Reconnecting with nature through concepts

On the construction of values in the ecosystem services paradigm

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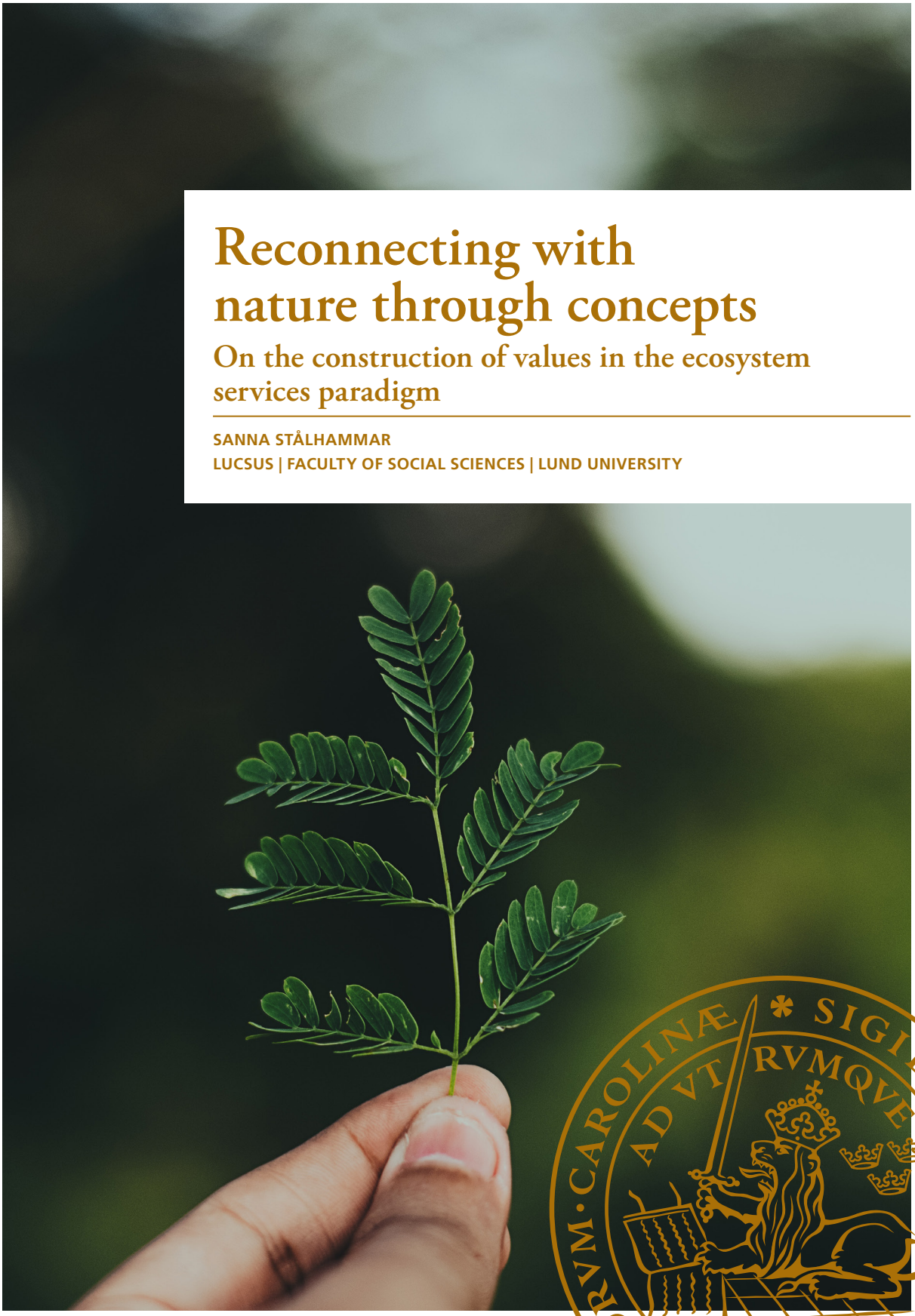

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Reconnecting with nature through concepts

The alarming rates of extinction and degrading ecosystems call for new means of understanding the different ways people depend on nature. This thesis is about ecosystem services and concepts developed to account for and understand diverse human-nature relationships.

Sanna Stålhammar
LUCSUS

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Abstract

The alarming rates of extinction and degrading ecosystems call for new means of understanding and accounting for how people depend on nature. Ecosystem services (ES) is a contested but widely applied concept aiming to connect ecosystem functions to human wellbeing and to assess and account for how nature matters in decision-making. More diverse frameworks and ideas of value intended for assessments are emerging to incorporate an array of disciplinary perspectives from the social sciences and humanities. This calls for closer examination of how human-nature relationships (HNR) are construed and captured.

This thesis aims to critically examine and diversify the conceptualisations of value and human-nature relationships within the ecosystem services paradigm. In doing so, it follows the moving target of concepts intended for ES assessment of social value. By drawing on philosophy of science and qualitative methods in the social sciences, I examine theoretical foundations of ES concepts while also studying HNR and values empirically. Empirically, the thesis is based on fieldwork in Sweden, in Cape Town, South Africa, and in Rio de Janeiro, Brazil.

In five papers, I investigate concepts or 'arenas' where values or benefits of nature are theoretically conceptualised and/or articulated by citizens and practitioners. Paper I is an analysis of existing critique of the ES concept and demonstrates how the idea of values used to describe human-nature relationships within ES has been influenced by economic theory. Paper II is an analysis of how Swedish focus group participants construct and perceive the values of their recreational experiences. The analysis highlights people's emotional and self-evidential relationships with nature and thus shows a poor fit with the consequentialist framing of ES valuation. Paper III investigates what the concept of relational value (RV) adds to three fields and their value concepts: environmental ethics; ecosystem services valuation; and environmental psychology. It shows how RV solves methodological problems within ES valuation, due to narrow conceptualisations of intrinsic and instrumental value, and enables widely different interpretations of what relationality means for studying HNR. Paper IV is an empirical study based on interviews with civil servants and practitioners working with green space and biodiversity management in Cape Town. It shows diverse values and perceptions of biodiversity as a management challenge, emphasises the need for recognition of the importance of urban nature in green space planning, but also points to the limited usefulness of socio-cultural valuation in highly diverse cities. Paper V explores how the biocultural diversity framework can be an advancement over the ES to study HNR in cities in the global south, based on insights from fieldwork in Rio de Janeiro. It shows that BCD can be suitable to study HNR in highly culturally and biologically diverse cities but further theoretical and context-sensitive adaptations are required.

As a whole, the thesis outlines theoretical and empirical challenges of including place-based and qualitative social science knowledge in the ES paradigm. It calls for a re-thinking of the focus within ES to go beyond concepts of value and descriptive modes of assessments, in order to create more inclusive and diverse conceptualisations of HNR.

Key words: ecosystem services, human-nature relationships, socio-cultural valuation, cultural ecosystem services, environmental values, relational value, interdisciplinarity, biocultural diversity, urban biodiversity, human-nature connectedness, urban green space planning, lived biodiversity

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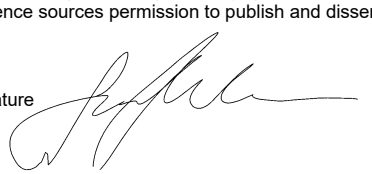
Signature  Date 2019-12-10

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Surely, (…) 'value' is something we humans impose on the world. Nature may be objects there without us. There may be a ready-made world, but human values are not found ready-made in it. We make up our values. But not so fast: perhaps we humans do find some non-human values, or some of our values already made up, in the evolutionary history of our Earth, or our ecology.

Holmes Rolston, 1997, p. 40

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Author contributions

I. HT and SS developed the idea for the article together. HT led the design, the theoretical framing and writing. SS contributed to literature review, analysis and writing.

II. SS had the original idea for the article. EP collected the data and both authors designed the framing of the paper. SS led the analysis and the writing of the paper.

III. SS and HT developed the idea for the article together. SS led the design, the analysis and writing of the paper with contributions from HT.

IV. SS developed the idea and methodology for the paper, collected data, undertook analysis and wrote the paper.

V. Both authors contributed equally to the literature review, research design, analysis of the empirical material, and writing. SS took the lead on the theoretical framing and discussion of conceptual implications. EB led the focus group activities in Rio de Janeiro.

Additional publications

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List of abbreviations

BCD	Biocultural Diversity
ECOSIMP	Implementing the Ecosystem Services Concept at the Municipal level
ES	Ecosystem Services
GI	Green Infrastructure
HNR	Human-Nature Relationships
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
MEA	Millennium Ecosystem Assessment
NCP	Nature's Contribution to People
RV	Relational Value
TEEB	The Economics of Ecosystems and Biodiversity
UGI	Urban Green Infrastructure
UGS	Urban Greenspace

Abstract

The alarming rates of extinction and degrading ecosystems call for new means of understanding and accounting for how people depend on nature. Ecosystem services (ES) is a contested but widely applied concept aiming to connect ecosystem functions to human wellbeing and to assess and account for how nature matters in decision-making. More diverse frameworks and ideas of value intended for assessments are emerging to incorporate an array of disciplinary perspectives from the social sciences and humanities. This calls for closer examination of how human-nature relationships (HNR) are construed and captured.

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Sammanfattning

Den alarmerande omfattningen av artutrotning och degradering av ekosystem kräver nya sätt att förstå och beakta de olika sätt varpå människan är beroende av naturen. Ekosystemtjänster (ES) är ett omtvistat men allmänt tillämpat begrepp som kopplar ekosystemfunktioner till mänskligt välbefinnande och därigenom möjliggör bedömning och utvärdering av naturens betydelse för beslutsfattande. Flera ramverk och beskrivningar avsedda för bedömning har växt fram, och fältet har diversifierats genom att hämta synsätt från samhällsvetenskaperna och humaniora. Denna utveckling innebär behov att närmare undersöka hur relationen mellan människa och natur beskrivs, mäts och förmedlas till beslutsfattare.

Syftet med denna avhandling är att kritiskt granska och diversifiera begreppsliggörandet av naturens värde och människans förhållande till natur inom ES-paradigmet. Arbetet följer det rörliga forskningsfältet som utvecklingen av koncept för utvärderingar av ES utgör. Jag undersöker de teoretiska grundvalarna för ES-koncept med hjälp av begrepp ifrån vetenskapsteori, samt använder kvalitativa metoder för att studera människa-natur relationer empiriskt. Det empiriska arbetet bygger på fältstudier i Sverige, Kapstaden i Sydafrika och Rio de Janeiro i Brasilien. Avhandlingen bygger på fem artiklar som undersöker hur värde och människa-natur relationer artikuleras genom koncept eller av samhällsaktörer och medborgare.

Artikel I är en analys av befintlig kritik av ES-konceptet som visar hur idén om värden för att beskriva förhållandet människa-natur inom ES har påverkats av ekonomisk teori. I **Artikel II** redovisas hur svenska medborgare som deltar i fokusgrupper uppfattar värdena i deras vistelse i naturmiljöer. Analysen belyser människors känslomässiga relationer med naturen och visar således en dålig anpassning till inramningen av värde inom ES-värdering. I **artikel III** undersöks vad begreppet relationellt värde (RV) kan tillför till följande fält och värdekoncept; miljöetik, ekosystemtjänstvärdering, och miljöpsykologi. Analysen visare att RV främst bidrar med att lösa metodologiska problem vad gäller ES-värdering, som en följd av en begränsad operationalisering av intrinsikalt och instrumentellt värde. **Artikel IV** är en empirisk studie baserad på intervjuer med tjänstemän och utövare som arbetar med hantering av urbana grönytor

och bevarande i Kapstaden. Resultatet visar att förekomsten av polariserade uppfattningar om värden av naturen och biologisk mångfald är en ledningsutmaning, understryker behovet av att framhäva betydelsen av urban natur i planering, men pekar också på den begränsade nyttan av socio-kulturella värderingar. I **papper V** utreds hur den biokulturell diversitet (BCD) kan vara ES-paradigmet till gagn när det gäller att studera människa-natur relationer i det globala syd. Arbetet baseras på en fältstudie i Rio de Janeiro och visar att BCD kan vara lämpligt för att studera människa-natur relationer i städer med stora socioekonomiska skillnader men att fler empiriska studier, och teoretisk anpassning utifrån plastbaserade behov är nödvändiga. Sammanfattningsvis så beskriver denna avhandling teoretiska och empiriska utmaningar med att inkludera plastbaserad och kvalitativ samhällsvetenskap i ES-paradigmet och belyser behovet av att integrera lokal och generaliserbar kunskap. Den visar också på nödvändigheten av ett nytänkande inom ES-paradigmet som möjliggör mer inkluderande och mångfasetterade koncept och utvärderingar av relationer mellan människa och natur.

1. Introduction

1.1 Ecosystem services and sustainability

The alarming rate of biodiversity loss and ecosystem degradation brings with it a pressing need to understand more about the connection between human well-being, biodiversity and ecosystem functions (IPBES, 2019). Tools have been developed to assess the relationships between humans and nature and to make them visible in decision-making. The notion of 'ecosystem services' (ES), defined as 'the benefits people obtain from ecosystems' (MEA, 2005, p. 53) was developed as a framework by the Millennium Ecosystem Assessment (MEA), published in 2005, to conceptually connect ecosystem functions to human well-being (Daily, 1997; Díaz et al., 2006; Braat and de Groot, 2012). The ideas underpinning this concept have a long history in environmental thinking, including some of the foundational notions in ecological economics, such as nature's 'life-supporting services' on which society depends (Westman, 1977; Erlich and Erlich, 1981; Erlich and Mooney 1983). Early on, ES came to be closely associated with monetary environmental valuation (Costanza et al., 1997), building on the logic that ecosystems processes and functions can be categorised and assigned a monetary value in order to be taken into account and 'made visible' and, moreover, that they are comparable to other values in decision-making (TEEB, 2010). As a contested but widely applied concept and framework, ES now constitutes its own field of research (Braat, 2018), and the concept is being implemented at the local, national and international scales in policy, planning, management and conservation (Hansen et al., 2015; Maes et al., 2018; Prip, 2018; Schubert et al., 2018). The popularity of the ES concept implies that it is increasingly being taken for granted, and that it has taken on 'its own life, its own autonomy, its own agency' (Kull et al., 2015, p. 128).

The application of the concept has resulted in a diversification of approaches, such that ES can no longer be directly traced back to its original purpose, which was associated with ecological economics and dependence on natural ecosystems (Daily, 1997; Folke et al., 2011). The utilitarian and anthropocentric framing of nature towards human benefits and well-being is a double-edged sword. It is, on the one hand, a feature that makes it useful and appealing for policy and decision-making (Beery et al., 2016). On the other hand, however, it does have an inherent flaw which, taken together with the operationalisation of nature as an exchange value, makes way for market-based

approaches that are not only potentially counterproductive to conservation goals (Redford and Adams, 2009), but also allow for the 'subsumption' of nature within the realm of capital (Robertson, 2006; Gómez-Baggethun and Ruiz-Pérez, 2011). Such a framing is reductive and instrumentalist in portraying nature as a 'service-provider' (Potschin-Young et al., 2018) and in construing human–nature relationships in terms of a production function (Raymond et al., 2014). The concept's Cartesian way of separating humans from nature is in strong tension with, or even antithetical to, the ambition to *re-connect* humans with nature (Folke et al. 2011).

In this thesis I engage with scholarship in what I refer to as the ecosystem services (assessment) paradigm.[1] This 'paradigm' deals with characterisations/descriptions and assessments of direct or indirect relationships between ecological structures and human well-being that are intended to inform policy and decision-making (Kadykalo et al., 2019). These relationships are seen as 'benefits' and 'services' in the ES literature (Potschin and Haines-Young, 2016). The ES paradigmatic perspective is also foundational for the synthesis and development of frameworks and methodologies for assessing human–nature relationships (HNR) through the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (IPBES, 2019). In the more recent literature associated with such efforts, the ES concept has been replaced by 'Nature's Contribution to People' (NCP) (Pascual et al., 2017; Díaz et al., 2018), which offers a more inclusive framework for addressing human–nature relationships. Moreover, the efforts associated with this ES assessment paradigm can be situated within the broader field of ecosystem management which involves processes for conserving and restoring ecosystems while meeting the socioeconomic and ethical needs of current and future generations (Szaro et al., 1998; Chapin et al., 2008). Research carried out under the ES assessment paradigm is diverse and has multiple aims, but its overall ambition is associated with the logic of 'measurmentality' (Turnhout et al., 2012), which relies on the assumption that a focus on generating more precise knowledge through assessment and mapping of ES will translate into more desirable and sustainable outcomes.

The starting point for this investigation is the concern that the framing and conceptualising of nature in terms of ES, despite its ambitions, can result in a reductionist understanding of the importance of nature for society (Norgaard, 2010). Simplifications are an inevitable part of the ES metaphor and concept. However, there is concern that the economic foundations of ES *misrepresent* how nature relates to society and prevents the approach from realising long-term sustainable outcomes in practice. ES has arguably become *the main framework* for conceptualising relations between natural ecosystems and human well-being within sustainability policy and, more broadly, in the environmental sciences. ES is currently being used as a way to

[1] I here use the term paradigm in a general, rather than in the Kuhnian (cf. Kuhn, 1962), sense to refer to the common set of goals and approaches centred on these scientific efforts.

understand how society relates to the environment and how the social sciences relate to the natural sciences. These philosophical and theoretical foundations thus provide a critical opportunity for engagement with Sustainability Science. The definition of values, and the integration of knowledge and techniques of measurement constitute the foundational conditions under which values are 'captured' and how ES performs as a transdisciplinary object in different arenas in policy, planning and management. With this development comes the need to scrutinise its theoretical foundations, examine available framings and clarify if some of them allow for more credible, useful or appropriate representations of human–nature relationships. The focus here is on the theoretical bases upon which concepts are founded, responding to the call to go beyond the uptake of the concept in policy and, instead, to scrutinise the workings of scientific knowledge itself within the ES agenda (Turnhout, 2018).

This thesis follows the 'moving target' (see section 4.4), of a rapidly evolving field where concepts and methodology are subject to constant development and interpretation. Major debates and knowledge gaps have shifted as my research has progressed and alongside the development of my five papers. The shifts are due to the increased recognition that there is no consensus as to what should constitute the benefits, 'value', or 'contributions' of nature, and that the measurement of these is not a straightforward scientific or methodological task. Describing and assessing relationships is not only a methodological issue aimed at how to connect ecological processes with social benefits, but also, ultimately, a matter of how to understand the relationship between humans and nature. In the discussions surrounding ES, value is often associated with monetary valuation and assessments, but the term 'value' is also used ambiguously and is frequently not explicitly defined (Hejnowicz and Rudd, 2017; Rawluk et al. 2018). Overall, perspectives on value and valuation are diversifying and moving away from monistic economic conceptions (Jacobs et al., 2016; Pascual et al., 2017; Arias-Arévalo et al. 2018). There is increased recognition of the many and diverse legitimate worldviews and perspectives regarding nature and also of the need to be inclusive of the social sciences and humanities in formulating these (Brat, 2018; Díaz et al., 2018). This has expanded aims that were initially associated with assessment and considered only ecological and economic values towards an increased focus on social (or socio-cultural) values and a transdisciplinary concentration on *representation* and involvement of stakeholders' and local people's diverse worldviews, perceptions and overall relationships with nature (Díaz et al., 2015; 2018; Pascual et al., 2017).

