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Conceptualising Ecosystem Services and Implications for Human Nature Relations

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Abstract

This thesis provides a trajectory over the concept of ecosystem services and discusses possible implications the concept of ecosystem services might entail for human-nature relations. Through a literature review, the thesis traces the concept's historical origins and how it has developed since second half of the 1900´s and become mainstreamed into present day society. The thesis discerns two discursive themes; i) ecosystem services as an instrumental link between nature and society, and ii) commodification of nature within the concept of ecosystem services. Through the discursive themes, the thesis discusses how the concept provides a simplified view of the complexity inherent in nature, and argues that the current application of the concept poses a risk of excluding values that do not fit the economic setting. There are also indications of nature being viewed as a machine with substitutable parts, especially regarding commodification and substitutability within nature. Although still debated, the language of economics makes possible a translation of nature's values to a wider audience than traditional conservation. The thesis also argues that the urban lifestyle of humans with a changing relation to nature creates a need to invent concepts like ecosystem services that better capture our "modern" instrumental relation towards nature. Ecosystem services can thus be seen as an instrumental link between humans and nature that is compatible with the economic language of society at large.

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1. Introduction

How we talk about and describe nature, have implications on the way we approach and interact with nature. If we for example see nature as a service provider that contributes to our economy in instrumental terms, it will have implications on how we interact with nature and what decisions we make in relation to nature. If we instead see nature as something that is central to our lives, our culture, our spiritual fulfilment and so forth, our approach towards nature will be different. The common way of talking about and framing nature has changed throughout history, and subsequently our interaction with it. Areas that earlier were referred to as for example swamps unfit for cultivation are now called wetlands that need protection due to its rich fauna (c.f. Dryzek, 2013; Sandström & Olsson, 2012). Another example of change in language is from the European colonization of North America where the explorers referred to a resource frontier that needed to be tamed, which are now called great wilderness areas that is under protection. Whales were once talked about as resources that produced oil, food and other products, and were hunted to great lengths in order to derive these benefits. Today whales are seen as sentient beings that should be able to live in harmony without human interference (Dryzek, 2013). In essence, we change our language and our approach to nature, which makes it important to investigate how language is used and has changed, in order to discuss possible future implications for human-nature relations.

The amount of wildlife in the world has declined by 50 percent since 1970 and humanity is through its global economic system continuously destroying the very habitat we are dependent upon (Marks, 2015; Gómez-Baggethun & Ruiz-Pérez, 2011). The human impact on species extinction is now surpassing that of natural processes, making researchers view this period as the beginning of the sixth extinction, in line and equivalent to the previous five extinctions in Earth's history (Marks, 2015; Ceballos et al., 2017; IPBES, 2018a). One way of trying to make nature "stand up" to this global force of economic development is by updating our relation towards nature via the concept of ecosystem services. Ecosystem services is generally explained as a concept providing the ability to assess what services ecosystems provide to human well-being. The services we receive from nature can via this concept be assessed and valued within societal development, basically bringing nature inside the system of socio-economics (Daily, 1997; MA, 2005). The concept of ecosystem services is a way to display humanity's dependence on nature and to provide the ability to systematize and value all the services we neglect or currently get "for free" by ecosystems (ibid).

The concept ecosystem services is widely used, generating roughly 77 million hits on Google and 2 million hits on Google Scholar. It has been developed through the years since the 1980's and in the late 1990's the concept gained popularity outside of

academia. The first systematized guidelines and framework for ecosystem services was developed in 2005 by the United Nations in the Millennium Ecosystem Assessment (MA), a collaboration with more than 1300 scientists (Chaudhary et al., 2015). This study concluded that the world is facing some great challenges regarding society's impact on nature, particularly challenges related to biodiversity loss and ecological degradation. Since the MA, the concept of ecosystem services has been further developed within the research community in parallel with inter-governmental collaborations and the concept has been adopted by governments and organisations worldwide.

Even though the concept has been in development for quite some time and been adopted throughout the world, it is criticized for applying a too instrumental and simplistic approach to nature in general, and for not being able to capture the complexity of ecosystems (Norgaard, 2010; Schröter et al., 2014). The application of the concept has also been criticized for implicitly imposing economical rules and values on nature, and for the lack of not being able to include non-material values or services (such as cultural and spiritual values) (Schröter et al., 2014; Jax et al., 2012). There have been responses to this critique. One example is the intergovernmental platform IPBES in 2018, where they presented the concept Nature's contribution to people (NCP) in an attempt to replace the concept ecosystem services in order to encompass non-material values to an increasing extent.

