenon is known as crowding out, and the worrying aspect is that once the monetary reward stops, the internal motivation does not seem to return. In effect, paying for ecosystem services seems to change people's mind about the value of acting for nature in such a way that it is branded forevermore as a service to be paid for in the minds of the providers or conservationists. For the goal of nature conservation, this creates a dependency on payments that brands nature useless once the flow of money stops. Coffey (2016) argues in addition that the very metaphors of ecosystem services and economic valuation narrow down the language with which to talk about environmental policy, which limits understanding and has political consequences.

Other problems that were already associated with the current economic systems now also rear their heads in the field of nature conservation, such as an unequitable distribution of goods and benefits amongst people (Farley *et al.* 2015). There is also a danger that economic valuation and commodification of nature will further disenfranchise the poor and empower the rich, and it doesn't change the institutional context enough to solve the environmental problems (Norgaard 2010). In the context of sustainable development, intergenerational equity also seems under threat once discount rates lower nature's value for future generations (Hare 2007).

1.5 Confusion and urgency

The critiques leveled at both ecosystems services and economic valuation are hardly represented by one unified voice or one point of view. Some authors see the two concepts as separate issues, while others see economic valuation as a natural continuation from a frame of mind that ecosystem services introduced (Gomez-Baggethun & Ruiz-Perez 2011; Silvertown 2015). The concerns also point towards various subtopics that are associated with both concepts. Some authors focus specifically at the precise limits of valuation techniques used to elicit economic values. Others list the technical problems associated with using rather arbitrary units for looking at ecosystems and services, such as using political boundaries. Again, others criticize the larger financial mechanisms such as biodiversity offsetting, or question whether ecosystems services and economic valuation should be incorporated into new ethical frameworks, or should even done away with entirely.

From the point of view of a policy maker, the criticism descends into a layered complexity, in which it is unknown how to deal properly with these concerns. Does the road to sustainable development lie in simply addressing some micro-issues about valuation methods (Christie *et al.* 2006), or should there be no valuation of services even as a decision-making tool in a toolbox, or should the problems be addressed at larger scales? And who exactly is being addressed in the critiques? The scattering of criticism across different scales creates confusion and hampers society in effectively taking them up (Schröter *et al.* 2014; Melathopoulos & Stoner 2015), while an enthusiastic application of the concepts is ongoing.

One way forward to dispel confusion and break through the apparent deadlock in the debate around the topic is to channel these critiques into practical adjustments of the way ecosystem services and economic valuation are implemented now. This PhD thesis works towards that aim in ways that are clarified in the next sections.

1.6 Objectives & outline of the thesis

The thesis can best be described as focusing on a single topic from different angles. Economic valuation of nature is explored in how it connects to ecological and economic theory, policy communication and human motivation. The different angles, meaning fields of study such as ecological economics, ecology and environmental policy and environmental psychology, together make for an interdisciplinary investigation that carries certain advantages with it. The interdisciplinary setup helps to build up a clearer image of the current use of economic valuation of nature and makes it easier to identify promising recommendations for the future.

The main research question is: what would be an appropriate role for economic valuation of nature in motivating nature conservation?
The sub questions to this research question are:

1. What do practitioners think about economic valuation?
2. How do EU research subsidy documents communicate the importance of biodiversity conservation?
3. How can we combine economic valuation with notions of sustainable use of ecosystems?
4. What are stakeholders' ideas about good indicators for conservation action success by farmers?
5. What are the motivations underlying committed conservation action?

The sequence of chapters follows a logical build-up of research questions. The thesis starts out with an exploration of the current opinions surrounding economic valuation, showing how practitioners in nature conservation consider its usefulness and limitations (chapter 2). Then, to investigate possible consequences of the ecosystem service language, chapter 3 looks at the trends within the language of policy and research subsidies. The two chapters following on this, explore new avenues for combining economic valuation and market approaches with ecological science. It is explored how economic valuation can be updated to take current ecological theories into account (chapter 4) and it is investigated whether ecological indicators can feasibly be used in a market based approach (chapter 5).

The final chapter (chapter 6) explores the motivations involved in successful conservation practices and considers the efficacy of economic valuation of nature as a motivational approach for nature conservation.

Chapter 1: General introduction
General introduction regarding ecosystem services and economic valuation of such services, and an outline of the thesis.