This thesis sits within the emerging discussion of how qualitative and humanistic perspectives can contribute to diversifying the understanding and conceptualisation of HNR and values within the ES and biodiversity agenda (IPBES, 2016; Jetzkowitz et al., 2018; Stenseke and Larigauderie, 2018; Vadrot et al., 2018). Perspectives from the qualitative social sciences and humanities are crucial for an integrated understanding and considerations of diverse relationships with nature. They provide insights into how and why people value nature and biodiversity in various ways, as well as the social

drivers of environmental problems and their solutions (Jetzkowitz et al., 2018). As I demonstrate in paper IV, which deals with varied perceptions and values of biodiversity, such insights are central for conservation management and urban green space planning. In the ES and biodiversity sphere, the widely influential idea of 'relational values' emphasises context-specific and qualitative knowledge as a crucial but understudied aspect of NCP (Díaz et al., 2018). However, scholars from the qualitative social sciences and humanities have largely been absent from the discussions around ES. Their reluctance to engage *constructively* with the ES field is perhaps due to its association with monetisation and commodification (McAfee, 1999; Sullivan, 2009; Kosoy and Corbera, 2010; Gómez-Baggethun and Ruiz-Pérez, 2011; Silvertown, 2015; Dempsey, 2016) and to the natural scientific (or realist) way of treating social dimensions (Chan et al., 2012; James, 2015). The historical natural-science basis of biodiversity and ecosystem services also provides unfamiliar settings, concepts, approaches and epistemologies for scholars adhering to qualitative or interpretivist approaches and modes of inquiry (Stenseke, 2016). Importantly, the latter do not draw on or typically connect their approaches to quantitative reference units of species or ecosystems, but build understandings based on concepts such as *discourses, power, agency, perceptions, and empowerment* (Stenseke, 2016).

I am here primarily interested in qualitative methodologies to describe 'social and cultural values' of nature and biodiversity in relation to ES. The framing of ES as instrumentalising nature and HNR, for the pursuance of particular ends related to well-being or preferences, is unfamiliar, especially in qualitative approaches. Attempts to describe HNR in relation to ES from the perspective of the qualitative sciences thus opens up new terrain for research and practice as well as the possibility of a richer and more in-depth understanding of the various ways in which people engage with and benefit from ecosystems. I reveal local expressions, perceptions and values of nature from sites that I studied in southern Sweden, Cape Town, South Africa, and Rio de Janeiro, Brazil, thereby responding to the call to use a 'context-specific' lens to explore place-based and diverse ways of valuing nature in specific geographical spaces (Botzat et al., 2016; Chan et al., 2016; Díaz et al., 2018; Merçon et al., 2019). Such place-based knowledge and interpretivist analysis, compared with a more 'standard' ES framing (relying on quantification and mapping, see Burkhard and Maes 2017), has the capacity to reveal hitherto uncaptured elements. The fundamentals of the lived experience of natural environments need conceptualisation that is beyond the non-contextual and categorical language of ES. Uncaptured elements provide leverage for resistance and reshaping. I explore such conceptual reshaping through an examination of the more recently launched concepts of 'relational value' and 'urban biocultural diversity'. These concepts, developed within the ES paradigm, are advocated as being better able to account for qualitative, place-based and 'lived' aspects of HNR (Buizer et al., 2016; Chan et al., 2016).

Methodologically, my contributions include exploring the application of interpretivist approaches to ES to gain an understanding of local perceptions, values and connections regarding nature and biodiversity. As a result, this thesis illustrates the opportunities and challenges of using interpretivist perspectives to understand HNR in the realm of ES. It demonstrates that despite conceptual reframing and methodological expansion, fundamental differences remain *between* the natural and social sciences, and *within* the social sciences and the humanities, that imply potentially conflicting ontological and epistemological perspectives of how to regard people's relationships with nature (benefits) within the ES paradigm. Moreover, this thesis demonstrates *how* ideas, metaphors and methods associated with economic theory have permeated and influenced both the integration of social and natural dimensions and the conceptualisation of values.

Importantly, my focus is broader than just the ES concept, as I also study the relational values concept (Chan et al., 2016) and the urban biocultural diversity concept (Vierikko et al., 2016; Elands et al., 2018). All the concepts studied here share the aim of seeking to define and understand human–nature relations for the purposes of assessing these and, ultimately, to inform policy and decision-making (see Box 1). They can thus be seen as belonging to the 'ES paradigm'.

There is also an implicit aim among advocates and users of these concepts that the concepts should help conceptualise human–nature relationships in ways that are in line with sustainability goals. I hope that this thesis contributes to this ambition, by suggesting and discussing diversified ways of understanding the importance of nature and biodiversity, while situating human well-being within the biosphere.

Box 1. Definitions of main concepts studied

Ecosystem services

The most commonly used definition of ecosystem services is the one offered by the Millennium Ecosystem Assessment: 'the benefits people obtain from ecosystems' (MEA, 2005, p. 53). Here, ecosystem services are divided into the four categories of supporting, provisioning, regulating and cultural services, all of which arise from properties of ecosystems (MEA, 2005, p. 56).

Cultural ecosystem services

Cultural ecosystem services (CES) are defined as the nonmaterial benefits people obtain from ecosystems through, for example, spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences (MEA, 2005).

Relational value

A category of value intended to describe how people do not make choices based on the intrinsic or instrumental worth of something but 'also consider the appropriateness of how they relate with nature and with others, including the actions and habits conducive to a good life, both meaningful and satisfying (Chan et al., 2016, p. 1462)'. Relational values are defined as preferences, principles, virtues about/based on meaning-saturated relationships (Chan et al., 2018, p. A3).

Urban biocultural diversity

A concept and framework of biocultural diversity (defined as the diversity of life in all its manifestation (biological, cultural, linguistic) and systemic interactions among these (Maffi, 2007; Merçon et al., 2019) that emphasises the importance of urban green areas for the quality of life in cities and aims to frame interactions from place-based cultural perspectives for urban green space management and planning (Elands et al., 2015, 2018; Buizer et al., 2016).

1.2 Aim and research questions

The overall aim of this thesis is to critically examine and diversify the conceptualisations of value and human–nature relationships within the ecosystem services paradigm. This aim has two central objectives that broadly coincide with the ambitions of the ES concept, namely, to integrate knowledge from several disciplines and to integrate local and transdisciplinary knowledge of nature. First, I critically examine the theoretical foundations of the concepts that are intended to assess HNR and value. Here, I draw on perspectives from philosophy of science to provide insights into the scientific and disciplinary foundations of ecosystem services and subsequent concepts. Second, I diversify ways of understanding HNR and value within the ES paradigm, by drawing on transdisciplinary knowledge. I apply interpretative social science methods to understand local values of nature in specific geographical contexts. In fulfilling this aim I strive to provide a more critically informed conceptualisation and assessment of values and ES in management, planning, policy, and conservation.

The thesis includes five papers that correspond to answering the following five research questions:

1. To what extent and how does ES integrate natural and social dimensions, and what is the role of economic theory?
2. To what extent do ES values reflect people's articulation of values?
3. What does the relational values concept add to existing concepts of value?
4. How should diverse social values of biodiversity and nature be accounted for?
5. How can biocultural diversity be an advancement over ES for studying human-nature relationships?

1.3 Papers

Each paper investigates concepts or 'arenas' where values or benefits of nature are theoretically conceptualised and/or articulated by citizens and practitioners. Research questions 1 and 3, and corresponding papers, deal with theoretical aspects of conceptualisation of HNR and values, while questions (and papers) 2, 4 and 5 draw also on empirical work and a number of interpretivist methods to understand the local and diverse values of nature and biodiversity.

Paper I is a contribution to the examination of the theoretical and epistemological foundations of the concept of ES. We investigate the interdisciplinary credentials of the integration of knowledge within ES science, building on the notion of scientific imperialism from philosophy of science. We offer a qualitative literature review of existing critique on the ES concept and employ the concepts of ontological integration, pluralism and value suppression to provide insights into the theoretical complexities of

achieving integration of ecology with economics and the broader social sciences with regard to values of ES and biodiversity.

In **paper II**, we investigate the extent to which the methodology of cultural ecosystem services (CES) valuation can be seen as integrated with local and situated values of nature. Our aim is to understand potential distinctions between individuals' expressions of values of their experiences and the 'language of value' of ES. We use an interpretivist approach to analyse empirical material of how Swedish focus group participants construct and perceive their values of recreational experiences. We then contrast these accounts with a typology and with theoretical underpinnings for valuation of CES.

In **paper III**, we investigate what the concept of relational value (RV) (Chan et al., 2016) adds to three fields and their value concepts: environmental ethics; ecosystem services valuation; and environmental psychology. We provide an overview of value concepts in each field and show how relational value has been described or applied. We discuss which problem the RV concept can be seen to solve and what the implications are for the application of RV in assessments and in conceptual frameworks.

In **paper IV**, which is a work in progress, I present empirical findings from Cape Town on diverse values of urban biodiversity within green space and biodiversity management. Based on interviews with civil servants and practitioners working with green space and biodiversity management, I investigate diverse local values and perceptions of biodiversity. I also investigate how practitioners see the usefulness of including assessments of social values of citizens in the management of urban green spaces.

In **paper V**, we analyse the *urban* biocultural diversity (BCD) concept and framework based on our insights from fieldwork in Rio de Janeiro, Brazil. Urban BCD has been explicitly advocated as a concept that can integrate and take into account place-based and diverse values and interactions, and including qualitative methods which the ES concept does not allow for (Buizer et al., 2016). By drawing on our experiences from focus groups and observations, we challenge and evaluate the main conceptual claims associated with how the urban BCD concept can be an advancement over the ES concept for studying HNR in cities.

Table 1. Overview of papers, research questions and specific questions in papers

	Approach	Research questions
		1. To what extent and how does ES integrate natural and social dimensions and what is the role of economic theory?
I	Conceptual	1) What are the interdisciplinary credentials of the ES concept? 2) Can ES be framed in terms of economic imperialism?
		2. To what extent do ES values reflect people's articulation of values?
II	Empirical	1) How do local inhabitants perceive and describe how they value their experiences in nearby ecosystem? 2) What are the implications of these descriptions for valuation of CES?
		3. What does the relational values concept add to existing concepts of value?
III	Conceptual	For each field: 1) How are value concepts defined in the field? 2) How has relational value been described or applied with reference to these value concepts? 3) What perspectives can relational value add?
		4. How should diverse social values of biodiversity and nature be accounted for?
IV	Empirical	1) What are the role of social values and perceptions of biodiversity and urban nature for management and planning? 2) What is the potential of assessments of social values in practice?
		5. How can biocultural diversity be an advancement over ES for studying human-nature relationships?
V	Empirical/ Conceptual	1) How can human-nature relationships in marginalised communities of Rio de Janeiro be identified and described through the urban BCD framework? 2) Based on these observations, how can the urban BCD framework and methodology emphasise a) interrelationships, b) variation of group values, c) participation, and d) be reflexive and sensitising?

2. The unfolding of value concepts within the Ecosystem Services Paradigm

This chapter provides an overview of the evolution of debates regarding the conceptualisation of value since the 2005 Millennium Ecosystem Assessment (MEA). It also broadly outlines the discursive and methodological development of (social) values and valuation within the ES paradigm, including the three concepts studied in this thesis—ecosystem services, relational value and urban biocultural diversity.

2.1 The 'values' term in the ES paradigm

The terms 'value' and 'valuation' are points of persistent discussion within ES science; this hints at the deep disagreements about what values are and how they should be understood and construed in this interdisciplinary environment.

The idea of value within the ES paradigm should be understood in relation to its close affiliation with high-powered initiatives such as the Millennium Ecosystem Assessment (MEA), The Economics of Ecosystem services and Biodiversity (TEEB) and the Intergovernmental Panel on Biodiversity and Ecosystem services (IPBES). Within ES, value as an object of study has been addressed through environmental valuation. Here, value is related not to underlying moral beliefs, but studied as the measure of a preference or an indicator (TEEB, 2010). This measure is supposed to reflect the relative importance for human well-being of different ecosystem functions (Costanza, 2000). The term 'values' within the ES paradigm was initially used in a narrow and economic sense to portray the importance of ecosystems in terms of their relative contribution to achieving the goal of sustainable human well-being (Costanza et al., 2014). This is a utilitarian framing of value (and well-being), with the measure of value being seen in comparison to other types of capital and based on the level of contribution to aggregated well-being (O'Neill et al., 2008; Gómez-Baggethun et al., 2010). More specifically, it is preference utilitarian, building on a subjective theory of value (Spangenberg and Settele, 2016) where the value of nature is seen to originate in

the minds of individuals and not in the structures of ecosystems themselves. The relationship between ecological structures and human values is conceptualised through the widely applied ES 'cascade model' and include a number of intermediate steps (Figure 1, Haines-Young and Potschin, 2010). A preference-based subjective theory of value has widely influenced how value is seen in ES, and this conception of value has thus inevitably become part of the study objectives of this thesis.

Along with the focus on *assessments* within the ES paradigm, that is, the systematic mapping and valuation of ES in monetary and non-monetary terms, the notion of value as pertaining to preferences has been influential. The scope of conceptualising values within IPBES is focused on 'the values that people associate with nature (principles, importance, and preference,) and the measures and indicators used to elicit these values' (IPBES, 2016, p. 3). ES valuation is the practical arm of the ES paradigm and is oriented towards developing and conducting assessments and valuations. ES valuation is not a comprehensive field but is made up of various disciplinary and interdisciplinary research efforts that span the natural, economic and social sciences and aim to assess the value of ES in either quantitative or qualitative terms (Potschin et al., 2016). It encompasses methodology from both mainstream environmental economics and ecological economics. These two fields draw on different starting points for understanding the dynamics that exist between the biosphere and the economy. While environmental economics builds on neoclassical economics and methodological individualism, ecological economics rejects the neoclassical view of the natural system as being separate from the economic system and strives to develop an understanding and methodology for assessing value beyond preferences (Venkatachalam, 2007; Kenter et al., 2015). Many of the methods that were initially applied and proposed for ES valuation stemmed from valuation methods that were developed within environmental economics and had a narrow focus on ecology and economics (TEEB, 2010). The research paradigm of ES valuation broadened to include diverse epistemologies and methodologies (Braat, 2018) (see section 2.4).

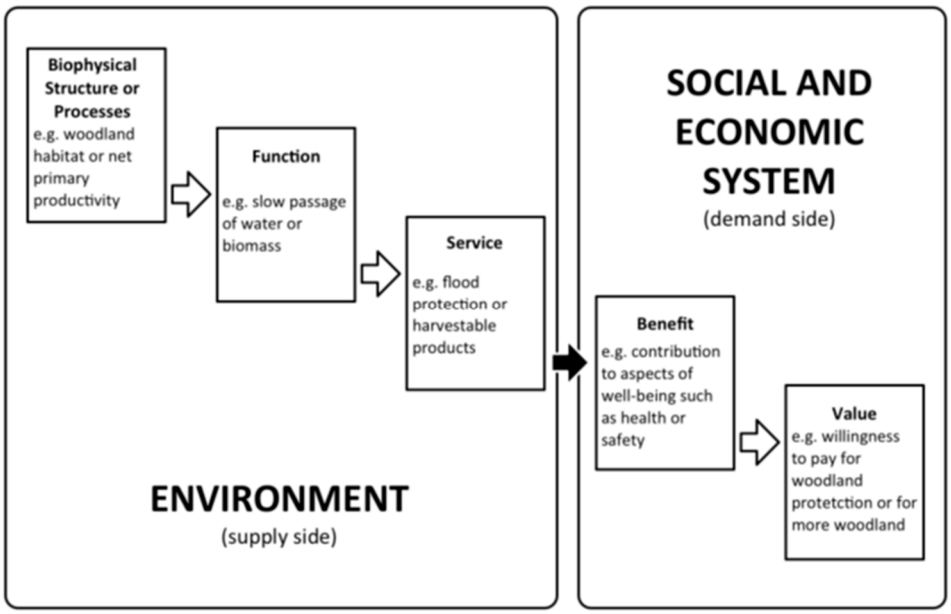

Figure 1.The ecosystem services cascade model adapted from Haines-Young and Potschin, 2010. It conceptually shows the relationship between ecological structures and human values through a number of intermediary steps. The model is criticised for portraying HNR in terms of a one-directional economic metaphor that neglects ecological complexity through re-directing the understanding of ecological processes towards human benefit.

The acknowledgement of the broader (normative) role of values in terms of the way they underlie and influence institutions and behaviour is emerging within IPBES, as is the recognition of 'plural values' for understanding diverse worldviews (Díaz et al., 2018). Some of the issues concerning *conceptualisation* of values—such as the development of concepts that meet certain criteria, for example, specificity, applicability and so on—are distinct from the *operationalisation* of those concepts of value. The operationalisation of values concepts implies that they are connected in practice to a concrete measurement in terms of valuation, assessment or 'elicitation' of values (see Kenter et al., 2019; Rawluk et al., 2019). The notion of values can thus be studied without engaging with the narrower field of ES valuation. However, the question of how to define concepts of value overlaps closely with, and affects, how valuation or value elicitation are conducted.

2.2 'Nature for people'

An important motivation behind the development of the ES concept has been to find synergies between conservation aims and the social goal of ensuring human well-being—aims that have often been treated as separate or opposed in both research and

practice (MEA, 2005; McShane et al., 2011). The ES concept has been successful in the sense of building a case of 'nature for people', that is, portraying biodiversity and ecological functions in terms of their importance for society. As it is helping to delineate different ecological processes and take them into account in land-use systems (Kremen et al., 2007) the ES concept allows for more *integrated* management. This has involved an increased framing of nature towards anthropocentrism in the last decade, building on the idea of accounting for instrumental—rather than intrinsic—values of nature (Daily et al., 2011; Chan et al. 2016). This new framing of nature is widely influencing policy and practice in that ES-based approaches are being implemented at local, national and international scales in policy, planning, management and conservation (Hansen et al., 2015; Schaefer et al., 2015; Bouwma et al., 2018; Maes et al., 2018; Prip, 2018; Schubert et al. 2018).

In previous research in Sweden on the implementation of ES in municipalities, we found that the anthropocentric framing of values that ES implies was one of the most welcomed aspects of the concept and approach among civil servants and politicians (Beery et al., 2016). Civil servants with responsibility for environmental and ecology issues realised that they could finally explain and convey matters they had been 'trying to argue for all along' in terms of the importance of natural ecosystems (Beery et al., 2016. p. 126). The concept was also described as allowing for the possibility of 'leaving out moral arguments about protecting nature for nature's sake', which was perceived as one of their usual struggles (Beery et al., 2016. p. 126). Traditionally, conservation biology and thus approaches to nature conservation in general have relied on such moral arguments based on the intrinsic value of biodiversity to justify the protection or conservation of nature (Soulé, 1985; Garson et al., 2016).