Purpose

The purpose of this thesis is to investigate the development of the concept ecosystem services, and to discuss what this development may entail for human-nature relations. More specifically, this thesis seeks to answer the following research questions:

1. How has the concept of ecosystem services developed, reproduced and manifested itself in society over time?

2. What meanings are ascribed to the concept of ecosystem services and what central discursive themes can be identified?

3. What implications on human-nature relations might the concept of ecosystem services lead to?

2. Methodology

In order to investigate the development of the concept ecosystem services I have conducted a literature study on selected articles generated from Google Scholar. The literature selection was done through identifying key works on ecosystem services based on relevance and citations. The relevance helped to limit the number of articles. This is because the article need to relate either to the development of the concept ecosystem services, meanings ascribed to the concept, or to notions of human-nature relations surrounding the concept. I also based the selection on number of citations, but since this approach also will yield articles which are not relevant, this became a secondary selective tool. In order to address how the concept has reproduced and manifested itself in society over time, I have reviewed key works such as Westman (1977), Costanza & Daly (1992), Daily (1997), Costanza et al. (1997) and Costanza, (2017). From these key works, it was possible to identify further relevant articles and works, mixing academic and non-academic literature (e.g. institutional impacts such as the Millennium ecosystem assessment from 2005 and IPBES Nature's contribution to people from 2018). Altogether, these works provided an understanding of how the concept of ecosystem services has emerged, how different meanings ascribed to the concept has developed and how the concept has reproduced and manifested itself in society over time.

The risk regarding this methodology is that I as the author ultimately decide what articles and works I deemed to be relevant. There are vast amounts of literature on ecosystem services available, and I picked a fraction of those to be explored in this

thesis. My own experience and bias risks neglecting literature that perhaps could have been relevant.

Based on this literature review, I constructed a historical overview of the trajectory of the concept. In order to explore the meanings ascribed to the concept of ecosystem services, I have analysed key definitions and the reasoning behind various definitions of ecosystem services. The three most prominent works being the Millennium ecosystem assessment from 2005 initiated by the UN, Gretchen Daily's definition and reasoning from 1997 in the book *Nature's services: societal dependence on natural ecosystems*, and the article by Robert Costanza et al. from 1997 which is the first assessment of the monetary value of the world's ecosystem services. Based on the literature review and my analysis on what meanings are ascribed to the concept of ecosystem services, I identified two discursive themes within the development of ecosystem services; i) *Ecosystem services as an instrumental link between nature and society* and *ii) Ecosystem services as commodification of nature*. The chapter on the discursive themes is inspired by discourse methodology and provides the basis for the discussion regarding implications on human-nature relations.

Jorgensen & Philips (2002) argue that our use of language makes different representations of reality possible, and thereby the choice of language we use to describe something alters the way we think about it. Reality of course exists without language, but it only gains meaning through language or discourse, which is also what is possible to change. How we discuss and write about nature then for example, is directly connected to what course of action we take, which impacts the physical (or real) world. Language and discourse then not only impact the meaning we ascribe something, but also in the end on how we interact with it. How we talk and think about nature impacts the way we interact with nature and subsequently what decisions we make. This is why I chose to use a discourse inspired methodology on the concept of ecosystem services, because the concept of ecosystem services has gained serious momentum beyond the research world. If the norm within nature conservation becomes communicating and calculating nature in terms of ecosystem services and natural capital, it is important to analyse why that is, where it comes from and what it might lead to.

The methodology inspired by discourse is mainly drawn from how Dryzek (2013) approaches discourse when analysing environmental issues and policy. Dryzek defines discourse as "… *a shared way of apprehending the world"* (Dryzek, 2013, p.9). In order to frame the discursive themes, I used the "checklist of elements" provided by Dryzek (2013):

- *Basic entities recognized or constructed*
- *Assumptions about natural relationships*
- *Agents and their motives*
- *Key metaphors and other rhetorical devices*

This checklist made it possible to structure and reveal patterns from the literature review. Basic entities are for example how the ecosystem services concept relate to terms such as *nature*, *economics*, *values*, *society*, *language* etc. Assumptions about natural relationships relate to terms such as e.g. *protection*, *economic internalization*, *rationality*, *instrumentality* etc. The agents and their motives are prominent mostly in the historical trajectory when exploring how the concept is manifested in society via the UN and EU down to national governments. As the discursive themes took shape, I could extract key metaphors and rhetorical devices from the literature, where notions of nature as a "machine" and a structured system is presented as well as nature viewed as a commodity.