Chapter 2: **The polarization of opinion surrounding economic valuation of biodiversity**
What do practitioners think about economic valuation? Is there a consensus about its use? This chapter takes all the available information about the virtues and limits of economic valuation of biodiversity and its alternatives and investigates the current ideas about this information among people who are involved in the field and carry out such economic valuation in projects. Chapter two provides an exploratory investigation to identify the most up-to-date views on these issues on the ground, and what scope the results suggest for adapting economic valuation methods or embedding them in ways that take other values into account.

Chapter 3: **The loss of biodiversity conservation in EU research programmes**
How does the EU ask scientists to deal with biodiversity? What do they communicate as to its value for conservation? This chapter investigates how the value of biodiversity is communicated within European policy networks, and how this value is communicated via the subsidy mechanisms to European scientists. This provides us with an accurate description of the state-of-play concerning values in higher policy circles and the implications of this state for future biodiversity conservation. The chapter explores the prevalence of ecosystem services, economic valuation and other biodiversity values in European research policy documents.

Chapter 4: **More than total economic value: How to combine economic valuation of biodiversity with ecological resilience**
How can we combine economic valuation with ecological knowledge and how do ideas about biodiversity tie into it? This chapter looks into the economic methods that are used to value ecosystem services and to explore whether these methods could be augmented with ecological knowledge. Chapter four explores an avenue of how economic valuation could be embedded into a larger framework that takes sustainability values and environmental risk assessment into account, based on an application of ecological theory.

Chapter 5: **A stakeholders' view on indicators of farmers' biodiversity performance**
The fifth chapter investigates practitioners' ideas about fairness in judging success in biodiversity conservation by farmers. Across a range of stakeholders in an agricultural production chain, the same question was posed about how efforts of biodiversity conservation should be judged and whether ecological indicators are acceptable in such a market-based approach to nature conservation.

Chapter 6: **Motivations for committed nature conservation action in Europe**

On what kind of motivations were successful conservation efforts built? The people who pushed for those efforts, what were their motivations? In this chapter, the aim was to find people who already are passionate about protecting nature, and ask them what makes them motivated to do their work. By exploring which motivations trigger them to act, and which motivations bar their actions, we gain insight into the role that biodiversity plays in daily life of these people. Nature has certain values in their eyes, and these values are linked to a readiness to act to preserve these values. Chapter six explores how the values of nature are incorporated into people's ideas for meaningful actions. This information informs us of the values that need to be given freedom of expression in biodiversity conservation to trigger motivation.

Chapter 7: General discussion

1.7 BIOMOT project

This PhD thesis has been deeply connected in practice to the BIOMOT project (BIOMOT: MOTivational strength of ecosystem services and alternative ways to express the value of BIOdiversity). BIOMOT is a European research project, subsidized under FP7 Grant Agreement FP7 282625. Its goal was to investigate the efficacy of the ecosystem services concept in motivating people to protect nature and simultaneously to investigate alternative ways of expressing the value of biodiversity, also in service to the motivation for nature conservation. The project presumed the failing of the ecosystem services concept in getting people to act for nature conservation as a *fait accompli*, and was meant to build on this knowledge by identifying both the causes of this failure and alternative avenues for action.

The data collection for the papers in this thesis were simultaneously part of the work packages of the BIOMOT project. It was obvious from the start that the overarching research questions of BIOMOT would be too all-encompassing for a PhD project to answer. It was decided that the thesis would narrow its focus to investigate specific research questions within the broader topic of motivation for biodiversity. The first work package focused on the economic valuation of ecosystem services and produced a comprehensive overview of the criticism raised against the approach. The thesis contributed to this overview by exploring an avenue to connect economic valuation with current ecological science (chapter 4). Then, using this comprehensive overview, the opinions on economic valuation were explored of experts and practitioners in the field in Europe who played a part in the social debate surrounding it. This exploration, which is also part of the thesis, would clarify areas of consensus and opposition between different views on the matter (chapter 1).

Another work package explored the deeper motivations of people who have already involved themselves successfully with nature conservation, and a better understanding of those motivations allows us to investigate how ecosystem services and economic valuation either provide an avenue for people to follow those motivations, or how they fail to provide this. This thesis carried out an exploratory investigation into the motivations of such people and how they relate to ecosystem services (chapter 6). The BIOMOT project went on to study forms of governance and to look at what makes some projects

successful compared to other projects, but on the topic of policy, the thesis confined itself to a study of the use of ecosystem services in subsidy documents of the European Commission (chapter 2).

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