It should be noted here that the concept of biodiversity also reframes nature in particular ways. The concept was developed as an indicator of the *condition* of life on Earth, emphasising its intrinsic value, including the normative ideas regarding the urgency of conservation which merged with the development of the field of conservation biology (Franco, 2013). The success of the term is due partly to its vagueness, which allows for varied application, and partly to the interests of those pushing the biodiversity agenda in conservation (Cooper, 2000).

It is important to recognise that the ES concept is evolving and diversifying rapidly. Along with the critique of value monism in ecosystem services and economic valuation (Norton, 2015), other competing conceptualisations of the benefits of nature are taking form. The establishment of Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) in 2012 is testament to the increased involvement in ES of disciplines outside of the traditional fields of ecology and economics. The NCP frameworks represent an attempt to ameliorate some of the perceived shortcomings of the ES-based approach, and to many this represents a 'paradigm shift' within the field (Díaz et al. 2018a; 2018b). The NCP approach promises to include a wider array of

disciplines from the social sciences and humanities, thereby encompassing a plurality of values (such as relational values) and to take into account indigenous and local knowledge systems; it thus captures the diversity of values of different relevant stakeholders (Pascual et al., 2017), providing more holistic assessments of benefits (Christie et al., 2019). The conceptualisation of well-being has also shifted and expanded into the notion of 'good quality of life' (Díaz et al., 2018). However, voices have been raised regarding the limited difference between NCP and ES (De Groot et al. 2018); critiques hold that the framework merely represents a shift in language while maintaining the instrumental framing of nature's benefits towards the accomplishment of human well-being (Kenter 2018) and that ES scholarship already incorporates the social sciences (Braat 2018). Irrespective of new framings, these developments all revolve around the notion of ES that are based on the perspective of 'nature for people' (Mace, 2014). In this study I refer to this work as being situated within the larger ecosystem services paradigm.

The ES concept is also the theoretical backbone, or centrepiece, of a range of management tools and strategies that have come to be grouped under the more general term 'nature-based solutions' (NBS) (Potschin et al., 2016a). NBS approaches also inform a current *spatial* approach to sustainability (Raymond et al., 2017), with ecosystem-based approaches and 'green infrastructure' incorporating the multi-functionality of ecosystem services (ES) provided by urban nature in urban planning (Pauleit et al., 2019). The idea of a green infrastructure perspective involves the joint consideration of different perspectives of urban green and biodiversity in order to provide for integrated management of, for example, 'green networks' (Hansen et al., 2016), which are seen to maintain the provision of ES (Maes et al., 2015). The green infrastructure perspective is aligned with an anthropocentric ES perspective that focuses on connecting ecological structures to human well-being, but does not necessarily involve ES categories.

2.3 Differences between biodiversity and ecosystem services

Even though the terms 'biodiversity' and 'ecosystem services' are often lumped together, they represent conflicting perspectives from an ethical point of view. They are both value-laden concepts, but start from different ideas about the ways in which nature is valuable (see Faith, 2012). The ES concept is central to the development of what is sometimes called 'New Conservation Science' (Kareiva and Marvier, 2012; Doak et al., 2014) where conservation biology is refocused towards aspects of ecosystem processes and structures that benefit human well-being rather than on the intrinsic value of particular species or, for example, their moral right to exist. ES and biodiversity also

represent two different and sometimes opposing perspectives with respect to understanding value from an *ecological* point of view. With ES, the value of biodiversity is framed in terms of ecological production functions (see Figure 1; Haines-Young and Potschin (2010)), while the value of biodiversity is seen in terms of underpinning or supporting such functions (Faith 2018b). A focus on managing for, or conserving, particular ES does not safeguard or necessarily enforce conservation on biodiversity (Balvanera et al., 2014; 2016), and has also been documented as ignoring ecological complexity, which may generate uncertain predictions (see **paper I**). Species that do not support ecological functions that benefit human well-being are left out of the equation and potentially excluded from protection. Faith (2018a; 2018b) notes how the enthusiasm for ecological production functions is overshadowing other aspects of biodiversity within the current ES and NCP discussions and that the original distinction between ES and 'option values' of biodiversity has been neglected and reframed towards the contributions of ecosystems to a good quality of life. Moreover, biodiversity as 'maintenance of options' for supporting well-being cannot be connected to particular ecosystems or ones that already exist, as unknown discoveries and potential uses cannot be anticipated (Faith, 2018a; 2018b).

The intent of ES research is nevertheless to find synergies between the two perspectives. ES has been seen as enforcing communication and allowing ecologists to use its particular framing as a 'Trojan horse' for conservation, that is, as a strategy for political impact (Spash and Aslaksen, 2015). Ecologists and conservation biologists have increasingly been accused of resorting to the language of money through the ES agenda, as a necessary evil and a key to political power, and this has shifted the debate towards discussing conservation and management in terms of both monetary valuation and market-based governance. During the study I undertook in Cape Town, practitioners working on biodiversity management described the main use of the ES concept and associated ES-valuation studies as being for 'marketing purposes'. ES was useful for communicating with decision-makers and the public, but of little value to their own work.

The arguments for protecting nature have shifted from an emphasis on intrinsic value to also including instrumental values. This includes a general re-framing so as to be more inclusive of people in ways that provide for integrated management of the two perspectives. My study in Cape Town (**paper IV**) demonstrates the tension between what can be seen as old or traditional conservation versus new—more people-centred—ways of understanding nature and biodiversity. Here, traditional conservation management of one of the most biodiverse places in the world is in stark contrast to new and anthropocentric ideas and framings of how nature should be seen and managed for the use of people.

2.4 Social values and non-monetary valuation

The mainstreaming of the ES concept and approach implies an increased focus on taking peoples preferences and perceptions into account for understanding and managing ecosystems. The recognition that the question of values of nature goes beyond scientific measurement motivates more democratic participation in the science-policy interface (Díaz et al., 2018). The involvement of societal reflections and actors makes ES an inherently transdisciplinary endeavour. This happens through transdisciplinary stakeholder involvement (Hauck et al., 2016), which resonates with the development of participatory approaches within Sustainability Science as increasingly recognised as essential to tackle real-world problems and contribute to transformational change (Lang et al. 2012; Miller et al. 2014). People's preferences and values of specific ES can be considered through social assessments.

One approach to environmental assessment is so-called social valuation (also referred to as socio-cultural or non-monetary valuation/assessment), which seeks to capture the 'intangible' social and cultural aspects excluded from ecological and economic assessments, including those that aim to analyse human preferences regarding ES in non-monetary units (Kelemen et al., 2016; Burkhart and Maes, 2017). This is not yet a fully established sub-field within ES. 'Social values', as seen in this field, are not easily quantifiable and are particularly unsuitable for monetary valuation methods, as they are not divisible into the discrete units required for economic analysis (Abson and Termansen, 2011; Chan et al., 2012). In the field of social valuation of ES, social values are not explicitly defined but are treated in accordance with what I refer to as the descriptive mode (see 3.1) of people's or communities' preferences for ES (Burkhart and Maes, 2017). Social valuation methods include: preference assessments; time use method; photo-elicitation surveys; participatory mapping; scenario planning, deliberative methods, and narrative methods (as applied in **paper II** and **V**) (Burkhart and Maes, 2017). Social valuation of ES has been mainly used for stakeholder representation in environmental management within the European Union (EU) (Walz et al., 2019).

The idea of social values or socio-cultural valuation has been developed in parallel and in association with cultural ES (Kenter et al., 2015; 2016; Scholte et al., 2015). The category of cultural ES was initially defined by the Millennium Ecosystem Assessment (2005) as the non-material benefits people obtain from ecosystems through, for example, spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences. The treatment of culture within the application of the MEA framework and the cultural ES category has been widely criticised (Daniel et al., 2012 Kirchhoff, 2012; James, 2015; Kull et al., 2015; Fraser et al., 2016). The idea that cultural benefits are correlated with ecological functions and structures masks as yet unresolved conflicts over the conflation of 'non-material' values and calculable benefits. Social aspects of HNR are portrayed as being the same type of phenomenon as, for

instance, water sequestration. The conception of culture as something that is non-material also trades on the received dualism between nature and culture which associates social perspectives with the non-material and ecological benefits with the material. The material aspects of nature are now also recognised as crucial for social values (Scholte et al., 2015) and efforts to include a more comprehensive understanding of social and cultural values (Chan et al., 2012; Fish et al., 2016) were formally established when the discussions and collaborations around IPBES, established in 2012, were joined by more of the social sciences. With the NCP framework, the understanding of culture has also become increasingly complex and the conception of culture is seen to permeate across all of the groups of contributions (Díaz et al., 2018).

Recent and ongoing developments of theory and method in relation to social values show the determination to fundamentally challenge the utilitarian framing and the analytical aggregation of individual values based on consequentialist assumptions (Raymond et al., 2019; Irvine et al., 2016; Kenter et al., 2016b). The narrowness of the neoclassical view of value within ES implies an emphasis on individual utility and excludes insights into the 'socially transacted character' of knowledge and motivation involved in understanding human–nature relationships (Wintrop, 2014, p. 209; Irvine et al., 2016). Assessing HNR through the language of trade-offs can, in many situations, be methodologically and ethically inappropriate (Wintrop, 2014). There is an increased interest in, and recognition of, the importance of understanding qualitative notions of HNR for the sake of describing different aspects such as identity, relationships with nature, and spirituality (Chan et al., 2012; Chan et al., 2016; Fish et al., 2016). Importantly, economic metrics cannot be applied to understand HNR (or values) if they are based on something other than economic benefits, such as ethical beliefs. This then implies a category error (Sagoff, 2004, Cooper et al., 2016; Spangenberg and Settele, 2016). I explore and demonstrate this notion in **paper II**. Another related critique is that the ES perspective ignores that the benefits people appreciate are often dependent on a particular place and local context rather than on the type of place or ecosystem function (James, 2015). These lines of criticism have given rise to the development of new methods and ways of understanding HNR within the ES paradigm, such as, for example, the (urban) biocultural diversity concept (Buizer et al., 2016, **paper V**) and the idea of relational values (Chan et al., 2016, **paper III**), which do not build on an economic or utilitarian perspective of value but instead strive to include perspectives from the wider social sciences and humanities.

While perspectives from the qualitative social sciences and humanities are recognised as being crucial for understanding the links of ES to human well-being, such perspectives are difficult to describe and to connect to specific ecosystem structures and processes (Milcu et al., 2013; Small et al., 2017). Combining these perspectives implies an integration or interaction of knowledge on lived experiences in nature with more abstract or universal systems of knowledge. The idea of combining local and situated knowledge with knowledge that is abstract and generalisable has been increasingly

problematized (Tengö et al., 2014) and has led work within IPBES to develop a distinction between human–nature relationships that are 'generalisable' versus those that are 'context-specific' (Díaz et al., 2018a). The idea of plural valuation within IPBES is also supposed to take diverse and multiple worldviews and valuation languages into account in understanding human–nature interdependencies (Díaz et al., 2015; Pascual et al., 2017). It is recognised that different worldviews can imply incommensurable values of nature, which also require existing power relations to be scrutinised (Löfmarck and Lidskog, 2017) and an examination of how valuation approaches are not value-neutral but construe and impose certain ideas of what values are (Vatn, 2005). The importance of focusing on the *diversity* of people's values regarding nature has gained ground in environmental governance, planning and discussions around ecosystem services.

Along with this development, there has been emphasis on the need to build more elaborate narratives of nature that involve viewing individuals not as either economic or moral agents, but in line with their roles as ecological citizens living 'meaningful' lives (Potschin et al. 2016b). This is a departure from the dichotomy of the intrinsic versus instrumental value and from the utilitarian notion of well-being as building on preference satisfaction. Relational value (**paper III**) responds to this idea, and is described as a new category of value intended to capture how people relate to nature and make choices (Chan et al., 2016, p. 1462. Relational value is defined as preferences, principles, and virtues about/based on meaning-saturated relationships (Chan et al., 2018, p. A3). The idea has been widely influential within IPBES and has been incorporated as a third value category, along with instrumental value and intrinsic value, into the NCP framework (Pascual et al. 2017; Díaz et al. 2018).

The distinction between a generalising versus a context-specific perspective within NCP (Díaz et al., 2018) implies a refined methodological perspective and development within the ES paradigm for understanding HNR and value. The context-specific lens implies a recognition of how local and indigenous systems of knowledge reject universally applicable classifications of HNR and categories, and directs attention to how NCP can be understood and studied in terms of 'bundles that follow from distinct lived experiences such as fishing, farming, or hunting or from places, organisms, or entities of key spiritual significance, such as sacred trees, animals, or landscapes' (Díaz et al., 2018, p. 272). The urban biocultural diversity (BCD) concept (**paper V**) shows one type of biocultural diversity approach (Merçon et al., 2019) that was developed to connect an understanding of relationships, both local and context-specific, between urban nature and quality of life, specifically in urban green space planning (Buizer et al. 2016). Urban BCD is an ambitious framework in the sense that it is meant to address weaknesses in the ES framework, such as human–nature dichotomisation and instead focuses on 'interrelationships' of interactions (Buizer et al., 2016; Vierikko et al., 2016). It also incorporates within the same framework both the context-specific perspective outlined by Díaz et al. (2018) in terms of 'lived' and 'stewardship' BCD, and the

generalising perspective, in terms of 'materialised BCD'. It thereby aims to address the critical questions of integrating or combining these two (seemingly incommensurable) methodological perspectives, which the ES and NCP community is starting to grapple with (see Jacobs et al. 2018). The urban BCD framework also builds the notion of 'lived biodiversity' which rejects 'top-down' ideas of quantification and measurement associated with the ES discourse as a means of understanding biodiversity (Turnhout et al., 2013); it starts instead by considering the varied and complex ways in which different social and cultural groups understand, engage with and protect biodiversity. However, the theoretical, methodological and empirical foundation for how to apply the framework is still in its infancy, and it has been developed and previously only studied in a European setting.

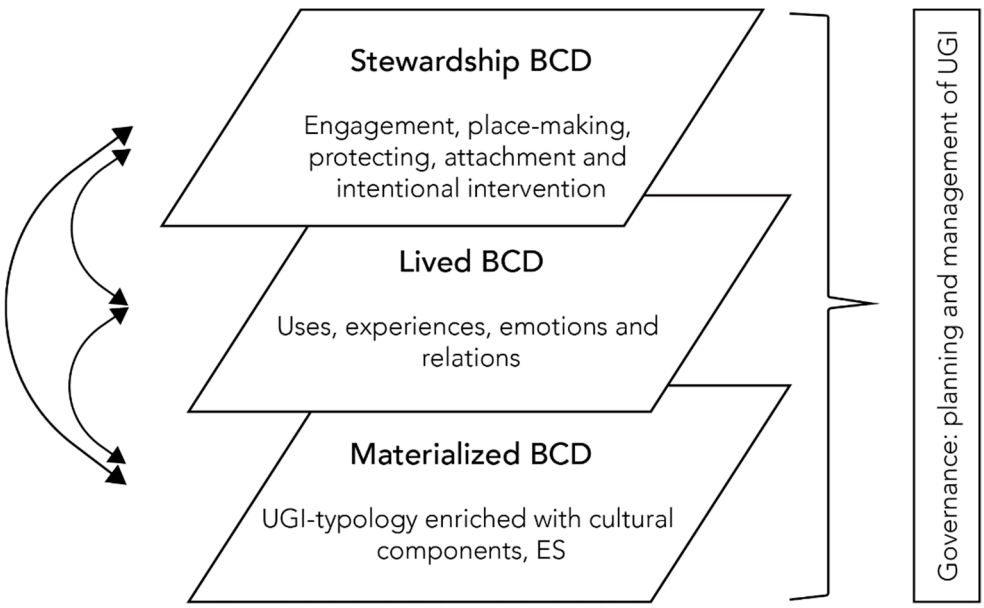

Figure 2. Illustration of the Biocultural Diversity (BCD) framework adapted from Elands et al. (2018). The framework, intended to inform urban green space planning and management through assessment of HNR, is made up of three dimensions of stewardship, lived, and materialized BCD. (UGI = urban green infrastructure).

3. Theorising the categorisation of nature

The theoretical and conceptual analysis of this thesis draws on theories from philosophy of science and science and technology studies (STS), as well as philosophical, and methodological distinctions of concepts of value. I follow the tradition of philosophy of science in that I study the foundations, assumptions and implications of different fields, disciplines and conceptualisations and expressions of value and human–nature relations. My contributions to understanding the conceptualisation and assessment of HNR and value within the ES paradigm are not only methodological but also engage with debates on the politics of environmental knowledge. This chapter first provides an overview of the distinctions between concepts of value and the main debates surrounding them that are relevant to this thesis. I then outline theoretical concepts and ideas that deal with the scientific and disciplinary foundations of knowledge and set the conditions for my inquiry.

3.1 On values

Value is a central concept in this thesis. In scholarly discussions, the term is often used both generically and specifically, which can be confusing. Generically, 'value' can be taken to mean the extent to which environments, individuals, things and processes matter, as in the standard meaning of the word. More precisely, and as a theoretical term, value and valuation involve definitions and notions that are specific to different theoretical and ideological traditions. In discussions around values in nature within ES, the term 'values' often refers to the products of descriptive scientific assessments of the links between human well-being and ecosystems (TEEB, 2010). However, this precise use and the operationalisation of the term is not how established scholarly traditions have generally conceived of (social) values. These have instead been understood as underlying beliefs and moral principles about what is good and right (Hirose and Olson, 2015), that claim the validity of imperatives of different standpoints in society, and influences science and institutions (Johnson and Cureton, 2019). These normative and philosophical understandings of value are not 'varieties' of values that can be aggregated alongside economic or non-economic values. Within the ES paradigm social

values are important from both perspectives: as descriptive assessments intended to capture the societal values of ES; and as underlying beliefs and norms that influence institutions and individuals and indirectly drive biodiversity loss (IPBES, 2019).

A sharp distinction between facts and values has informed philosophical thinking about the nature of science and the role science should play in society during much the last century. An influential idea is captured by the so-called value-free ideal that states that science should be strictly concerned with facts and that this ipso facto involves steering clear of value judgements. This idea has come under increasing attack in recent years (Putnam 2002; Douglas, 2009). We draw on the idea of values outside of science, in **paper I** to investigate suppression of values pluralism through the ES concept.

In Sustainability Science, interdisciplinary understandings and definitions of values are used, drawing on a range of scholarly traditions (Raymond et al., 2019). In Sustainability Science, value is described as a generic term of 'ideas of what is of importance', often referred to as underlying and informing approaches, discourses, goals and institutions related to sustainability (Miller et al., 2014).

In this thesis an important distinction regarding how values can be understood is made between descriptive and normative modes. Descriptive modes are taken to include values that aim to describe values in some form, often empirically. These are the values included in different kinds of ES assessment that seek to establish, how, and to what extent a group or a community values nature. As I am concerned with both the conceptualisation and the operationalisation of values, there is also an important distinction made here between the conceptualisation of what values are and their operationalisation through methodologies for assessment and valuation (descriptive modes). (I use the terms 'assessment' and 'valuation' interchangeably.) Furthermore, I recognise that all types of conceptualisation and operationalisation with respect to valuation have normative assumptions and foundations and, as such, are in no way neutral (see Vatn 2006; Ernstson and Sörlin 2012). I recognise descriptive modes of value as being constructed to reflect their specific theoretical framing.