In addition to methodology drawn from Dryzek (2013), I have taken inspiration from a theoretical concept derived from Fairclough's approach to discourse, namely the notion of *common-sense*. Common-sense as described by Fairclough (2001) is the notion of phenomena developing into something that can be taken for granted due to its obvious place in society. Common-sense is also what helps us make sense of the world and to simplify our reality, and eventually the common-sense evolves into the notion of ideology. It was perceived meaningful to include the notion of common-sense to the discussion because it creates a basis for a discussion on the common-sense argumentation of implementing the ecosystem service approach. There is an underlying notion that the ecosystem service approach is common-sense; of course we should value nature. This is where ecosystem services as a concept is being criticised for being a somewhat excluding term within environmental issues.

In Dryzek's work, he discerns the discourse of *administrative rationalism*. Administrative rationalism as described by Dryzek (2013) is the notion of compiling scientific expertise in an organized form via bureaucracy. This means that the expert is favoured above the citizen or producer/consumer in a certain domain. The concept of administrative rationalism is a useful tool when discussing the discursive themes that I have identified, as it provided the thesis to discuss notions of justice, ethics, power and

locality, in relation to the concept of ecosystem services (c.f. Sandström 2008). In this thesis, I also discuss these notions in relation to clashing perceptions between the urban and rural, based on differences regarding centralized versus localized knowledge and differences in perception of nature.

3. A historical review of the concept of ecosystem services

This chapter explores the early developments and emerging ideas behind the concept and how it progressed within academia.

3.1 Early developments and first notions

As humanity has progressed, the dependence between humans and nature has developed from simplistic hunter-gatherer relations into global complex socio-ecological systems that now threaten the resilience of the ecological systems on which humanity depend (Marks, 2015). This is apparent when considering biodiversity degradation, which became more obvious in the second half of the 20th century, when the notion of a planet with finite resources was taken as a serious limitation to the economic system (Dryzek, 2013; Marks, 2015). The ecological degradation was so evident at this point in time, that it could be seen with the naked eye, which inspired works like *Silent Spring* by Rachel Carson (1962) and Garret Hardin's *The Tragedy of the Commons* (1968) to be written, which contributed to shape a general awareness and worry about the state of the natural world (Costanza et al., 2017; Marks, 2015). Daily (1997) argues that ideas of human's dependence on the services nature provide can be traced as far back as Plato's descriptions of soil erosion due to unsustainably managed natural resources. However only in the second half of the 1900's ideas of including the dependence on these services into societal development started to emerge.

In 1935, the term *ecosystem* was first used by Tansley (1935) and later by Lindeman (1942) (Braat & de Groot, 2012). The notion that ecosystems provide benefits to human well-being came about in the 1960's and 70's, when a range of publications from the realm of natural sciences was published on the topic (Braat & de Groot, 2012). In the 1970's, the term *nature's services* appeared for the first time in an article in the magazine Science from 1977 by Walter Westman called "*How much are nature's services worth?"* (Costanza et al. 2017). In the 1980's, the concept of ecosystem services emerged, with its first appearance in Ehrlich & Ehrlich's article *Extinction: The Causes and Consequences of the Disappearance of Species* from 1981 (Costanza et al., 2017). There was at this period in time an increase in research regarding ecosystems and how these systems function and depend on one another (Moran, 1990). This systematic thinking of nature could be thought of as a bridge towards seeing the ecosystems as service providers. The early works on ecosystem services had as a main idea to provide interest in nature conservation by viewing nature as something that is useful for people, instead of viewing nature as being something restricting and in need for protection based on romantic or philosophical ideas (Pistorius et al., 2012; Westman, 1977). The systematized view of nature and seeing nature as a contributor to human society in combination with the environmental challenges associated with

economic growth, eventually lead to the development of the discipline ecological economics in the 1990s. Ecological economics continued the work of connecting the functions of ecosystems to services that provide humans with benefits (Braat & de Groot, 2012; Costanza et al., 2017).

Ecological economics mixed the research field of ecology with economics, sprung from the ideas of seeing the limits of economic growth in relation to the ecological limits. The notion of a stock of *natural capital* which needs to be managed in order to reach sustainable development was for example brought up by Costanza & Daly (1992), where they among other things mention the notion of a tax on natural capital depletion. Nature is in this approach depicted as a fixed stock of capital (natural capital) that make up the natural world. Each tree, river, bird etc. is part of this stock of natural capital. Natural capital in turn make up the ecosystems, which then provides human life with an array of services. The stock of natural capital (e.g. each tree, river, bird) needs, according to Costanza & Daly (1992) to be managed in a sustainable way in order not to deplete it, and in order for humanity to continue to derive ecosystem services (Costanza & Daly, 1992). Costanza & Daly (1992) argue that in order to reach sustainability we have to adapt the economics of society to the physical boundaries of ecosystems (Costanza & Daly, 1992).