Values operationalised through the descriptive mode can be conducted either subjectively or objectively in a methodological sense. The wording is problematic, as the term 'objective' can easily be misinterpreted as neutral or value-free and 'subjective' as non-scientific. The distinction made instead aims to describe the type of value theory underlying how values are measured and described scientifically. Values that are described empirically can be based on a theory of values that is subjective in that the value of something is considered to be determined based on someone's preference or perception (as in neoclassical economic theory) (Ekelund and Hébert 2002; Spangenberg and Settele 2016). As an alternative, it can be determined 'objectively' based on other relationships that do not necessarily have anything to do with individual preferences or perceptions of particular objects of value (as in biophysical and ecological assessments of ES or measures of stress reductions of exposure to natural areas through

biomarkers) (Ewert and Chang, 2018)). This methodological distinction is important because it recognises that people can be misinformed or lack the capacity for judgment about something, that is, their preferences can simply be wrong with regard to how nature or parts of nature contribute to their well-being (Norton et al., 1998). Kenter et al. (2019) use various 'lenses' to understand different dimensions of (social) values in different knowledge traditions and show how values can be considered in terms of social values as 'lenses of worthiness' with underpinning 'meta-lenses' that explain how values are assessed (Kenter et al., 2019). While some traditions understand values as innate human principles that are stable and generalisable, others see them as situationally constructed (Rawluk et al., 2018). Various traditions also conceive of value differently in terms of 'abstractness' of what is important, as something concrete like an object, in monetary value, or as something more abstract like ideas and principles (Rawluk et al., 2018).

Normative modes can be seen as principles and notions that inform how we should regard values of nature, human–nature relationships, and why nature should be protected. Normative modes encompass ideas of value within philosophy and more specifically normative ethics (i.e., moral philosophy) (Pojman, 2012). Value is the fundamental term of concern here because it is from value that we derive *duty* (towards nature) and can determine what actions towards nature are right or wrong. In the sub-branch of environmental ethics, the distinction between intrinsic and instrumental value sits at the heart of the discussions around ethical values of nature (Brennan and Lo, 2016). In simple terms, this is taken to mean that the things valuable as ends in themselves (intrinsic) versus things valuable as a means to an end (instrumental) (O'Neill ,1992; O'Neill et al., 2008). The use of the terms subjective versus objective values is also a meta-ethical distinction (Schmidtz, 2015), which is discussed in **paper III** This distinction regards mainly the ethical justification of why or how nature has value. Objective values in a meta-ethical sense refers to values that can exist in the absence of evaluative attitudes of some subject whereas subjective values emanate from the evaluative attitudes of some subject.

The term value crosses multiple disciplines and various and contrasting ontological and epistemological positions. These positions determine how value concepts are framed and conceptualised, and thus result in different understandings and applications.

3.2 Deconstructing ES conceptualisation

A scientific concept is more than just a word. Concept formation is at the foundation of every scientific discipline and field (Hempel, 1952). Together with theories, methods and models, it forms part of the 'cognitive tools' of a discipline (Bechtel, 1986). Clarity regarding the differences in how concepts are used and understood is usually acknowledged as a prerequisite for establishing common ground in academic work.

I start from the idea that there are no inherently neutral concepts or frameworks. This notion is widely recognised in philosophy of science and in the critical social sciences, but is approached in different ways depending on tradition. Developments within philosophy of science have shown that the models, metaphors, and analogies we use to construe reality are inherently *partial*; this is what makes them at all useful (Mitchell, 2008). Recognising this partiality forms the basis for a scientific perspective of pluralism. In the field of science and technology studies (STS) (Rohracher, 2015) and in the literature on the 'politics of environmental knowledge' (Turnhout, 2018) it is recognised that concept formation involves a social process of boundary setting, which privileges and reinforces some interpretations of the world, or nature, at the expense of others. Scholars here recognise and problematise the power involved in scientific definition and classification of the environment which 'reorders' the relationships between humans, environment and society (Latour and Wolgar 1979; Robertson 2006; 2012; Lave 2012; McElwee 2017; Turnhout 2018). While these scholars typically focus on social, institutional and political factors that influence knowledge production, I instead problematise the classification or categorisation of the environment by focusing on the disciplinary and methodological influences on categorisation, with the aim of identifying, and outlining remedies to their problems and limitations.

Concepts and frameworks can be seen as 'performative'; they do particular 'work' in that they outline the world through boundary setting and direct attention and courses of action. The idea is that concepts and methods do not just describe realities, but are performative in their framing, and *enact* these realities (Callon, 2006; Law, 2009). In this sense, the ES concept is co-constituting the objects of study, which are the ES themselves. By applying the concept we are steering knowledge production in certain directions, and contributing to 'making a world of ecosystem services' (Robertson, 2012). The choices of metaphors to describe human–nature relationships are both informed by and, to some extent, perpetuate certain beliefs, and we should therefore pay closer attention to these choices (Norton, 2011).

As mentioned above, the ambitions of the ES assessment paradigm is diverse and includes multiple aims, but the ambitions are associated with the logic of 'measurmentality' (Turnhout et al., 2012), which relies on the assumption that a focus on the generation of more precise knowledge, in terms of assessment and mapping of ES, will translate into more desirable and sustainable outcomes. Quantification of nature fits neatly into the political ideal of decision-making based on numbers, being considered more objective and fair (Porter 1997; Reiss and Sprenger 2017). As such, it is central to environmental policy-making based on cost–benefit analysis (O'Neill et al., 2008). A focus on quantification and standardisation is a very general feature of modernity, and well as being a specific component of what is called New Public Management in public administration and governance (Diefenbach, 2009). Within ES assessment, the production of user-friendly knowledge has been described as an end in itself that builds on technocratic ideals about knowledge (Turnhout et al. 2014).

Moreover, ES has a self-appointed privilege, namely, that of describing relations between humans and nature in supposedly legitimate ways, giving an impression of political neutrality (Ernstson and Sörlin, 2012). In consequence, it has a way of rendering social and political challenges 'technical' (Ernstson and Sörlin 2012; Dempsey 2016). For such de-politicisation of nature to take place, systems of classification and standardisation have to be established. Robertson (2012), building on Marx (1973), emphasises that understanding neoliberal nature requires close attention to the techniques of measurement and abstraction that are stabilised in capitalist contexts. He argues that we have 'strongly inherited the idea that some vital and effective 'natural', (i.e., non-social) source of value survives abstraction and comes to directly constitute value in capital relations' (Robertson 2012, p. 389). While my work does not focusing on monetisation, I do strive here to unpack this type of 'value-neutral' idea of value (within the ES paradigm).

This thesis strives to problematise how the understanding of ES knowledge and values currently *re-orders* how human nature relationships are understood in theory and practice. ES is a 'policy concept' and a field in the science–policy interface. It is a 'science in the making', although in its policy implementation it is often portrayed as relying on a fully understood scientific basis, masking ecological complexity and uncertainty (Latour 1987; Barnaud and Antona 2014; la Notte et al. 2017). Moreover, ES re-orders our understanding of nature both through its categorisation of services and through how the ES cascade model construes the relations between social and natural dimensions (Potschin and Haines-Young, 2016). The re-ordering of nature through ES can be understood in distinct ways through closer examination of negotiations that are happening at the theoretical foundations of the knowledge systems involved, and especially to 'uncaptured' elements, both in the social and natural sphere. Robertson (2006) shows how there remains some aspects of our scientific understanding of nature in the ecological sciences that is uncaptured by capital and can thus provide leverage for resistance to this process. Some ES are also more subject to commodification, while others seem to have physical and material properties that help explain their resistance to measurement (such as soil regulation or pollination) and McElwee (2017, P.109) refers to this as "nature [is] pushing back".

Another way of understanding nature as 'pushing back', from a philosophy of science perspective, is that there is a lack of integration between theories within ecology and within economics, which prevents nature from being included in the commodification. Interdisciplinary concepts such as ES are often aimed at integrating fields or disciplines at some level. Integration, especially of social and natural dimensions of knowledge, is a long-standing discussion in Sustainability Science that revolves around whether, or on what terms, different theories, concepts and frameworks can be integrated when epistemologies and ontologies between the disciplines involved are in conflict (Jerneck et al., 2011; Thorén and Persson, 2013; Olsson and Jerneck, 2018). Interdisciplinary concepts can fail to be integrative, usually by being overtly flexible or vague (Thorén,

2014). We explore this idea in **Paper I** by analysing the interdisciplinary credentials of the ES concept by employing the notion of scientific imperialism to investigate some of the ways in which it is influenced by economic theory. Scientific imperialism, as we use the concept, concerns transgressions between disciplines, particularly transgressions that are perceived to be epistemically or scientifically detrimental (Mäki 2009; 2013). This frame of analysis thus concerns instances where one discipline influences another in (epistemically) unjustifiable ways. This influence can operate at any of the dimensions of a discipline such as theories, methods, models or concepts as well as on social and intuitional factors and practices, thus yielding different forms of imperialism (Mäki, 2013). This account of imperialism employed by Mäki is 'normatively neutral' in that an observation and description of the phenomenon of imperialism does not define if this development is inherently negative. It does, however, give a structured account of the (economic) disciplinary influence over the ES concept, which is necessary for understanding the conditions needed for this concept to describe and assess HNR in credible or viable ways.

In terms of transdisciplinary credentials, ES is often referred to as a 'boundary object'. Boundary objects (or concepts) are transdisciplinary concepts, ideas or tools that allow for interaction or common understanding between scientific and societal actors and that are both flexible and adaptable but at the same time 'maintain a common identity' across sites and disciplinary boundaries (Star and Griesemer 1989, p. 393; Star, 2010). ES is often taken to align with these characteristics as it is especially useful in dialogues between science and policy-making (Abson et al. 2014; Steger et al. 2018).

The construction of frameworks for understanding and assessing HNR involves not only the interaction between disciplines but also the interaction between scientific knowledge and local knowledge. Within the larger discussion on the relationship and integration between scientific and local knowledge (Agrawal, 2002; Tengö et al., 2014; 2017; Löfmark and Lidskog, 2017), I am primarily concerned with the transdisciplinary ambition and methodological challenge of combining abstract systems with an understanding of the lived experience. As mentioned above, an important recent advance with regard to how values can be understood methodologically within the ES paradigm is the distinction between a generalising versus a context-specific perspective within NCP (Díaz et al., 2018). My inquiry can be understood as methodological, as I explore the context-specific perspective in relation to ES. Importantly, the application of the ES concept does not automatically entail monetisation, commodification, or even quantification. It does, however, involve an increased focus on categorisation, systematic assessments and measurements of human–nature relations and values. As mentioned above (section 2.4), there is an increased interest in, and recognition of, the importance of qualitative and narrative approaches for ES assessments and in understanding and including local values in relation to different management intervention schemes, planning frameworks or general biophysical ES assessments. This thesis, which observes how abstract systems (fail to)

represent the lived experience, can be situated in wider discussions around quantification (Berman and Hirschman, 2018) and established perspectives in critical theory on the increased differentiation between abstract systems and the lifeworld (Habermas 1981, Thomassen 2010).

In Sustainability Science, the consideration of diverse and conflicting social and ethical values to support sustainability transitions motivates a transdisciplinary science that involves participation, deliberation and stakeholder engagement (Wiek 2007; Miller et al. 2014). The efforts to conceptualise and assess values within the ES paradigm overlaps with this aim. Information and deliberation on people's and stakeholders' values here is also ultimately intended to inform sustainable ecosystem management (Hauck et al., 2016).

4. Methodology

4.1 Epistemological starting points

This thesis is situated within Sustainability Science, an interdisciplinary field driven by the problems it addresses rather than the disciplines it employs (Clark and Dickson, 2003). The field does not form or suggest a unified or standardised research approach but involves a range of disciplinary and methodological approaches and encourages a plurality of perspectives to understand complex sustainability challenges (Isgren et al., 2017). Research in Sustainability Science is often conducted in a 'constructive tension' (Wiek et al. 2012, p. 5) between a 'critical' (or descriptive-analytical) mode, and a 'problem-solving' (or solutions-oriented) mode, which has characterised some of the work within Sustainability Science (see also Jerneck et al. 2011) with the unifying aim of producing knowledge with policy implications.

My aim is to follow the critical problem–solving approach offered by Mahmoud et al. (2018, p. 39), in order both to critically examine the theoretical foundations of concepts in the ES paradigm and to methodologically inform improvements to the solutions-oriented tool of ES. Following a critical problem–solving approach involves a number of criteria: basing analysis on empirically grounded human–environmental realities while taking into account the influence of ideas and discourses; embracing methodological pluralism rather than unification; and using social theory as a guide for integrating the social and natural dimensions, in order to devise questions and strategies to explore and steer human–environmental change (Mahmoud et al. 2018).

This is an interdisciplinary study in the sense that I deploy the resources—theories, insights, and methods—of several disciplines such as philosophy of science and interpretivist social science. I import methods and concepts from these broader traditions so as to integrate knowledge and methodological perspectives that would not be possible if the problem were addressed from disconnected disciplinary perspectives (Klein, 1990). I draw on perspectives from philosophy of science to provide insights into scientific and disciplinary foundations of ecosystem services and subsequent concepts. As the phenomenon of 'human–nature relationships' cannot automatically be assigned to a given discipline, I apply interpretive social science theory and methods to empirically study local HNR and values and contribute to expanding and exemplifying ways of understanding these within the ES paradigm. The methodological choices coincide with the inter-and transdisciplinary ambitions of the ES concept:

aiming to integrate disciplinary knowledge on social and natural dimensions, and to draw on, assess or reflect societal stakeholder's values.

In studying human–nature relationships within Sustainability Science, cognisance must be taken of both the natural and social dimensions. I take 'human–nature relationships' to be the direct and non-direct interactions between humans and nature. 'Nature' here indicates the natural world and the living biosphere. Within ES science, an 'objectivist' stance of seeing nature in terms of biophysical entities and processes is generally assumed, and ES refers to biotic, that is, ecologically living rather than abiotic aspects of nature (MEA, 2005). I do not rely on such sharp distinctions, but acknowledge that it is the living and non-human biosphere with which I am mainly concerned when I refer to nature and natural environments. I also, however, take 'nature' to be a culturally contingent idea and construct (Everndern, 1992). I acknowledge that in broad terms, we can understand the social construction of nature as either the construction of our *concepts* of nature or the process of constructing nature in the *physical, material*, and hence, ontological sense (Demeritt 2002).

A starting point for this inquiry is in constructivism, broadly understood as an ontological perspective with empirical implications. Constructivism can be seen as building on the philosophical ontology referred to by Jackson (2010) as mind–world monism (cf. Bryman, 2017). This perspective presumes no separation between mind and world in that there is no *independent*, 'ready-made' world (Putnam, 1982) against which knowledge claims can be tested. In aligning with this position, I see the mental constructs of theory as continuously produced along with the phenomenon that is being investigated. The work presented here is produced according to cultural values and standards that define the investigation. The idea that the knowledge produced by science is the result of human choices, theories and values is a basic starting point for the modern theorisation in the philosophy of science, in STS-studies and in interpretive approaches. The idea of recognising that equipment or terminology constitutes something like a social object does not, however, mean that what exists is only in the minds of individuals (Rolston, 1997). I do not adhere to the idea that 'everything is language and discourse' and nothing escapes social mediation, and I thereby depart from the postmodernist project. Instead, I follow a *moderate* constructivism (Arias-Maldonado, 2011) which recognises the difference between phenomena and noumena in Kantian terms and that our access to the real is subjected to cultural and social mediations. It thereby shares some stances with critical realism, which is often applied in Sustainability Science (Nastar et al., 2018).

A constructivist position has been seen as challenging to take on in relation to (environmental problems and) the biodiversity agenda, especially as more extreme accounts or a simplification of the position can be taken to mean that there is no reality beyond human imagination, which fails to take the biodiversity crisis seriously (Soulé et al. 1995; Crist, 2004). In following a (moderate) constructivist position here, I do

not aim to refute the foundation of knowledge in science, to dismantle the idea that science should have a unique status as knowledge bearer in society, or that it should be just one set of knowledge claims amongst others. Instead, I strive to interrogate scientific perspectives that are potentially used in 'inappropriate' ways through the ES concept and metaphor, which portrays a reductionist understanding of human–nature relations and values.

In my investigations I aspire to follow and explore a non-dualist and relational understanding of human–nature relationships (cf. 'transactional worldview' Altman and Ragoff, 1987), building on mind–world monism in line with constructivism (Jackson, 2010). There is no consensus and little guidance on what constitutes such a view and how it should be operationalised to study human–nature relationships (see Lejano, 2019; West et al., 2020), but these notions have recently received more attention in the context of ES, values and Sustainability Science (Muraca, 2011; Cooke et al., 2016; Muraca, 2016; Kaaronen, 2018). In this thesis, I offer some theoretical insights and clarification around these debates as well as apply interpretivist methodology that take 'relationality' as a starting point.

4.2 Research strategy

The objects of study here include concepts within the ES assessment paradigm, and the unit of analysis is the articulation or conceptualization of value. I study different and sometimes overlapping concepts and systems of knowledge (units of observation), which require different approaches and methodologies to be understood (see Table 2). Each unit of analysis and knowledge systems is more precisely used in the following way: citizens' articulation of value (paper II, V); ES typology of value (paper II); conceptualisation and integration of value within ES research (paper I); conceptualisation of relational value in three disciplines (paper III); articulation of values of urban nature and biodiversity (paper IV) as well as conceptualisation and integration of value within the urban BCD framework (V).

Paper I and **III** follow a broadly informed philosophical tradition of inquiry. We carry out document analysis in the form of qualitative literature reviews guided by our research questions and provide theoretical overviews and analysis. The approach here is mainly focused on the activity of outlining and questioning theoretical *distinctions*. As Sokolowski (1998, p156) puts it, 'Philosophy explains by distinguishing'. This does not mean that distinctions are merely made for the sake of distinguishing. Instead, the 'method' is to show why and how things should be distinguished, or that certain distinctions are invalid, and based on those distinctions make different claims (Sokolowski, 1998, p. 516). I have used this approach to illuminate the level of influence and integration of disciplines within ES, as well as to distinguish between different definitions of value. This way of conducting analysis has been a useful tool in

navigating the interdisciplinary landscape of values and ES, where arguably many theoretical distinctions are lacking (see Nahlik et al., 2012).

Papers II and **V** partly follow a methodological approach that can be seen as an internal critique (cf. immanent critique, (Antonio, 1981) (Mahmoud et al., 2018)). Here I take the theoretical perspectives of some concepts as starting points in my analysis and apply them to empirical findings so as to uncover their contradictions or de-construct their logic. This I do in paper II when analysing and contrasting participants' descriptions of experiences if interpreted through a cultural ES typology and theoretical perspective, and in paper IV in the application and analysis of the BCD framework. This approach allows analysis and critique of a perspective through following its steps on its own terms 'internally', rather than through applying an external theoretical perspective.

Empirically, I have employed the qualitative methods of focus groups, interviews, and some document analysis in **papers II, IV and V**, following mainly constructivist grounded theory (Charmaz, 2006) and an interpretive approach which I expand on below.

Table 2. Research strategies in papers

Paper	Overarching research question	Approach	Unit of observation	Methods and material
1	To what extent and how does ES integrate natural and social dimensions and what is the role of economic theory?	Conceptual	Existing critique on ecosystem services concept	Literature review/ Theoretical overview and analysis
2	To what extent do ES values reflect people's articulation of values?	Empirical	i) local residents in southern Sweden descriptions of values of experiences in nature ii) ES conceptualization of CES value	8 Focus groups, 54 participants
3	What does the relational values concept add to existing concepts of value?	Conceptual	Relational values concept Systematic analysis of value conceptualization within three fields: environmental ethics; ecosystem services; environmental psychology	Theoretical overview and analysis
4	How should diverse social values of biodiversity and nature be accounted for?	Empirical	Green space and biodiversity managers and practitioners in the city of Cape Town	17 in-depth interviews, document analysis
5	How can biocultural diversity be an advancement over ES for studying human-nature relationships?	Empirical/ Conceptual	i) Local residents descriptions of human-nature relationships in Rocinha, Rio de Janeiro ii) urban BCD conceptual framework	3 Focus groups, 6 in-depth interviews, Conceptual analysis

4.3 Interpretivism and ecosystem services

I follow an interpretivist approach to empirically study human-–nature relationships and values in relation to ES. Interpretive approaches are not common in Sustainability Science, but their ability to uncover *meanings* in social–ecological systems is increasingly recognised for developing concepts that respond to the complexity and plurality of the social world and designing interventions that are just and effective (Sörlin, 2012; Castree et al., 2014; West, 2016; Jetzkowitz et al., 2018; Stenseke and Larigauderie, 2018; Vadrot et al., 2018). An understanding of *how* and *why* people value nature and biodiversity in various ways provides insights into the social causes of both loss and transformation in relation to the ES and biodiversity agenda (Jetzkowitz et al., 2018).

Interpretivism can be seen as a broad theoretical approach to research. In line with constructivism, the interpretation of the phenomenon is produced continually and is constitutive of the world that is described, rather than seen as overlaid essential properties or experiences. In contrast to the natural sciences, the social sciences and interpretive approaches follow a 'double hermeneutic' (Giddens, 1982) where theorisation takes into account both a 'direct' observation about how the (social) world is structured and how the subjects *themselves* interpret the world. Moreover, the analysis requires the use of theories and concepts that give *additional* meaning to participants' expressions or text to provide insights into the social world. The findings are thereby 'concept-dependent', in that they are 'invisible' in the absence of the correct terminology and equipment (Jackson, 2010, p 62).

I draw on constructivist grounded theory as a form of interpretivism in **paper II** to understand how the ideas, perceptions, meanings and values of nature are articulated and constructed. Constructivist grounded theory (Charmaz, 2014; 2006) in turn builds on the theory of symbolic interactionism to understand meanings in social worlds (Blumer,1969). In symbolic interactionism, interaction and practice are seen as the basis for interpretation, and are a symbolic process that depends on spoken and unspoken shared (rather than individual) meanings (Blumer 1986; Cutliffe 2000). Interaction can, for example, be with the 'material' environment, where the distinction between subjective and objective is considered a discursive construction (Charmaz, 2014). **In paper II**, we wanted to understand participants' distinct ways of thinking and talking about *the idea of* values of experiences in nature, and not just interpret their descriptions *as values* per se. We therefore borrowed the concept of 'interpretative repertoires' from discursive psychology (Wetherell et al., 2001), also rooted in symbolic interactionism, to identify which ideas, notions and metaphors participants drew on to articulate their experiences and express their values of nature. Interpretative repertoires are coherent ways of speaking about something as well as a framework that is drawn from for conversations and construction of discourse (Edley, 2001). It was used here to conceptualize the general construction of participants' ideas of values of nature in conversation.

In **paper V,** we also use a combined approach to understanding the meaning and characteristics of participants' descriptions of their relationships, practices and encounters with nearby nature. We use an interpretivist approach and drew on the phenomenological concept of the 'lifeworld' (Husserl 1980). The lifeworld consists of everyday experiences that people live and reflect upon (Eberle 2014), and was used here to understand residents' embodied, experiential meanings and detailed descriptions of everyday interactions with nature. We used eight sensitizing phenomenological concepts as a place to start inquiry and bring experiences to light. Sensitising concepts also form part of symbolic interactionism, and as explained Blumer (1954 p. 7): 'whereas definitive concepts provide prescriptions of what to see, sensitizing concepts merely suggest directions along which to look'. We drew on the sensitising concepts of the 'fractions of the lifeworld' (Ashworth 2003, 2016) of selfhood, sociality, embodiment, temporality, spatiality, project, discourse, and moodedness, to enrich the analysis of qualitative data. These are considered 'necessary aspects' of any experience and can be used for interpretation of individuals' involvement in the lived environment (Ashworth, 2016). We followed an interpretative phenomenology that does not strive to set aside or 'bracket' the researcher's understandings, but is instead characterised by the intersubjective interconnectedness between the researcher and the researched (Finlay, 2009).

In **paper IV,** I draw on constructivist-grounded theory in combination with thematic content analysis to uncover narratives and perceptions of biodiversity as well as management challenges, through semi-structured in-depth interviews with practitioners. Here, the focus of analysis is not on the interpretation of meanings of the participants' own experiences and relationships with nature, but of the narratives and discourses within their organisations. I used an inductive and thematic coding based on the interview guide, and analysed the material in the software Atlas.ti. I followed Charmaz (2014; 2006) in conducting initial, focused and thematic coding of the transcribed material, along with a constant comparative approach between the material, codes and emerging categories. I also conducted document analysis of official policy and green space management documents from the local government in order to triangulate and contextualise the findings. Taken together, this approach allowed for rich narratives and themes with descriptive power.

Focus groups interviews are used for data collection in both **paper II** and **V**. These are an established interpretative method that can be used to understand social and cultural values and meanings of natural environments (O'Brien, 2003). In the case of ES, focus groups can allow for many types of values to be expressed (Kenter, 2014) as well as 'shared' norms and discourses related to values of nature rather than individual ones (van Scholte et al., 2015). With interactions between participants at the core of the method, focus groups can allow the researcher to uncover both individual and group values, observe how normative discourses are reproduced—or challenged—in a certain community, and locate tensions between beliefs and practices (Smithson 2000). In

paper V, focus groups were deemed appropriate in our position as foreign, highly educated and white women interviewing *favela* residents. Compared to the individual interview, the group setting provides a different power dynamic, which is useful for our situation, is collectively powerful vis-à-vis the researcher being able to steer the conversation, and provides access to shared knowledge the researcher does not know exists, which increases the data quality and mitigates the risk of the researcher constructing them as 'other' (Smithson 2000).

Interpretivist approaches are recognised as one method for non-monetary assessment of ES (Kelemen et al., 2014), sometimes referred to as 'narrative methods' (Santos-Martín et al., 2016). I explore the use of such methods through using focus groups to understand expressions of values and experiences in relation to nature and well as interviews to understand diverse local perceptions of nature. Moreover, both theories of symbolic interactionism and the lifeworld provide novel starting points for understanding human behaviour and values in relation to ES. They are in contrast to rational choice theory that underlies the conception of human behaviour in environmental valuation, and in monetary (TEEB, 2010) and even some non-monetary valuation of ES (Raymond et al., 2014).

4.4 Studying a moving target

This thesis focuses on a 'moving target'—conceptualisation of values within ecosystem services research. It forms a sequencing research design of studies that are developed in parallel to advancements within the field of ES. I have followed the development of a new field and concept, and as often happens with the emergence of a new concept, research gaps can quickly close, while others open and reveal expansive unexplored territory. Keeping up with this progression explains some of the methodological choices I have made.

So what precisely is the object of this moving target? The concepts and frameworks discussed in this thesis, namely, ecosystem services, cultural ecosystem services, relational value and urban biocultural diversity (see box 1.) have the common aim of being intended for assessment of relationships and social values of nature in different ways. The target is thus the concepts that, in turn, aim to describe and assess values, and that are ultimately developed to inform decision-making in some form. These concepts operate against an interdisciplinary 'background' that is increasingly diversifying as more perspectives are included, with urban BCD, which aims to include diverse values of nature and various epistemologies, being the latest addition.

Over the last few years, as I have been engaged with ES, the field has grown and diversified rapidly (see section 2; Costanza et al., 2017; Braat, 2018). Ideas that initially seemed more or less established or static have become questioned, opening up the

debate for insights from a wide range of perspectives. One such idea relates to what constitutes value and how values should be measured. From the 2000s and into the early 2010s the discussion on value was still dominated by ecology and (environmental) economics, with little reference to the rest of the social sciences. The question of the conceptualization of value and of HNR within ES is now widely debated with the involvement of a range of fields and various disciplines from the social sciences and humanities. I observed the diversification of the value debate and definition as part of the European Ecosystem Services Conference in 2017, when ES researchers developed and collected signatures for a declaration that explicitly aimed to realize the transformative potential of the ES framework through 'reclaiming' the notion of value and stated that: 'to do justice to all the ways nature matters to us as humans we need to include diverse values into our assessments. By embracing a multitude of perspectives, voices and values we can move away from understanding nature's importance in a purely monetary way' (Antwerp Declaration, 2019).

The conception of culture has also advanced within ES research with the development of categories in line with perspectives from broader disciplines. Work coming out in association with IPBES has now even come to reject the entire concept and framework of ES, to replace it instead with the idea of 'Nature's Contributions to People' (Díaz et al., 2018a; see also Brat 2018; Kenter 2018). This is despite the fact that the organization itself, created in 2012, has the concept of ES as part of their name (the Intergovernmental Science-Policy Platform on *Ecosystem Services* and Biodiversity). This move demonstrates how ideas on the usefulness of concepts and framings change rapidly when informed by new fields within this space.

In parallel with the development in academia, the rest of society is implementing an ES perspective on various levels. However, this uptake does not follow the rapid diversification of methods and perspectives in academia, but is instead in part following the standard approaches of ES, such as those developed by the MEA and TEEB (Naturvårdsverket, 2015). I have thus tried to operate based on the idea that in practice, the original idea of ES is *increasingly mainstreamed*, but with an interest in how more novel conceptualizations can inform this work. Keeping one eye continuously on municipalities as part of ongoing engagement in transdisciplinary research projects (through MISTRA city to city learning lab on ecosystem-based planning and adaptation, and ECOSIMP (Ecosystem services implementation on municipal level) (Jönsson et al., 2017), has allowed me to develop problem framings that are sensitive to the needs of practitioners. This work can in this respect be seen as transdisciplinary. In paper IV I examine perceptions of biodiversity and implications for assessments of social values in relation to ES from practitioners and management perspective in Cape Town.

A note on my positioning in relation to the moving target is also in order here. It is important to recognise that while I am studying the process and development of this

moving target, this thesis can also be seen as forming part of this overall development. Focusing on, for example, methodology for social values within ES and engagement with these debates also contributes to *enacting and legitimising* these approaches (Ernstson and Sörlin, 2013). Moreover, interactions with societal stakeholders such as through interviews can further lead to strengthening or enforcing certain discourses or perspectives, such as a legitimisation of a focus on quantification or an ES approach, without that being the intention of this work (see Berry et al., 2016). In this way it is inevitable to recognise this work as positioned within the ES paradigm, even though I strive to contribute to these debates with a critical problem-solving mode of inquiry from Sustainability Science (Mahmoud et al. 2018). In doing this, I interrogate underlying assumptions of existing methods in order to ultimately construct more credible approaches for real-world problem-solving.

4.5 Selection of study sites

Here, I explain the procedure for selecting data for the studies that build on empirical material: **papers II, IV** and **V.**

Paper II builds on focus group material that the second author of the paper collected in Sweden. I was not involved in the design of the study or in data collection but took the lead in the analysis and in the structuring and writing of the paper. Some define all data collected by a researcher other than the analyst as secondary data (Vartanian, 2010) whereas others (Boslaugh, 2007) see data collected by a researcher within the same team and with the same analysis purpose as primary data. The focus groups were originally designed to understand how individuals describe nearby environments as part of a separate research project on cultural ES. A potential problem with using data collected by someone else is that the data collection process might not be accessible, fully visible or considered properly documented. However, as I had been collaborating with the researcher who collected the data, the information regarding the study design and data collection procedures was accessible. The focus groups sampling was purposeful, based on a selection of participants who were deemed to provide a detailed, nuanced and rich descriptions (Robson, 2011). Participants in the focus groups were initially recruited through a combined convenience and snowball sampling, through local organizations and through the second author's informal network. One criterion for selecting part of the sample was that participants regularly spent time outdoors. The material was suitable for my interest in cultural ES, as recreation is considered as one of the non-material types of benefits associated with cultural ES (MEA, 2005), and the benefits which lay people allocate to nature experiences is often the focus of recreational CES assessments (Milcu et al., 2013).

Cape Town and Rio de Janeiro were both purposefully and strategically selected as study sites based on the idea and selection criteria of 'critical cases' (Flyvberg, 2011).

Selection based on critical cases is particularly useful in this type of exploratory qualitative research where the case represents the studied phenomenon in a way that has the potential to yield the most interesting data and the greatest impact on the development of knowledge, including theoretical understanding.

Photo of Cape Town, South Africa. View of city centre from Table Mountain National Park. (Photo by Scott Webb)

First, both Cape Town and Rio de Janeiro are *urban* biodiversity hotspots, with high concentrations of endemic species and with high habitat loss (Myers, 1988). There is a pressing need to understand the relationship between biodiversity, ES and human well-being in urban areas in the global south that are rapidly urbanising, especially in urban biodiversity hotspots that are vulnerable to loss and extinction (IPBES, 2019). Both Cape Town and Rio de Janeiro are cities of unique social and ecological diversity but severely unequal geographies and distribution of resources. If there is a need to develop approaches to consider diverse values of urban nature to be used in governance and planning, it is here. However, a comparative approach to the two cases was never intended. Rather, the case selection can be seen as a collective approach to case study selection, where each case is treated as its own individual entity to draw conclusions from, which may, in turn, be transferrable to similar settings (Mills, 2010).

Cape Town was selected to be a critical case, but can also be seen to represent an 'extreme case' (Flyvberg, 2011) which I will explain further below. It is a critical case because of the representation of high diversity of social groups and high levels of

biodiversity in the city, which can be expected to exemplify diverse representations of nature and values. It can also present crucial tensions between governance based on an emerging people-centered ES perspective versus a traditional biodiversity conservation perspective. Cape Town was an early adopter of the ES concept, and was one of the exemplars of the TEEBs (The Economics of Ecosystems and Biodiversity) which are local and regional assessments of biodiversity and ecosystem services that provide guidance on how to implement ES at the city level (TEEB, 2011). The city of Cape Town had commissioned a study to describe how ES can be implemented at the city-wide level through the approach of monetary valuation, namely, by 'Building a business case for investing in Cape Town's Natural assets biodiversity" (de Wit et al., 2009). The city represents a case of strategic importance in relation to the general problem (of value conceptualisation) in that it is a place with high diversity of cultural groups and high levels of biodiversity as well as a well-developed application of the ES concept. Moreover, the City is currently developing a green infrastructure plan for the city, and a major part of this involves issues of how to take into account social aspects/values and cultural ES in this development. The case thereby demonstrates not only the tension between a traditional conservation perspective and an ES perspective, but also includes the realm of cultural ES assessments or social valuation.

Moreover, Cape Town represents an 'extreme case' (Patton, 1990). It has the highest number of threatened plant species at the city level in the world. This, alongside the apartheid legacy and current developmental and urbanisation challenges, represents highly polarized perspectives on nature and biodiversity in governance, in a way that is not generalisable to many other places. Lessons learned from this extreme case can however be relevant to inform the ideas of social valuation in general, in the sense of using a "deviant sample to illuminate the ordinary" (Patton, 1990, p. 171). Importantly, all 34 biodiversity hotspots identified by Conservation International contain urban areas (Conservation International, 2016), and while the results are not generalisable to all cities, they provide insights for urban places with high biodiversity values.

Photo of the informal settlement Rocinha, Rio de Janeiro, Brazil where we conducted focus groups with residents. (Photo by Sanna Stålhammar)

Rio de Janeiro, and more specifically the *favela* of Rocinha, was selected as a critical case of high urban biological and cultural diversity. The aim was to critically apply and evaluate the (urban) BCD framework, and it was assumed that if it is not applicable here, we can presume that it is not applicable anywhere else either (see Flyvbjerg, 2011, p. 307). Yet, the selection was pragmatic and based on convenience sampling. My colleague (second author), who has previously resided and studied the favela in which we carried out focus groups, was developing other research there and we were both interested in the potentials of the new BCD framework. Through this collaboration I was able to get 'access' to citizens in the favela, and empirically investigate human–nature relations here. It should be noted, however, that this is a small empirical sample initially developed as a pilot study, and while we draw on our experiences on conducting focus groups, the paper mainly contains conceptual analysis.

5. Summary of questions and findings

In this thesis, I answer five research questions that, taken together, address my overarching aim of critically examining and diversifying the conceptualisations of value and human–nature relationships (HNR) within the ecosystem services paradigm. I have deliberately investigated different conceptualisations of theoretical values and local articulations in order to understand the dominant perspectives within the ES paradigm, and to challenge or further develop these by drawing on empirical examples. The 'unit of observation' includes more than one phenomenon, and this chapter provides an overview of how I answer my five research questions.

5.1 Paper I

To what extent does the concept of ES integrate natural and social dimensions, and how does economic theory influence the concept theoretically?

In paper I, we investigate the interdisciplinary credentials of the ES concept and the extent to which it can be framed in terms of economic imperialism. We review relevant literature by mapping out existing critiques on the ES concept that pertain to imperialist influences. We use three aspects of imperialism for our analysis: the failure to achieve unification (or integration), the failure to observe scientific or epistemological pluralism (when pluralism is appropriate), and the failure to account for value pluralism (social and ethical values).

An important observation here is that because of the prominent role of *values* in the field of ES science, questions that can usually be kept analytically distinct in this type of analysis, as either ontological or axiological issues, tend to collapse. What this means is that the discussion around unification, pluralism and social and ethical values all concern the question *both* of what values are (ontology) and what value should be based upon (axiology).

We show that there seem to be contradictory lines of critique that have been directed at the ES concept. While some lines of criticism correspond to the charges of economic imperialism, the picture is mixed and we espouse to avoid categorical statements. Applying the ES concept on its own requires minimal integration as it can be adapted to fit different fields. The theoretical foundation of ES offers a lot of room within which

studies can be characterized and labelled as ES research without integrating ecology or economics and without being interdisciplinary in general. Related to this, the concept has been accused of being too flexible and too vague, lacking some of the material/organisational structure that a boundary object is supposed to live up to (see Star 2010).