3.2 Popular academic development

The discipline of ecological economics continued to develop through the 1990's, and in 1997 the book "*Nature's services: societal dependence on natural ecosystems*" by Gretchen Daily et al. was published. This book was written collectively by the leading researchers in ecological economics and can be seen as a cornerstone work with regards to how researchers at the time viewed the limits of the current management of natural resources, and the relationships between society and nature (Costanza et al., 2017). In the book, ecosystem services were defined as; *"Ecosystem services are the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfill human life"* (Daily, 1997, p.3). The book established the ecological basis, providing a systematized view of the concept (Pistorius et al., 2012). The same year, the most recognised article about ecosystem services to date was published in the journal *Nature,* which can be seen as an extension of the aforementioned book. The article, labelled "*The value of the world's ecosystem services and natural capital*" by Costanza et al. (1997), assessed the monetary value of the world's combined ecosystem services. In the article, ecosystem services are defined as "[ecosystem services] …*represent the benefits human populations derive, directly or indirectly, from ecosystem functions*" (Costanza et al., 1997, p.253). The article estimated the value of the world's ecosystem services to be around US$ 33 trillion per year, and this was to be considered a minimum estimate (Costanza et al.,

1997). The article generated criticism both with regard to the factual findings and to the ethics surrounding the monetization of nature. Some criticised the article for estimating a value too low, and others argued that any monetary value ascribed to nature is inadequate, as nature should be considered as invaluable. Others criticised the article for estimating a value which was higher than the global GDP (gross domestic product), which was argued of as an impossibility (Costanza et al., 2017).

Amongst the critique of the article by Costanza et al., the main point of argument from the authors was to make visible how humanity derive benefits from ecosystems through the services, but that the values of these services are neglected in the world of economics and societal development. Essentially arguing that humans derive enormous benefits from the services of ecosystems "for free", because the services are not included within economics. Conveying nature's services in a relatable currency (money) which was possible to translate into the economics of society, generated a great interest in the article and in the concept of ecosystem services. The article received attention beyond academia through magazines, newspapers, radio and TV and other news outlets (Costanza et al. 2017) and initiated a surge of research in the field of ecosystem services. The article has since its publication in 1997 been cited more than 19 000 times (as of June 2018). The news about the monetary valuation of the worlds ecosystem services also spread to the world of policy where the concept started to gain interest among policy-makers in the United Nations (UN) and European Union (EU) among others. The number of released papers using the term "ecosystem services" or "ecological services" has increased exponentially since the late 1990's (Fisher et al., 2008; Chaudhary et al., 2015).

4. Mainstreaming Ecosystem Services

4.1 Paying for ecosystem services – from academia to public policy

After the recognition of the 1997 article and book, the concept of ecosystem services started to travel from academia into the world of policy and successively becoming institutionalized (Gómez-Baggethun et al., 2009). Costa Rica was the first nation to initiate steps towards implementing so called payments for ecosystem services (PES) in 1997 due to the pressing issue of deforestation (Porras et al., 2013). Payments for ecosystem services follow the lines of the "steward earns principle" which means that the one who creates a positive effect or improvement on the environment (in this circumstance an ecosystem service) is rewarded through payments, often by governments (Gómez-Baggethun & Ruiz-Pérez, 2011). The basic logic of PES is that the one who benefits from the improved ecosystem services should pay the steward(s). The programme in Costa Rica focused on four ecosystem services provided by the country's forests; i) capturing and storing carbon, ii) protecting water sources, iii) conserving biodiversity and iv) conserving scenic beauty (Porras et al., 2013). The landlords that managed their forests in a proposed way decided by the government of Costa Rica, were payed 45 US dollars per hectare as compensation (Gómez-Baggethun & Ruiz-Pérez, 2011). According to Porras et al. (2013) the programme has secured around one million hectares of forest since 1997. Although a lot of trees have been protected, it has been difficult to evaluate the extent to which the four ecosystem services that were focused on in the programme were protected as well (ibid). The programme has been successful in the protecting of forests and created new job opportunities, but there has been some critique of the programme being biased towards landowners with large properties and the overall fairness of the programme (ibid). Payments for ecosystem services have however, also been carried out earlier, for example in USA, in the 1930's, in an effort to stop soil erosion and protect farmlands from urban expansion, although the concept ecosystem services didn't exist at the time (Gómez-Baggethun & Ruiz-Pérez, 2011).