Existing critiques in the literature describe how ES provides what we interpret as an underdeveloped *ontological* integration. We demonstrate that the ES concept does not provide a theory for how to organise the relationships between the fields involved. The widely used cascade model (Haines-Young and Potschin, 2010) which shows the relationship between ecological structures and human values conceptually through a number of intermediary steps is criticised for neglecting ecological complexity and for re-directing the understanding of 'functions' of ecological processes towards human benefit. The broad point here is that neglecting the ontology of ecosystems and overlooking the internal dynamics is a failure to, in a stable way, relate the ontologies of social science disciplines and ecology.

The second charge of imperialism in terms of ES not accommodating scientific pluralism is a common critique. It speaks to the idea that the concept has been overtaken by economic methods to the detriment of a *plurality* of scientific perspectives, and thereby suppressing a more complete understanding of ecosystems and human–nature relationships. A lack of an understanding of underlying non-linear ecology has been described as 'cherry-picking' within ES research based on data availability and ease of quantification. Methodological convenience hinders pluralism, and in consequence, possibly also leads to ignorance of how the framework itself directs venues of research. We also recognise how the question of plurality in the ES discussion is to an increasing extent beginning to revolve around the inclusion of the broader social sciences and humanities, and not just ecology and economics.

The third charge of imperialism that we investigate is about a lack of social value pluralism, or 'value suppression'. The charge of (economic) imperialism here has to do with how the influence of economics misrepresents social and ethical ideas more broadly, including values outside of science, about how nature should be valued. This includes fears of how economic influence leads to value monism despite the inclusion of a plurality of perspectives. We here shed light on the importance of the choice of metaphors and language of ES, which reifies certain constructions of human–nature relationships. The framework, for example, contains prevalent economic metaphors and analogies, as in the ES cascade which is loosely based on a production chain with a supply and demand side.

The axiology of what constitutes ES value in valuation has generally been influenced by economic conceptions and a subjective theory of value. Here, the value of an ecosystem is seen to originate in the minds of individuals and not in the structures or properties of ecosystems themselves. The application of this theory of value has been

criticised from an axiological perspective, as it makes up only a small part of potential values that can be considered relevant and can be seen to override philosophical ideas of value within environmental ethics. Other values, such as spiritual and aesthetic values, have been shown to be fundamentally different categorically, that is, they do not have an instrumental end or cannot ontologically be understood as in relation to preference satisfaction. This type of category mistake is what I scrutinise in paper II, and aspects of social and ethical value suppression are also further explored in paper III (see below).

A central question in the continued examination of interdisciplinary efforts in and around the ES paradigm is to consider on *whose* or *what* terms different fields and disciplines are or become involved. It is central to examine what the constraints are on new social science authors in the debate on ES and NCP.

5.2 Paper II

To what extent do ES values reflect people's articulation of values?

In this paper, we analyse people's articulation of values, using empirical material from focus groups organised in Sweden. We examine how the subjective and context-specific aspects of values mesh with the generalising systemic imperatives of cultural ES valuation and classification. This study answers two questions: How do local inhabitants perceive and describe how they value their experiences in a nearby ecosystem? And what are the implications of these descriptions for valuation of CES? We use an interpretivist approach of grounded theory and discursive psychology to analyse participants' descriptions of how they value of their experiences in their own words.

In general, participants described a 'romantic' view of nature (see Cronon, 1995) which has been influential in Sweden since the late 18th century, and associated with the idea of *friluftsliv* [outdoor recreation] (Fredman et al., 2013; Sandell and Sörlin, 2008). These views do not represent all Swedish citizens as perspectives are increasingly diversifying (Jensen and Ouis, 2014).

In answering the first question, our overall finding is that participants had difficulty describing their experiences in terms of benefits to their well-being. Participants instead talked about their values in terms of how experiences constituted *emotional* relationships with nature, and of direct sensory experiences as inherently valuable. They also had difficulties labelling the experience in terms of value in an instrumental way. Using the concept of an 'interpretative repertoire', as a coherent way of speaking about values of nature in conversation and discourse, we present our findings as the broader interpretative repertoire of 'axiomatic value'—of nature's value as being self-evident. The repertoire informed three discourses that participants describe as valuable in

relation to experiences in nature: 'indivisibility', 'incommensurability', and 'the goodness of perceived naturalness'. The latter comprised the underlying themes that describe *characteristics* of nature, 'nature as authentic', 'nature as healing' and 'nature as beauty, magic and movement'. While the findings can be seen as being in line with, for example, theories about restorative environments, attention restoration theory, and studies on preferences for perceived naturalness, our methodology allowed us to interpret the idea of naturalness and identification with nature differently. A search for authenticity in the experience of the environment can be seen as a search for a condition of connectedness in the person–environment relationships, of which authenticity is a property. Furthermore, the desire for connectedness, identification with nature, emotional relationships, fascination, 'magic', and perceived naturalness can be interpreted in terms of spiritual experiences. Our participants described how the undetermined character of nature seemed to give rise to feelings of authenticity and connectedness because there was something about the *undetermined* characteristic of the experience that they identified with. They expressed a sense of identification with nature as a subject or a force to a greater extent than as a place containing ecological structures. This can be seen as an aspect of 'personhood' in relational epistemology that has not yet been explored in the sense of place literature. These findings are in line with Beery (2013) who found a strong relationship between Swedish outdoor recreation and connectedness to nature.

With regard to the second question, we found fundamental differences in how these descriptions compare to the non-contextual and categorical language of CES. This analysis functions as an internal critique of preference-based valuation of CES and some of the economic theoretical underpinnings that follow with this approach.

First of all, we raise here a concern about the general preoccupation (within ES valuation) with the attempt to fit the ways that the natural environment matters to people into the concept and notion of 'values'. Our analysis shows that that participants had great difficulty describing their experiences in terms of a benefit to their well-being or as a value, which questions the use of stated-preference methods. The benefit of the experience could instead be seen as the *capacity* of natural ecosystems to evoke emotional responses. We describe the perceived benefit as axiomatic in the sense that it was largely implicit, taken for granted, incommensurable and indivisible. Descriptions of restoration, serenity or beauty could not be meaningfully broken down in components to describe how participants valued the experiences, as is required of mainstream classification schemes such as the European CICES (Common Classification of Ecosystem Services). This analysis thus demonstrates the tension between qualitative and quantitative approaches to understanding HNR as values, and methodological problems associated with reducing these relationships into types and itemised lists. The findings stand in contrast to the economic logic of intentionality which takes preferences and expectations to be cognates for beliefs and desires and assumes that preferences are ordered and transitive in individual's minds. Stated

preference (also non-monetary) valuation assumed that people can evaluate their experiences in terms of utility to their well-being, and that appreciation for nature translates into reasoning of where value can be allocated in logically coherent ways. Instead we here see the value as perceived meaning of the human–nature relationship, which is expressed through emotions. Moreover, with regard to the conceptualisations of ES, descriptions that can be interpreted as forming part of participants' sense of identity does not seem accurately interpreted as an external 'service' to that person. This conceptualisation decouples meaning from context and turns the relationship into an instrumental representation. The point here is that these descriptions of experiences can be seen as a categorically fundamentally different type of phenomenon (what we refer to as 'axiomatic' in kind) than what is assumed by a consequentialist framing of ES valuation (cf. Cooper et al., 2016). See also Kirchoff (2018), who draws on my study, and argues that the concept of CES applies a natural-scientific concept of ecosystems to a sphere of reality (people's perceptions) for which it is an ontological mismatch.

This analysis shows how aspects of participants' descriptions can be seen as 'resisting' standardisation, as they remain uncaptured by ES valuation methods. These findings can be argued as providing leverage for resistance to the entire idea of value elicitation. The basic argument for valuation of ecosystem services is that we need to know how to make trade-offs between different preferences for decision-making. Our findings suggest that all values cannot (ontologically) be interpreted as preferences and be used to assess trade-offs without losing their fundamental meaning because they are entangled and co-emergent. For conceptualisations and operationalisations of value to bear the meaning that it has for them, value needs to be connected to the sensory experiences and emotions that experiences give rise to. We wish to add these considerations to the current development on 'relational value' (e.g., Díaz et al., 2015; Chan et al., 2016), and encourage the exploration of how emotional aspects relates to the idea of Eudaimonia in ecosystem management. In seeing experiences in nature in terms of relational phenomena that continually enable 'benefits', we encourage exploration of how different aspects are mutually reinforcing rather than separated and isolated into parts and categories of services.

5.3 Paper III

What does the relational values concept add to existing concepts of value?

In this paper we start from an interdisciplinary perspective and delineate how the newly launched relational values (RV) concept can contribute to addressing problems in three fields that deal with environmental values in different ways: environmental ethics; ecosystem services valuation; and environmental psychology. We provide an overview of value concepts in each field and show how RV has been described or applied. Our

analysis shows that value concepts are used to solve different problems in the three fields with implications for how relational value can be framed and situated in value theory. These differences involve, for example, the descriptive question of how people value nature in ES assessments and environmental psychology versus the normative questions of why nature should be valued in environmental ethics. The RV concept can instead be seen as solving the problem of narrow conceptualisations of intrinsic and instrumental value in ES valuation and suggest that RV can be conceived of as a *methodological framing* rather than a values concept.

Based on our analysis, RV does not seem to add much in terms of a new *values concept* in either environmental ethics or environmental psychology. In environmental ethics, it concerns questions around how or why we should value nature in a normative rather than descriptive sense. The distinction between intrinsic and instrumental value involves various interpretations, and it can be argued that some interpretations already account for the perspective that relational value is seen to add in terms of relationships. In environmental psychology, the values concept is taken to mean deeply held and stable individual principles. It does not align with how RVs have been outlined because values in psychology are more abstract and not about specific contexts. RV can instead be seen to solve a methodological problem within the field of ES valuation that is itself an outcome of a narrow conceptualisation of what intrinsic and instrumental values mean in this field. Here, intrinsic value is seen as a value that an object has independent of humans (as 'weak objective value' (O'Neill, 1992)), while instrumental value is defined in terms of preference satisfaction. The basic starting point here is then that ES valuation is seen to encompass only instrumental value, and everything else becomes left out of the scope of assessments (including intrinsic value). As people's values of nature can not only be understood in terms of preference satisfaction, which we also conclude in paper II, new approaches are considered needed, and this is where the supposed need for a relational values concept arises. This can, however, more appropriately be seen as a broadening of methodological perspectives within ES valuation, rather than filling the need of a third values category. We conclude that RV is more than a values concept, since it is also used as a rationale for broadening the otherwise mostly positivist or post-positivist epistemological perspective within ES valuation and ES-related approaches. As such, it seeks to include more of the qualitative social sciences, humanities and in general more constructivist epistemologies and relativist research traditions. RV is intended to contribute to social valuation through the inclusion of relational 'meanings' to understand the importance of people's relations with people and environments for their well-being. Our point here is that it can be questioned if studies that are now applying the concept can be seen as employing a more constructivist perspective or qualitative methodology, which includes a more comprehensive idea of *culture* than (previously was the case) in ES, rather than a new type of value.

RV sheds light on a larger contradiction within the ES discourse on values. It involves a merging of descriptive and normative modes of understanding value. The task of developing conceptualisations of values that can take into account assessments of people's current perceptions and behaviour, while providing effective communication is merged with the normative question of why and how we should value nature. There is reason to be aware of the differences between these modes of understanding value, since describing how people value nature, regardless of how accurate the methods are, does not necessarily provide us with answers to the underlying moral concerns or concerns related to more sustainable outcomes. A closer reading of disciplinary perspectives and engagements with theoretical underpinnings of values can prevent confusion from the outset regarding different aims of values concepts. Moreover, there is a risk that moral considerations may be overridden if they become subject to reconceptualisation in the form of descriptive values with the application of RV. With RV currently being developed as a strategy to inform IPBES assessments, diverse perspectives from across the social sciences and humanities are increasingly being repositioned and conceptualised according to how the NCP as a conceptual framework, just like ES, is *one-directional* and not able to reflect intrinsic value (Kenter, 2018), if intrinsic value is conceived of as being independent of humans. RV deliberately manifests the separation of intrinsic value from the scope of NCP or ES and posits people's subjective relations as the locus of interest and separate from nature. This thus maintains a dichotomised conceptualisation of HNR.

This study also highlights an arbitrary engagement with the idea of 'relationality' of HNR within the conceptualisation of RV. While some interpretations and operationalisation of RV deal with relations as an added variable (see section on environmental psychology) that operate based on a subject–object distinction, others call for a radical relational perspective that goes beyond 'Cartesian dualisms' to focus on relationships (see Muraca, 2011). It is important to consider the level of 'relationality', of how the concept is operationalised on the spectrum from ontological meanings of the term to epistemological and methodological. The differences of these accounts across fields suggest that it is questionable to group all of these into approaches that 'elicit' RV. Operationalisations of the concept should make explicit what aspect and on what theoretical 'level', as well as what discipline or field is drawn from. The inconsistencies of RV lead us to suggest that perhaps instead of a values concept, it could be seen as a 'boundary object', which could be useful for integrating specific epistemological perspectives on value. However, with regard to the differences in operationalisation, questions arise as to what it is about RV that could ensure effective communication across disciplinary boundaries as a boundary object. A shared term is presumably not sufficient to integrate, for example, perspectives from humanities into ES valuation, as these stem from fundamentally different ontological and epistemological perspectives (cf. paper II). RV has nonetheless been influential in expanding the disciplinary perspectives in ES valuation and provides further

opportunity for cross-fertilisation. Despite theoretical uncertainties, its pragmatic influence on the ecosystem paradigm and sustainability agenda in expanding the perspectives of HNR can be considerable.

5.4 Paper IV

How should diverse social values of biodiversity and nature be accounted for?

This question concerns the broad discussion on how a diversity of values, perceptions and worldviews of nature can be taken into account in assessments for policy and decision-making (Christie et al., 2019, Díaz et al., 2018). In order to inform this discussion I in paper IV explore local expressions of values of biodiversity in management and planning of urban nature in Cape Town, South Africa. The role of varied perceptions and values of nature and biodiversity, in order to inform an understanding of how to develop methodologies that account for diverse social values in management and planning of urban nature. I analyse in-depth interviews with civil servants and practitioners working on green space and biodiversity to investigate: i) narratives on the role of social values and perceptions of biodiversity and urban nature for management and planning, and ii) the potential of assessments of social values in practice.

I found that practitioners perceive highly polarised representations and values of urban biodiversity in the city as a management challenge. They described opposing views and values of biodiversity amongst management as well as amongst citizens and management. The informants reported widely varied and often opposing values and views of biodiversity and green space as an important aspect and an underlying challenge for management. Many of the challenges were described as stemming from contrasting views of nature and biodiversity, which results in conflicting perspectives in management and planning as to for example what different sites should be used for, and if to restrict or permit citizens use and access. These contrasting views were described as an overarching polarisation of, on the one side, fairly homogenous perspectives of traditional biodiversity conservation management of nature reserves versus, on the other side, various more people-centred governance perspectives, including focusing on ecosystem services and developmental perspectives. The traditional biodiversity conservation narrative was explained as building on biodiversity being managed as a conservation area or national park following national and international commitments to conserve critically endangered ecosystems, also referred to as a 'pure biodiversity' perspective (cf. 'nature for itself' and 'nature despite people' (Mace, 2014)), with little consideration of the proximity of the city and people's developmental needs. Alternative narratives to this were voiced, stating that biodiversity in an urban environment should not be managed based on traditional conservation ideals, but instead be adapted to other social goals.

The complexity and radical diversity of different perceptions and values of biodiversity provide a difficult setting for green space planning and management to work in in ways that are inclusive. Even though providing access to green areas is one of the most important action points and problems for management, direct engagement with nature is complicated because it can damage biodiversity if not highly managed. Moreover, a lot of resources go into just 'defending the sites', by managing fences and keeping people out. There are thus challenges here as to what more 'people-oriented' management of urban nature implies in a biodiversity hotspot, where citizens needs and perceptions are not necessarily in line with conservation priorities.

Observations of polarised views of biodiversity are not novel in the city of Cape Town. However, they demonstrate in a sense *new* or particular challenges to the idea of understanding local values of biodiversity (in relation to ES) and of social (socio-cultural) valuation. Diverse values of urban nature was explained as a challenge to efficient management as well as a challenge to comprehensive management of green space based on a GI (and ES) approach. Here, goals of biodiversity conservation conflicting with people's preferences brings new challenges to the viability and role of social assessments and stakeholder inclusion. This study also shows how GI planning in a city with high biodiversity levels needs to be able to take into account the various conflicting perspectives of what biodiversity means for different stakeholders involved, since biodiversity is 'contextual'. For example, an urban farm is in Cape Town not considered categorically (and scientifically) as part of 'biodiversity' conservation, while in a European city or a less biodiversity city, an allotment garden is usually considered part of biodiversity (Elands et al. 2015).

Socio-cultural valuation were considered mainly useful in a green infrastructure planning perspective, for current usage information and preferences for different places, and for different socio-economic groups, but less useful as an overall informant for participants' work, and especially for use in biodiversity management. The idea of taking citizens' values into account (through explicit assessments) in management was described as problematic from a biodiversity management perspective because of a general lack of knowledge of the ecological complexities involved. The expressed usefulness for social valuation or increased information about citizen's values and perception of biodiversity in informants' own work was described as low. This was explained as being mainly due to the mismatch between citizen's values, or priorities, and overall conservation goals. These findings are in line with Ruiz-Frau et al. (2018) who question the overall usefulness of socio-cultural valuation in ecosystem management due to incomplete knowledge of stakeholders.

In addition, this study show how there is a need not only recognise existing preferences and values, but also to include social values in ways that allow for their change and deliberation. The potential of natural spaces to provide spaces and interactions that contribute to social change and citizen building, especially in underprivileged areas, was

emphasised as important. Moreover, there is a need to take such 'transformative potential' of green spaces and urban ES into account in green infrastructure planning and management, rather than to convey information on current values as static figures. Socio-cultural valuation is of limited use to account for diverse values here. The focus on capturing current preferences is delimiting, and approaches may also further mask and delegitimise the multitude of ways of knowing urban nature, since ES valuation is intended to incorporate assessment results into top-down systems of decision-making (Ernstson and Sörlin, 2013). These findings call for further development of deliberate approaches (Ravenscroft 2019) to understand and take diverse values into account in management of urban green space, as well as exploration of how values change according to different practices and through social learning (Kendal and Raymond 2019; Eriksson et al., 2019).

Informants emphasised the need for restoration of and access to urban green areas by low-income communities in order to create co-benefits of citizen building and promote nature-based solutions. Specifically, there is a need for an integrated management approach that transcends different sectors in order to focus on the multifunctionality of natural ecosystems, so that the current benefits of these to society be fully realised, as practitioners now perceive that there is a disconnect between an understanding of the link between well-being and local biodiversity. Moreover, a conceptual shift which probes more 'holistic' management (Beery et al., 2016) is requested and the use of ES is considered to be able to contribute to this development along with the development of a green infrastructure plan.

5.5 Paper V

How can biocultural diversity be an advancement over ES for studying human-nature relationships?