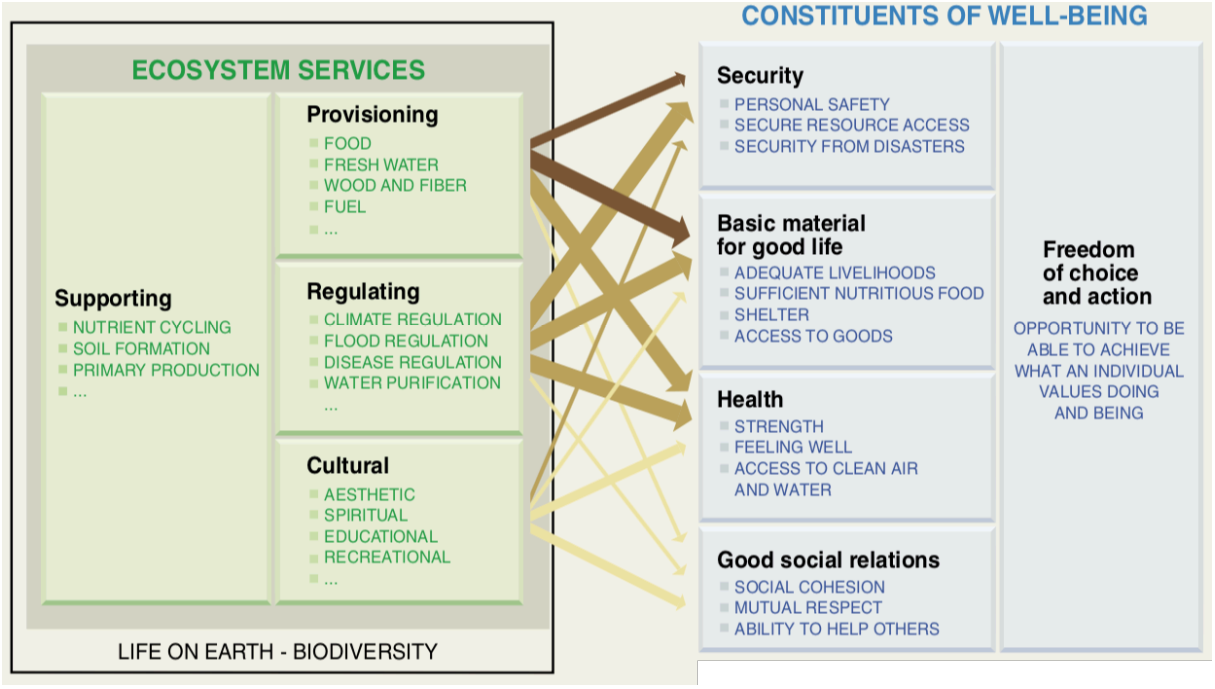
In the year 2000, the Secretary-General Kofi Annan of the UN requested a report (*We the peoples: The role of the United Nations in the 21st Century)* that assessed the world's ecosystems, based on the degradation of nature and a planet in distress. The study was labelled the Millennium Ecosystem Assessment (MA), and had the objectives to assess the connections between ecosystems and human well-being, and to assess the consequences of degradation of ecosystems (MA, 2005). In the MA, ecosystem services were defined as "*the benefits people obtain from ecosystems*" (MA, 2005, p.4). The concept of ecosystem services started to manifest itself within the language of nature conservation with the help of this assessment. More than 1300 scientists from a variety of research fields, institutions and organisations contributed

to the assessment (Chaudhary et al., 2015). The MA was completed in 2005 and had a substantial impact on the prioritization of incorporating ecosystem services within governments, institutions and organisations throughout the world (Pistorius et al., 2012). An important point of departure for the MA was to establish a bridge between society and nature, and to promote science-based policy action. After the MA, ecosystem services as a concept was further developed in research and policy development, and the MA spurred more research in the field and the application of the concept gained increased legitimacy in both academia and in the world of policy making (ibid).

In the MA (2005), ecosystem services were classified into four different categories.

1. **Provisioning:** Food, water, timber, fiber and genetic resources etc.
2. **Regulating:** Regulation of climate, floods, disease, water quality, waste treatment etc.
3. **Cultural:** Recreation, aesthetic enjoyment, spiritual fulfilment etc.
4. **Supporting:** Soil formation, pollination, nutrient cycling etc.

This structured overview of the flows and services of nature is how the MA (2005) communicate the concept ecosystem services. The illustration shows how each of the four types of ecosystem services impacts well-being of people, and to what degree. Thicker lines mean a high degree of impact. For example, *provisioning ecosystem services* such as fresh water, highly impacts the basic material for a good life.



Source: Joel Chorell (2018), altered illustration. Based on original in: MA, 2005, p.6

In 2007, two years after the launch of the MA in 2005, the EU initiated The Economics of Ecosystems and Biodiversity project (TEEB). This initiative was introduced by the G8+5 countries, to explore the financial side of biodiversity loss and to make nature's values visible by assessing costs of biodiversity loss and decline of ecosystem services, with the purpose to assist decision-makers to include ecosystem service valuation when developing policies (Chaudhary et al., 2015). The TEEB can be seen as a further step towards a stronger economical focus on the application of the concept of ecosystem services. The TEEB was divided into three phases. Phase one entailed developing a methodological foundation, including collecting evidence and examples of valuation and constructing frameworks for valuation. Phase two, which was completed in 2010 and consisted of four reports on; i) ecology and economics, ii) the connection to policy-making, iii) local and regional perspectives and iv) the connection to business and enterprise. This second phase contributed significantly to the inherent goal of TEEB of mainstreaming the economics of nature (TEEB, 2018). The third and final phase focused on implementation and action, and specifically targeted at helping developing countries reaching their developmental goals without exhausting their natural resources (European Commission, 2016). The TEEB initiative had a clear focus on the economics aspect of ecosystem services, with the aim of highlighting and mainstreaming the economics of nature into society. The TEEB 2010 synthesis report also includes conclusions and recommendations for governments and policymakers, essentially instructing governments on how to integrate the economics of nature into societal development (ibid).

Other examples of multilateral initiatives aiming at linking the protection of biodiversity with the protection and restoration of ecosystem services are the EU biodiversity strategy 2020, from 2011 initiated by the European commission and the Inter-Governmental Panel on Biodiversity and Ecosystem Services (IPBES) from 2012. The EU strategy focus on biodiversity issues on several fronts with the overall aim to halt the loss of biodiversity and ecosystem services by 2020 and to restore them if possible (European Commission, 2011).

The Inter-Governmental Panel on Biodiversity and Ecosystem Services (IPBES) is another initiative involving more than 100 governments to provide policymakers with synthesized science reports on ecosystem services and biodiversity. The IPBES also aims to provide the tools needed to be able to implement suitable actions and policies regarding ecosystem services and biodiversity (Chaudhary et al., 2015). The IPBES has since its formation grown to 128 member-countries (IPBES, 2018b) and the overall mission is to "*… strengthen knowledge foundations for better policy through science, for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development.*" (IPBES, 2018c). IPBES explain their role similar to what the IPCC (Intergovernmental Panel on Climate Change) does for the global climate, but

their focus is instead on biodiversity and ecosystem services (IPBES, 2018c). Through IPBES together with similar initiatives, Chaudhary et al. (2015) argue that the concept of ecosystem services has become institutionalized and legitimate within the field of nature conservation and policy-making. The concept of ecosystem services is now widely used by most governmental agencies across the globe and has impacted greatly on how governments approach nature conservation and natural resource management.

Since the launch of the MA and the subsequent initiatives of TEEB and IPBES, there have been a number of developments in the ecosystem services agenda which have led to slightly different definitions and classifications. There has, thus, been a need for a harmonized view of ecosystem services, such as the Common International Classification of Ecosystem Services (CICES) initiated by the European Environment Agency (CICES, 2018). The CICES initiative aims to make a common classification and definition of ecosystem services possible. The initiative is not meant to replace other classifications, but to make comparisons between different classifications of ecosystem services easier, especially when making valuations of nature. The first operational version of the CICES classification was released in 2013 and a revised version of the CICES classification was released in 2018 (CICES, 2018).

In 2018 IPBES published an article, *Assessing Nature's Contributions to People* by Díaz et al. (2018), in *Science*. In this article, Díaz et al. (2018) argue that the concept of ecosystem services applies a too narrow and instrumental approach on human-nature relations, which stems from the idea that there is a stock of natural capital which delivers a flow of services to human welfare. According to Díaz et al. (2018) a too narrow and instrumental approach to ecosystem services fails to encompass ideas from social science while at the same time also excluding other values such as e.g. cultural values and different types of knowledge- and context specific perspectives on natural resource management. Regarding local knowledge, Díaz et al. (2018) argue that natural resource management usually takes place where local knowledge of the nature and area already exist, but that kind of knowledge is not prioritized or really considered within assessments of ecosystem services. Díaz et al. (2018) also criticises the concept of ecosystem services for having a too narrow and instrumental approach to for example the "provisioning ecosystem service" food. With the concept of ecosystem services, food is thought of as a service that is provided from ecosystem services that benefits humans in terms of calories that can be measured and counted. But food is much more than calories, it is strongly culturally defined, involving identity formation, tradition etc. None of these and other non-material values are explicitly represented in the concept of ecosystem services according to Díaz et al. (2018), which demonstrate the narrow approach that the concept entail. Therefore, Díaz et al. (2018) suggest a new concept, *Nature's contribution to people* (NCP) to replace the ecosystem

service concept which may open up for a more inclusive system that puts more emphasis on cultural values according to Díaz et al. (2018).