In **paper V**, we analyse the urban biocultural diversity (BCD) concept (Vierikko et al., 2016; Elands et al., 2018) and framework based on fieldwork in the culturally and biologically diverse urban region of Rio de Janeiro, Brazil. We give this version of the BCD approach the prefix 'urban', although this is not how the authors themselves denote it, because we find it necessary to clearly distinguish it from other, more established uses (see Maffi, 2005; Merçon et al., 2019) to avoid the uncritical appropriation of these. Urban BCD is advocated as a framework for informing urban green space or green infrastructure planning. Like ES, it entails a focus on assessing HNR; however, it moves away from the assessment of *services* and of *values*. Instead, it focuses on local *interactions* and *engagements* in relation to citizen's quality of life, through a range of methodological perspectives. It is specifically intended for inclusion of local and place-based HNR and implies a larger transdisciplinary focus than ES.

Through field observations, focus groups and informant interviews we investigate manifestations of human-nature relationships in the *favela* (informal settlement) of Rocinha and the neighbouring Tijuca Forest. Based on these we discuss how the urban BCD framework and methodology can theoretically and pragmatically (more fruitfully than ES) emphasize: i) interrelationships, ii) variation of group values, iii) participation, and at the same time iv) be sensitizing and reflexive.

The study show that overall, the urban BCD framework is an advancement to the ES approach for studying HNR in cities in several ways. With its starting point in 'interrelationships' and diversity of values, rather than benefits and services, BCD may be more suitable to study human-nature relations in contested places like Rocinha, since it can portray both negative and positive aspects of nature. In this regard, the framework can also be suitable for a city like Cape Town, where, as mentioned above, most open spaces are considered 'negatives space' because of crime. However, attention to the diverse ways people engage with nature can also highlight positive engagements and relationships with nature in places where these are not commonly emphasized. In our focus groups, the participants in general expressed a positive image of their relation with nature. These findings provide an alternative to the 'usual' narrative about *favelas* as places of environmental degradation and disaster risk, revealing BCD and nature connectedness in Rocinha that are as much related to popular culture, fitness ideals and citizen-building, as to traditional livelihoods and spiritual beliefs.

While the focus on inter-relationships is a main advantage for studying urban HNR in diverse cities, we also raise questions regarding how this idea should be interpreted methodologically, and to what extent the framework suggests a disciplinary *integration* of social and natural dimensions of knowledge. One aim of the framework as stated is to go beyond the dichotomized thinking associated with ES; however, it does not provide a theoretical foundation for doing so. Instead, the methods suggest (Vierikko et al., 2017b) that the approach is not integrative, but involves a multi-disciplinary or pluralist combination of methods and disciplines intended to assess the different layers of 'materialized', 'lived' and 'stewardship' BCD. We therefore deem it important not to overemphasize the inter-relationality or 'co-constitutiveness' of the framework, but instead, to recognize different methods as partial perspectives, subject to positionality (Nightingale, 2003).

The focus on a variety of group values is also an advantage, since it directs attention to the diversity of ways people understand and engage with urban nature, and how such uses and developments are negotiated. A central methodological question to clarify here is what constitutes a cultural group in a place. In our focus group selection we found it helpful that the urban BCD conception of cultural diversity allows for attention to both conventional categories such as ethnic and religious groups, but also other urban subcultures. However, a focus on descriptive categorization of groups according to uses of green space can also be unfitting in cities like Rio de Janeiro (and Cape Town),

because it risks de-politicizing and de-historicizing the current situation of previously displaced groups. Nevertheless, with the attention to interactions between different groups, BCD can be a useful framework to highlight contested spaces, and how some people might benefit from particular green spaces at the expense of others.

Participation and inclusion of knowledge is another ambition associated with the framework. The aim is to allow for transdisciplinary integration and to consider participants' perspectives rather than pre-determined typologies of nature and biodiversity. There are however limits to how 'inclusive' a framework building on scientific knowledge can be of local knowledge. Successful inclusiveness hinges on to what extent local people's ideas of nature are allowed to *challenge* the authority of scientific (ontological) conceptions of nature, as opposed to local knowledge being subsumed and overridden by scientific data. Since the framework is also intended to be useful and credible for policy and planning, such radical inclusion of local or alternative views of nature seems unlikely. Instead, there is a descriptive focus on assessing HNR, to reveal a diversity of ways of engaging with nature. A crucial question is how a descriptive account of HNR can be participatory or empowering, or contribute to 'co-production', especially in a place like a Brazilian *favela*. In applying the framework, one needs to be aware of how it directs attention to individuals' quality of life, rather than the broader societal and institutional landscape that is currently affecting and shaping urban natures. However, we see that scaling up the focus, and further engaging with perspectives in e.g. critical urbanism and migration, can allow for analysis of how and why particular practices exist. In addition, through our focus group analysis, views of and engagements with local nature emerge that challenge the narrative of favela residents as 'environmental villains', showing that this descriptive approach of HNR through the BCD framing can be subversive in making alternative narratives and engagement known, which, in turn, could strengthen residents' identity in relation to formal city. Through a purposeful focus on suggested BCD indicators such as inclusiveness and land tenure (Vierikko et al. 2017b), there is potential for researchers and planners to highlight environmental justice issues.

This analysis also exposes the limits of how much a framework and concept can really "do". The premise for this thesis is that concepts, frameworks and metaphors are important because they frame our problem framings and investigations, tell us where to look, and this affects interventions and practice. However, there are limits not only in terms of how much the framework it can be expanded to include various perspectives, but in terms of what type of action it can direct. The urban BCD framework is an example of this. It is very ambitious, but a concept or a framework cannot by itself be e.g. inter-relational, inclusive, reflexive or transformative. This depends also on its operationalization, involving specific theoretical perspectives and methods. The framework can be complemented by for example perspectives focusing on emancipation combined with an examination of structural mechanisms (Isgren and Harnesk 2019) or subjectivity in participatory resource management (Morales and

Harris, 2014). The urban BCD framework needs more criteria and methodological guidance in order to strengthen its transdisciplinary merits.

In sum, urban BCD implies a conceptual advancement in considering local HNR in cities, also for the global south. Compared with the ES concept, it allows for a more inclusive and comprehensive understanding of the relationships between urban nature and people's quality of life. Moreover, it allows for a diverse application of methodologies, especially with regard to the qualitative social sciences. Importantly, this does not imply that qualitative social science knowledge is automatically maintained or taken into account in BCD-driven policy and decision-making. The crucial step still remains to develop forms in which qualitative ES or BCD data on e.g. emotions and the lived experience can be usefully presented and integrated into policy and planning next to other indicators.

6. Assessing human–nature relationships within the frame of ES

This thesis uses perspectives from the humanities and social sciences to foster understanding of HNR in relation to ES and ES assessments. In doing so, it provides insights into the theoretical and methodological challenges and opportunities of combining these perspectives. There are fundamental differences between the social and natural sciences, especially with respect to qualitative social sciences methods (Myrdal, 2004; Gilje and Glimen, 2007). The latter do not sit neatly within ES frameworks and approaches dominated by quantitative or natural sciences; nor do they in obvious ways produce knowledge that is applicable to them. My methodological contribution is an exploration of the application of interpretivist approaches to understanding local values of nature and perceptions of biodiversity in combination with an ES perspective. I discuss challenges related to methodology in this chapter with a focus on the role of interpretative approaches within ES. In the first section I reflect on the broader implications of current conceptualisations of (social) value within the ES paradigm.

6.1 Values are not everything

The discussion regarding values within the ES paradigm is conducted in an interdisciplinary space at the nexus of different disciplines, environmental policy and conservation policy, where diverse aims, problems, methods, theories, and conceptual schemes meet in ways that, while warranted, are also a source of considerable confusion. **Paper III** shows how different value concepts result from particular disciplinary framings. Value concepts in different fields deal with entirely different questions—for example, in psychology values refer to stable individual principles, whereas in ethics value deals with normatively significant questions regarding, for instance, why and how something (like nature) has value.

A common terminology needs to be established for discussing the value of nature in the HNR assessment space, given that some disciplines and stakeholders take the term 'value' to mean entirely different things (see recent work on this: IPBES 2016; Kenter et al., 2019). An ambiguous use of the term can mask values; a vague term can imply

reductionist representations. A narrow operationalisation of one type of value, such as economic value, can also by stakeholders or policy-makers be interpreted as total value, or as overall importance. To provide for a plural perspective on values of ES in policy- and decision-making, we need to engage with a multitude of different value concepts and methodologies, clarify their different theoretical underpinnings, and ultimately position these in relation to sustainability goals.

Although a central focus of this thesis is on values, I want to emphasise that a focus on value concepts per se within ES can be delimiting. The preoccupation with the idea and concept of values can potentially prevent us from understanding the various ways in which nature matters to us. In order to clarify how different theoretical framings of values compare and overlap, different disciplines need to conduct extensive interdisciplinary analysis (see Kenter et al. 2019; Rawluk et al. 2019). Such analyses can, on the one hand provide necessary insights into how we can study and understand HNR from varying methodological perspectives, as shown in **paper III.** Engagement with different interpretations of value also provides diverse perspectives from which to consider the importance of nature; moreover, by including a plurality of perspectives, it challenges dominant views or monistic economic valuation. On the other hand, the focus on values as a concept diverts us from the original task associated with ES assessments, that is, to understand how society benefits from ecosystems. The preoccupation with values adds layers of theoretical complexity (especially with the inclusion of the broader social sciences), which requires interpretation of additional perspectives of what values are as a theoretical term, rather than analysis of the links and relations between people and ecosystems. The goal of increased interdisciplinary engagement and a focus around the term 'values' implies a loss of direction and of an overall goal within the ES paradigm.

It is not surprising that values have been a central focus within ES assessments, as these have been developed in close affiliation with environmental and ecological economics. However, within the discussion around the concepts that I have investigated, I show how the notion of value, in some respects has been given a needlessly large focus. In **paper II**, I question attempts to fit the ways that the natural environment matters to people into the concept of values. The tendency to understand and conceptualise HNR *as values* within ES is also exemplified through the RV concept (paper III), where values are explained as a foundational way of describing and understanding the relation between humans and nature. However, a focus on values concepts is not exhaustive when it comes to the domain of understanding human–nature relationships; it is just *one* way of describing aspects of these. To some extent, I agree with Holland (2009, p 510) who described (ethical) value as an 'empty placeholder'—attention to meaning is more important for understanding people's moral relationships with nature. The empty placeholder analogy for values applies more broadly within the ES paradigm, as it is does not concern only ethical values. *If value, therefore, is something like an empty placeholder, what should it be a placeholder for?* In **paper III** we question the framing of

RV specifically as a values concept, seeing it instead as an umbrella term for methodological framings that emphasise relationships. Even though the current use of RV as a values concept is questionable, I welcome this development as a pragmatic function that allows for the integration of more comprehensive understandings of HNR within the IPBES conceptual framework (see Chan et al., 2018).

It is important, however, to ask why this methodological expansion requires a new values concept. This 'third' values concept (RV) constitutes and motivates the existence of 'new' phenomena and objects that are to be measured (relationships). As we clarify, the values concept needs to be constructed to demonstrate that there are other values outside the narrow interpretations of intrinsic and instrumental values within the ES paradigm. The establishment of these values then motivates their operationalisation, that is, the development and use of a wider range of methods to assess them (IPBES, 2016). (Establishing this new values concept and category alongside the intrinsic and instrumental categories also enables different types of values to be compared, which provides an overview of how different values and assessment approaches complement each other.) In this way, the creation of a new values term broadens the scope of understanding the various ways in which nature matters to us. Moreover, RV can be seen as a 'weighed concept' (Hughes and Vadrot, 2019) that emerged alongside the global IPBES assessment, in which political (rather than strictly disciplinary) struggles form part of the construction of the concept itself. Further examination of the concept can thus reveal underpinning political order in the science–policy interface.

The values term is also problematic in the discussions around ES, as it refers both to descriptive scientific assessments of the links between human well-being and ecosystems, and to underlying beliefs and moral principles in society that influence science and policy. As described in **paper I**, ontological questions regarding *what values of nature are* tend to be coterminous with axiological issues of *moral and ethical values in society*. The transdisciplinary nature of ES means that it is not only about scientific representations of values, but ultimately about how to account for social and ethical values of nature more broadly in science and policy. That this is difficult to analyse as two distinct questions is increasingly recognized in work on assessments of ES. Here, the assessment process is influenced by various choices, such as the framing of value, the selection of participants involved, the methodological tools and measurements, the choice and delineation of the particular ecosystem to focus on, and so on (Jacobs et al. 2016). I come back to the distinction between descriptive and normative modes of understanding values below in chapter 7. The point, for now, is that this difference needs to be clarified with respect to the aim of social values assessments, as these two broad versions of value currently reside under the same term.

It is important to note that the way in which the ethical values categories of intrinsic and instrumental (and now also relational) value are referred to in discussions around ES are specific interpretations of those values categories. These interpretations have

emerged within ES valuation thinking, where values have been understood in relation to assessments of descriptive modes of values. **Paper III** demonstrates how both instrumental value (seen in terms of preference-satisfaction) and intrinsic value (seen as objective value) are narrowly interpreted within ES (and often in environmental/ecosystem management in general (see Faith, 2012; Vucetich et al. 2015), which leads to the perceived need for a third values category of relational value. Moreover, there is a trend of associating intrinsic value with conservation of biodiversity, as 'evolutionary and ecological processes' while associating 'genetic diversity and species diversity' with intrinsic value within the IPBES (Pascual et al., 2017). A problem with this is its portrayal of efforts to preserve intrinsic value as being about something separate from humans. However, a focus both on biodiversity and ES can be seen as instrumental in some respects, and a focus on conserving biodiversity cannot adequately be conceived of as 'independent' from human interests (Faith, 2018a; 2018b). Environmental ethicists have offered more holistic positions to understand nature's ethical value without assuming separation as a starting point (see Næss, 1973). Holmes Rolston (1988) offers one such intermediate position between meta-ethical subjectivism and objectivism, arguing that instead of seeing nature as having been assigned an instrumental or intrinsic value, nature should be seen to *carry* values and to be valuable because it is *able* to produce *value* through its evolutionary processes, of which humans form a 'sub-set'. (Rolston, 1988, p. 4). This resonates with how I interpret 'value' of HNR **paper II**, in terms the capacity of land and water to evoke emotional responses. There are also parallels to the need in Cape Town (**paper IV**) to recognise urban nature's future *potential* to contribute to social learning and transformation. Furthermore, in line with the 'relational' understanding of HNR investigated by this thesis, the 'subjective' self is not a polar opposite to the 'objective' nature. A focus on 'relationality', however, as pointed out in **paper III**, also implies a focus on the subjective locus of interests, by placing people at the centre. Instead, conceptualisations of value within ES need to recognise the subjectivity embedded within the 'objectivity' of nature. Both relational and instrumental values would then not be separate from intrinsic values (cf. Pascual et al., 2017) but sub-categories of them (see also Arias-Arévalo et al. 2018).

6.2 'Elicitation' of meaning

This section provides a methodological discussion on the application of an interpretative approach to studying HNR in relation to ES. My empirical studies highlight incompatibilities between in-depth qualitative understandings of HNR and generalisable knowledge, which leads me to question the appropriateness of the idea of value capture or elicitation in combination with qualitative and place-based methods.

The observation that values are just one way of understanding and conceptualising HNR informed my interest in the urban BCD concept for **paper V**. While this concept and framework are also intended to inform assessments of HNR (for policy and planning), guidance on its application does not suggest starting from a specific values conceptualisation. Instead, it loosely portrays HNR as local interactions and practices in nature that can be understood from a multitude of methodological perspectives. This concept is in line with an expansion of ES valuation to which RV is also testimony (**paper III**), namely, a methodological operationalisation of social values through more qualitative and context-specific understandings (Díaz et al., 2018). The expanding methodological perspectives imply a shift to include not only a focus on describing and assessing natural capital, but also on describing people's *inner worlds* in relation to ES. This is a central idea explored in all my papers, but less so in paper I.

The qualitative social sciences and humanities are becoming involved in describing HNR within the ES paradigm, and this brings their entire traditions, epistemologies, theories and perspectives to the table. Attempts to frame these perspectives in terms of benefits from nature (and well-being and quality of life) open up new terrain for research and practice but also imply competing theoretical perspectives (Stenseke and Larigauderie 2018; Vadrot et al. 2018a,b). Kenter et al. (2019) acknowledge that for traditions that see value as embedded in social and institutional contexts, such as the humanities, applying the language of value—as in to 'capture' value—is inappropriate. The idea of value 'elicitation' also does not apply here, as values are not something that can be isolated or aggregated. The qualitative 'narrative' approaches that I have employed in **paper II** and **V** to understand HNR do not rely on scientific ideals of objectivity but involve interpretative approaches, and are in line with a context-specific rather than generalisable perspective (Díaz et al., 2018). From this perspective, I question the extent to which or what aspects of HNR are subject to 'elicitation'. The idea of value elicitation is central to ES assessments and to the work of IPBES for conceptualising and assessing values (IPBES, 2016). It is also central in many quantitative social sciences that rely on surveys (Fischhoff, 1991), and this perspective typically assumes that values are pre-formed, held, and can be articulated by respondents through assessments. **Paper II** demonstrates the problem of combining the idea of elicitation with an interpretation of the meanings of relationships with natural environments, as these are described as axiomatic, emergent from sensory encounters and part of a sense of identity. In **paper V**, I do not specifically compare participants' descriptions with a values elicitation perspective, but instead use an interpretivist method drawing on the concept of the lifeworld. There is a tension, or gap, between employing methodology to describe phenomena as relationships of meaning versus the perspective of interpreting these phenomena as values, that is, 'eliciting' them through valuation. Constructivist and interpretivist methodology strive to understand knowledge in case-specific and local contexts, not to extract or generalise (Moon et al., 2014).

This tension is especially evident in the concept of relational value. In **paper III** we demonstrate how the idea of relational value is intended to be used for assessments associated with socio-cultural valuation (or cultural ES valuation), while at the same time being described (at least by some) as centring around more qualitative understandings of meanings of HNR. It is questionable how these can be combined in such a way that notions and relationships of meaning are 'elicited' through assessments. This depends also on differences in the perspectives of ontologies of social values: of the extent to which we regard values as, for example, pre-formed and held versus constructed when they are articulated through assessments (Kenter et al. 2016; Kenter et al, 2019). It also depends on what methodology is applied to interpret values. For example, my grounded theory approach allowed me to interpret participants' descriptions of experiences as immediate, affective and experiential and as forming aspects of 'values' that are emotional, implicit and not available for elicitation (paper II, cf. *felt values* Schroeder 2013, p. 78). The development of RV as a category to describe such qualitative aspects, certainly *describes* these phenomena better, but it does not necessarily make their 'properties' subject to elicitation. The crux is to represent local (context-specific; Díaz et al., 2018) perspectives of nature that hinge on the uniqueness of particular encounters and relationships and that form part of people's identities and citizen-building (**paper II, IV** and **V**), without distorting these meanings.