4.2 The mainstreaming of the concept in a Swedish context

The Swedish government was part of the Nagoya conference on biodiversity in 2010 where ecosystem services was one of the focus points (Regeringskansliet, 2017). Since then, the Swedish government has worked to set up 10 goals regarding biodiversity and ecosystem services to be evaluated in 2016 and 2018 (ibid). The development of strategies regarding biodiversity and ecosystem services was considered necessary by the Swedish government in order to reach both some of Sweden's national environmental goals as well as some of the Sustainable development goals (SDG) set up by the UN to be reached by 2030 (ibid).

In light of the progression in the research and debate regarding ecosystem services, the Swedish government carried out a public investigation on ecosystem services in 2013. The aim of the investigation was to assess the knowledge situation surrounding the concept of ecosystem services, methods for valuing ecosystem services and the possibility of integrating ecosystem services in socio-economic decisions (SOU 2013:68).). Parallel to the investigation, the Swedish government decided that the meaning of biodiversity and ecosystem services should be known to the general public by 2018.

The valuation of ecosystem services is described in the public investigation as a difficult thing to do. Particularly the monetary valuation is stated as something potentially problematic when it comes to capturing the complexity of ecosystems as well as the ethical judgements of what values of ecosystems that should be suitable to express in monetary terms (SOU 2013:68). The investigation also notes that in certain situations too many assumptions needs to be made in order to make monetary valuations, which might lead to ill-informed decisions. Due to the complexities and uncertainties, the report emphasises the importance of sharing knowledge regarding ecosystem services and methods for valuation etc. between organisations, companies and institutions. The investigation suggests focusing on democratic and ethical impacts of monetary valuation of ecosystem services, due to the potential irreversible effects that decisions based on this might have (SOU 2013:68). The democratic aspect would also enhance the legitimacy of decisions. These suggestions in the report led to recommendations of better co-operation between sectors and institutions, and to promote stronger institutional capacity regarding the application of ecosystem services. Although the MA and TEEB already had frameworks and classifications etc. put in place, proceeding with caution when it comes to valuating ecosystem services is suggested in the report (SOU:2013:68). However, the importance of society's

dependence on ecosystem services and biodiversity was consistently stated and underscored in the report.

One of the goals set up by the Swedish government regarding ecosystem services and biodiversity was to identify and systematize ecosystem services, the state of ecosystems "well-being" and their value to human welfare and economy (Regeringskansliet, 2017). In 2016, Statistics Sweden (SCB) received the mandate to develop methodologies in valuing ecosystem services and biodiversity. This was completed in 2017, and SCB concluded that more development in research and statistics still is needed in order to guarantee that the valuation of ecosystem services and biodiversity are correct (Regeringskansliet, 2017).

The Swedish Environmental Protection Agency worked in 2014-2016 to integrate the ecosystem service approach to institutions, companies, consultants and other stakeholders. The aim was to provide step-by-step instructions on how to implement ecosystem services as a tool when assessing societal development. The instructions on integrating the ecosystem service approach aimed at providing county administrative boards with knowledge so that they could further educate municipalities which in turn then can use the ecosystem service approach in municipal planning (Regeringskansliet, 2017). There also have been investigations in taxes and subsidies regarding land use and ecosystem services. These taxes or subsidies would potentially be implemented in order to direct landowners to make decisions that promote the protection or restoration of ecosystem services (ibid).

Research on ecosystem services has also been encouraged from the Swedish government. From 2014 to 2016, seven research projects aimed at valuing ecosystem services was granted 29,7 million SEK (Regeringskansliet, 2017). The initial findings of these research projects pointed to the concept of ecosystem services being good to make visible aspects of nature that are not accounted for, especially to make ecosystem services visible in environmental impact assessments and socio-economic analyses.