How qualitative notions of, for instance, meaning in relation to ES (and NCP) can be taken into account should be informed by what aspects of HNR we are seeking to assess. My empirical and theoretical analysis of HNR and people's values in relation to ES thus leads me to question the aim of narrative approaches for socio-cultural assessments, in terms of what these can accomplish in that space. Specifically concerning social values, we should clarify what we are striving to describe through assessments involving citizen and stakeholder values, and for what purpose, in order to allow determination of the extent to which more *in-depth* understandings of HNR contribute to our goals. What is the placeholder of value here supposed to represent: *preferences, principles, beliefs, worldviews, ideas, perceptions or attitudes?* All of these can supposedly be important in different governance and management contexts, as deeply held values and preferences for resources can play different roles in social-ecological systems. For example, during the interviews I conducted in Cape Town some informants interpreted my question regarding citizens' *values* of biodiversity as relating to something more deeply held and distinct from how they saw the usefulness of information on citizens' ES *preferences*.

This thesis also demonstrates that the role of interpretivism in relation to ES (and, more broadly, humanistic and social science approaches to understanding local values) is not only to provide more in-depth understandings of HNR. It is also to stand in opposition to, and challenge, how ES (and subsequent concepts and efforts) portrays HNR. As we discuss in **paper V**, interpretivist knowledge plays a role in challenging the inclination to perceive social and qualitative methods (i.e., 'lived biocultural diversity' in paper V)

as representing only 'the subjective', as something merely going on in people's minds and that is projected onto 'the objective' and stable foundation of biophysical nature and indicators, which are more easily picked up on for decision-making. Meaning and interpretation are often seen as overlaid tangible, material and easily quantifiable aspects, rather than as co-constituted by human–nature relationships (Gilje and Grimen, 2007). However, meaning, from the perspective of symbolic interactionism employed in this thesis, is seen as arising from the co-constitution of, and relationships in, interaction (Blumer 1986). This requires consideration of how the meaning of interaction is constituted in HNR and an acknowledgement of how people do not in general perceive nature as a function of 'ecosystem services' or 'green infrastructures' (see also Kirchoff, 2018). Moreover, in recognising the legitimacy of diverse worldviews, we need to also acknowledge that the 'context-specific' lens of understanding HNR can show an entirely different picture of the same environments than the generalizable lens (Díaz et al. 2018). As we discuss in **paper V** with regard to the difference between 'lived' and 'materialised' BCD, the different lenses can imply different ontologies and epistemologies that do not even necessarily resemble the same 'things', and there is a strategy required to encompass a plurality of ontological perspectives.

Relational value is advocated by some as a more 'radically' relational and embodied means of understanding HNR; this can help with understanding meaning in the interaction between humans and nature (Muraca, 2016) and is more considerate of different indigenous ways of knowing. If we want to take this 'relationality' seriously however, we need to recognise that these more embodied modes of engaging with nature do not only belong to the indigenous (Ingold 2006; Latour 1993), and that this is also a matter of methodological perspective (West et al. 2020). Non-indigenous 'local people' also carry these modes of experience and relationality (**paper II** and **V**), and we can employ more embodied conceptualisations to try to understand these (see Cooke et al., 2017; Raymond et al. 2017). However, as mentioned above, such understandings are not necessarily compatible with abstract or generalisable systems of categorisation.

6.3 Categorisation of the lifeworld

An increased categorisation of HNR can have implications for how we understand and perceive our relationship to the natural world in a broader way. This applies both to people's experiences and relationships with natural environments (as explored in **paper II** and **V**), and to moral considerations of nature (**paper III**).

One concern here is the extent to which people's experiences and relationships with the natural world are subject to being represented through assessments, and what happens to elements of the lived experience that remain undescribed. Aspects of the direct experience of HNR inevitably eludes description and abstraction. Muraca (2016) refers

to Whitehead's description of the primary mode of experience as 'a vague totality', which precedes a subject–object distinction and does not take the form of detailed observation (Whitehead 1966, p. 109). This echoes ideas that draw on phenomenology such as Ingold (2006) who argues that we perceive the environment through a 'relational' mode of engagement with it, not detached observation of it. My analysis in **paper II** shows that a bifurcation of human–nature relations regarding a subject that perceives entities and aspects of the natural world in terms of objects of value does not account for the immediacy and meaning of experiences and human–nature relationships, in line with Muraca (2016) and Kirchoff (2018). This thesis does not set out to describe metaphysical aspects of human–nature relationships and perception. However, I want to emphasise that a focus on instrumentalising and categorising relationships with the natural world can erode and undermine crucial aspects of HNR or values. Here one can draw parallels with Habermas' idea of the 'colonisation' of the lifeworld (Habermas 1987; Thomassen 2010). The concern is not only that elements of being and knowing human–environmental relations are uncaptured by ES assessments and remain outside their scope. It is that these uncaptured elements are potentially 'corrupted' by more abstract systems of categorisation. When relationships with nature are scientifically described, they become potentially 'more visible' for management and policy-making, or so goes the logic within the ES paradigm. However, scientific descriptions—both quantitative and qualitative approaches—inevitably also 'demystify' the very nature of these relationships through theoretical interpretations and abstractions. The relationship as such becomes and is constituted by its scientific interpretation, as Evernden describes, 'once defined, the nonhuman other *disappears* into its new description' (Evernden 1992, p. 131 [emphasis added])". This does not only have to do with recognising the 'partiality' of methods. The concern here is that demystification also implies a process of giving primacy to methodological interpretations over content. Human–nature encounters and *embodied* modes of being-in-the-world are increasingly lost to detached description. Vetlesen (2016, p. 82) describes this as an interpretation of modernity that gives primacy to '*classification* over sensuous-bodily perception and experience that goes back to Hobbes and Galileo' [emphasis added]. He argues that we are increasingly understanding nature in terms of a 'domesticated reality', in that what counts as real is what is 'worked-upon' or designed to meet human needs (2016, p. 149). This domestication and demystification resonate with an increased 'disenchantment' of our relationship with the rest of the natural world, and the Enlightenment belief that there is 'nothing new under the sun' and that everything bears the human stamp (Adorno & Horkmeier 1972; Weber 1963; Gilje and Grimen, 2007).

In giving primacy to methodological descriptions of over content, our understandings of HNR increasingly *become* scientific descriptions. The concern here is that this deterministic and scientific understanding of HNR will increasingly be internalised by people in their general encounters with and perceptions of nature. Robertson (2012)

describes how ES renders the biophysical world as composed of neatly nested classifications and stacked functions, resulting in nature being encountered (by consultants) as ecosystems that already take the commodity form, rather than acknowledging that the commodity form is being imposed on ecosystems. The choice of ES as an (economic) metaphor for HNR can affect and perpetuate understandings and values of nature in practice, as we point out in **paper I** (see also Norton, 2011). ES performatively frames HNR into utilitarian relationships of structures, functions and benefits. Lakoff and Johnsen (2003, p. 145) argue that metaphors have 'the power to create a new reality', because we start to experience the world in terms of the metaphor. ES, portrayed crudely, represents a lifeless and mechanistic worldview, where nature constitutes functions and structures of 'green infrastructure' that manufactures and delivers 'services' or contributions to people's wellbeing. From this perspective, the idea and project of categorising HNR (even through qualitative methods) implies an increased demystification and instrumentalisation of our relationship with the rest of the natural world. It involves a process of making notions of human–nature interactions such as wildness, vastness, otherness, and openness into 'benefits' to well-being through description, classification and categorisation. What is more, these (qualitative) notions too become manageable resources for policy objectives, leaving nothing for the unknown and nothing outside the scope of 'contributions' to our wellbeing.

The concern is that this development, of incorporating all aspects of HNR into an ES framing, imposes systems of quantification and rationalisation of how to understand relations with the natural world that people, in turn, adopt into their own understanding, with aspects left out of the calculation being eroded. As we demonstrate in **paper III**, even though relational value expands the methodologies and ways of understanding HNR within the ES paradigm, it also deliberately signals the separation of intrinsic value from the scope of NCP or ES. The implication is a repositioning of diverse perspectives across the social sciences and humanities that also become interpreted either as intrinsic value unrelated to HNR or as a matter of a *contribution to wellbeing*. If, as we mention in **paper II**, connectedness to nature is to be seen as a foundation for understanding HNR and for encounters with nature, then it seems misinformed to construe connectedness as making a contribution to well-being, which is inevitable when the ES paradigm assumes separation between humans and nature as a starting point for conceptualisation.

The categorisation or 'colonisation' of our understandings and encounters with nature are perhaps more likely to take other routes than through the assessment of 'social value' within ES. In fact, health aspects and the fast-growing field of *mental health benefits* in relation to nature include methodological approaches that are (already) in line with an ES perspective (Bratman et al., 2019). The ES framing (or instrumentalisation) of HNR towards particular ends related to well-being is well aligned with how some fields in psychology and the neurosciences study the impact of environments on well-being. These employ quantitative approaches (e.g. 'Quality of Life' and 'Daily Adjusted Life

Years') that understand human–nature relations in terms of transactions as a 'dose' of exposure and a 'response' of, for example, restorative benefits, which are more easily comparable to monetary indicators (Bratman et al. 2019; Johansson et al. 2019). While this thesis has focused on methodological perspectives that are to some extent incompatible with ES, critical attention should also be paid to the developments involving those fields that are compatible with the ES perspective to begin with. These provide for easy incorporation of a categorical, dichotomous, and linear ('supply and demand') understanding of HNR into the ES paradigm. However, there is also considerable opportunity for inter- and multidisciplinary collaboration between health-related efforts and more qualitative approaches. For example, both the methods and findings in **papers II** and **V** can provide complements to quantitative assessments through an understanding of *why* people experience restorative benefits and how their relations with nature provides for, to cite one example, citizen building.

7. Assessing social values of nature for sustainability?

Assessment efforts within the ES paradigm, and the concepts studied here, rely on the idea that increased measurement and description of values will lead to more sustainable outcomes (MEA 2005; TEEB 2010; Elands et al. 2015, 2018; Pascual et al. 2017). The idea is that generating more precise knowledge of the values of nature through assessments, and incorporating this knowledge into decision-making, will ultimately lead to a more desirable ordering of social-natural relations. Even though the ES concept was developed for sustainability purposes, it has not been conceptualised with regard to specific sustainability principles or criteria, such as justice or ecological integrity (Schröter et al., 2017). The focus is often not on how to manage for sustainability transformations, but on how to measure current or past states (Rau et al., 2018).

The focus on measuring and describing current states of ES and values implies that the difference between *descriptive* and *normative* modes of values is underemphasised when it comes to social values (see Maier and Feest, 2016). The lack of consideration of the difference between normative and descriptive questions of value is demonstrated through the category of relational value (RV), as demonstrated in **paper III.** RV as a values category is supposed to better describe and take into account people's current perceptions and behaviour *as well as* provide answers to the normative question of why and how we should value and protect nature. The problem with this conflation is that there is no reason, in theory, to believe that descriptions of people's current values, perceptions, and preferences with respect to nature reflect *how we should value nature* or, indeed, that they resemble 'sustainable' values. In fact, there is reason to believe that it is the other way round. Current social values are recognised as *indirect* drivers of biodiversity and ecosystem loss (IPBES, 2019). Developing more refined methodologies to more 'accurately' assess these social values will, seen from this perspective, simply give us a more detailed account of what we already know—people in general do not value nature enough.

Moreover, **paper IV** demonstrates how a focus on describing and assessing diverse values of urban nature does not necessarily provide planners and policy-makers with an account that could strengthen the rationale for conservation, maintenance, or

restoration of green areas. Especially in cities in low-and middle-income countries, citizens' interactions and values are not necessarily beneficial or perceived as positive, given that informal green space is often associated with problems of waste, sewage and crime, and formal green space can be difficult to access. Especially in cities with high biodiversity values such as Cape Town, citizens' perceptions, interactions, uses and values of urban nature are not necessarily in line with conservation goals and targets. Recognising current social preferences and values in traditional conservation management approaches is not necessarily useful or sought after.

Even if, as in **paper II** and **V**, participants do express 'high' values or strong feelings of 'connectedness' with nature, we cannot from these descriptive insights (alone) draw normative conclusions about how we should consider the importance of nature in policy and decision-making. The point here is that, despite methodological and conceptual advancements in assessing and integrating social values into policy and management—a focus on descriptive modes of values—we need additional justification for why or how peoples' 'mental states' or preferences, or descriptions of HNR coincide with sustainability goals. We need social criteria that are different from the preferences or values themselves in order to decide what is optimal in terms of scale, fair distribution and efficient allocation in sustainable development (Sagoff 1994; Norton et al. 1998; Costanza 2000). Arguably, the focus on assessing people's stated preferences and values in ES, with its roots in environmental valuation, is an implication of economics, of giving legitimacy to 'consumer sovereignty', and as being tied to the fundamental economic mission of optimally satisfying (fixed and given) preferences (Farber et al., 2002). This is contrary to establishing new social criteria and to focusing on how current values should and can change in order to satisfy these (Norton et al. 1998 Costanza, 2000). A focus on current values, through an 'instrumental assessment paradigm' (Raymond et al., 2014) risks missing an important target for sustainability transformations, of allowing for changing perceptions and adaptations of ways of understanding nature's importance for society, both on the part of stakeholders and institutions. My findings from Cape Town show that a focus on and allowing for changing perceptions, preferences, as well as the 'transformative potential' of urban nature is perceived as important for management of urban nature. Further exploration of 'deliberate' approaches to valuation (Ravenscroft 2019), as well as values change (Masterson et al., 2019; Kendal and Raymond 2019; Eriksson et al., 2019), can contribute to challenging and expanding the focus on descriptive modes of values.

Assessments of social values should not be seen as a descriptive project that aims to aggregate values to present a monistic 'supervalue' of nature. Instead, an important use of assessments of social values within ES should be as a tool for 'inclusiveness' of diverse perspectives (Díaz et al., 2018), which can reveal diverging interests of different social groups within given places, as we conclude in **Paper V**. The role and usefulness of social assessments of ES also depend on what type of representation is sought in policy (Raymond et al., 2014). It is important to clarify if applications of assessments are

intended to be, for instance, statistical representation of individuals' use and preferences, or if the goal, more in line with creating 'legitimacy', and the effective involvement of all stakeholders.

Consideration of social values of ES is important for urban planning and management, as demonstrated in **Paper IV.** However, the findings of this thesis show that the *form* in which values are to be presented to policy and decision-making is uncertain. Both values in descriptive and normative terms are here important. The drive for interdisciplinary engagement has led to a conceptualisation and operationalisation of social values in relation to ES in terms of a multitude of scholarly perspectives of worldviews, preferences, perceptions, beliefs, ethical standpoints, attitudes, visions and behaviour. A central question here is, if engagement with different theoretical terms representing 'value' muddles more straightforward and constructive understandings of the links between wellbeing and ecosystems. What more constructive understandings entail, and who is to decide, is however uncertain. As a way to outline more refined conceptualisations we can, instead of starting from definite positions of 'what values are', focus on what we want the 'placeholder' of value to represent within ES, and what 'job' it is supposed to do.

Moreover, it is critical to examine the conditions under which social science researchers are involved in interdisciplinary ES efforts, as **Paper I** shows. They are increasingly conforming their disciplines and approaches to economic frames, such as fitting understandings of HNR into the framing of value (**Paper III**), in order to be given a political voice in the biodiversity agenda.

The form in which values are to be described, made known, and integrated into policy depends not only on scientific conceptualisations or accurate measurements, but of wider societal relevance. It is clear, with the current transdisciplinary efforts of IPBES, that a focus on *legitimacy* of knowledge (Cash et al., 2002), through stakeholder participation, is becoming increasingly important within the ES paradigm. When it comes to the inclusion of diverse perspectives, there are limits to what concepts and frameworks can do (**paper V**). There is a trade-off between inclusiveness of perspectives on the one hand and robustness and practical usefulness on the other. Moreover, concepts cannot on their own ensure democratic participation and legitimacy. Additional criteria are needed to establish legitimate processes of knowledge inclusion. To what extent concepts and assessment methods can integrate for example qualitative knowledge into decision-making depends also on if institutions are susceptible to such forms of knowledge. There is no conceptual 'fix' to the problems of knowledge integration. Nonetheless, concepts and frameworks can here play a role in helping to facilitate the transdisciplinary process through outlining directions, and in providing for efficient communication across boundaries.

This thesis is testament to how values and assessments methods are diversifying beyond utilitarian conceptions within the ES paradigm to include also the qualitative social

sciences and humanities. Both RV and urban BCD are useful concepts in that they can help the ES paradigm to come to terms with its economic past. They include conceptualisations and methodologies that stand in contrast to, and challenge, some of the permeating economic ideas. However, this thesis also shows that, despite conceptual reframing and development within the ES paradigm, conflicting ontological and epistemological perspectives persist, in particular regarding how to view people's relationships with nature or the benefits they derive from 'it'. Understanding and studying HNR as particular and place-based knowledge can be incompatible with abstract systems of categorisation and generalisation. This echoes long-standing philosophical differences between scholarly disciplines, such as how an understanding of the lived experience has little do with 'rationality'. This brings challenges concerning how to account for HNR through a 'context-specific' perspective (Díaz et al., 2018) within ES assessments. There is need for further exploration and research on how to combine and integrate these dimensions.

Importantly, the choices of concepts, assessment methods, and levels of generalisability to study HNR in relation to ES is not only a question of accurate measurement or description, it is also about justice and 'ontological politics' (Blaser, 2012), it involves asking whose worldview is represented and reproduced. Here, the role of descriptive knowledge is crucial. As this thesis shows, qualitative in-depth investigations can be 'subversive' through representing alternative narratives (**papers II, IV** and **V**). In this sense, this thesis contributes to 'politicising' the understanding of how to conceptualise HNR in relation to ES.

The successive expansion to include the wider social sciences and humanities in the realm of ES science comes at the loss of a neat way of dealing with values as indicators that allow for clear trade-offs between choices in decision making. Knowledge of the importance of nature for people should not be disregarded on the grounds that it is not compatible with cost-benefit analysis. Alternative representations of HNR that are not easily 'domesticated' or seem fundamentally impossible to be incorporated into abstract systems of accounting and rationality can challenge existing hegemony and allow for new paradigms to emerge. Much of the critique associated with the ES concept, in that it makes way for commodification and reductionist representations of nature, concerns precisely how it fits *all too well* into larger structures of quantification, accounting and cost-benefit analysis. This signals that we need concepts that do not align with the realms of economics so easily. The social sciences and humanities play crucial roles here in representing the unruly, unquantifiable, and to provide perspectives that make situated and marginalised knowledge heard.

Efforts to conceptualise and assess the ways that nature matters to people is in a way a contradictory endeavour, since the fundamental importance of how people relate to and depend on nature is immeasurable and infinite. The ES assessment paradigm implies a lens of measurement, quantification and description of HNR that is now

difficult to 'unsee'. This poses challenges to conceptualising, assessing, and including values of nature in decision-making without reducing their meaning and representations. I have presented different ways of understanding values of nature, and some of the stakes involved in this dilemma. I hope these insights contribute to the further development of approaches that take into account diverse ways of understanding human-nature relationships, while recognising nature's potential to sustain our values.

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