4.3 From academia and institutions to business-networks

Parallel to the developments of incorporating and mainstreaming the ecosystem service approach into public institutions and policy making, there have been similar developments of networks and organisations within business and industry sectors. Here the focus has been stronger on trying to introduce natural capital accounting, for example through the work of the EU network of Business@Biodiversity. Natural capital accounting is seen as a tool to assess the impact companies have on nature, and to assess how much natural capital they are dependent on, and subsequently also change

their impacts on the degradation of nature (European commission, 2018a). The general aim of the network EU Business@Biodiversity is to assist businesses to integrate natural capital and biodiversity considerations in business practices. The network is supported by the European commission, and the natural capital accounting can be seen as a continuation of the ecosystem service approach to be more focused on economics. The network also aims to build partnerships and synergies between businesses and institutions, and to prevent duplication of work in the field of ecosystem services and natural capital accounting (European commission, 2018b). Some of the partnerships include:

- *Natural capital coalition* which aims at developing a natural capital protocol for businesses, new norms for industry and to include natural capital accounting within businesses.
- *Natural capital finance alliance* which aims to integrate natural capital considerations into the finance and insurance sector, and bring change at the CEO level.
- *OPPLA* which is a marketplace for ecosystem services and natural capital.

4.4 Summary on the development of the concept

The idea of nature providing humanity with services can be traced far back in the history of humanity. However, the first systematized approach to this thinking started to develop after the notion of ecosystems in nature developed. It all starts from the disciplines of ecology and economics, which later merged into ecological economics. Within this discipline, more research went into ecosystem services which created interest from institutions. Via the MA in 2005, the concept started to become institutionalized, spurring on exponentially more research and a confidence in the field (Chaudhary et al., 2015). This in turn led to seeing the potential from more viewpoints than earlier, including also the limits inherited in the concept. This is what later led to a call for a more inclusive all-encompassing approach regarding transdisciplinary approaches including issues that previously were neglected (e.g. power, ethics, justice, local knowledge) and values (non-material, spiritual, cultural, intrinsic). In light of the exponential rise in research in the early 2000s, the concept has been widely established and mainstreamed within environmental policy making. The implementation of the concept despite its argued shortcomings has brought up questions regarding simplifications, differing approaches to the concept and frameworks. The central role of ecosystem services within society and environmental issues could to some extent be attributed to the language that is used to communicate nature's values through the concept of ecosystem services. If it is possible to translate environmental issues and nature conservation to the general societal development in easier terms than before, the impact will be greater. The communicative advantages often also come with a trade-off according to Danley & Widmark (2016), where a more

simplistic approach neglects complexity to a higher degree, and on the other hand a complex approach lose the communicative aspects. The concept of ecosystem services has developed from merely a metaphor or illuminating thought experiment, to local examples in ecosystems initiating the idea of substitution. These systematic and instrumental approaches to nature led to more focus on calculations and monetary value translations arguably leading the concept to a path towards the possibility of commodification within nature. The concept also transformed from the local and regional to tackle global perspectives on ecological issues. Lately the critique against the instrumental focus of the concept has generated notions of more inclusive and broad categories putting culture and non-material values at the core, incorporating areas of social science that before were neglected to a large extent.

5. Discursive themes connected to ecosystem services

Through my literature review on the development of the concept ecosystem services, it is possible to discern two central discursive themes connected to the concept. These themes are:

1. Ecosystem services as an instrumental link between nature and society
2. Ecosystem services as commodification of nature

5.1 Ecosystem services as an instrumental link between nature and society

The original idea of the concept of ecosystem services was to portray the societal dependency on nature, and that nature provides services to human welfare that we derive value from. Ecosystem services has been portrayed as a link between nature and society (MA, 2005) and as a concept that re-connects the relation between nature and society. When valuing ecosystem services, many assumptions needs to be made in order to estimate the values of ecosystem services. These assumptions are what Norgaard (2010) calls a *complexity blinder*, meaning that the concept via its language simplifies nature and human's relation to it, to such a degree that one risks losing the sight of the complexity of ecosystems. The notion of simplifying nature and overlooking for example cultural values has caused some response to the concept ecosystem services, such as the development of the concept NCP (Nature's contribution to people) by IPBES.

Westman (1977) who was the first to write about ecosystem services (although using the term nature's services) states in his article *How Much Are Nature's Services Worth* that the topic of valuing the services of nature is both controversial and illuminating. What can be discerned from his article is an emerging instrumental view of nature, where the concept ecosystem services make nature appear as something useful that provides society with benefits. In order for society to continue to derive these benefits, society need to manage the state and functions of the ecosystems in a sustainable way. The concept of ecosystem services, thus, already from the start was embedded with a new instrumental nature and society view. Later when definitions started to ground themselves in academia and institutional reports, the instrumental view of the concept became more apparent and explicit, particularly when considering the following three definitions mentioned in the historical review earlier;

> "*Ecosystem services are the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfill human life*" (Daily, 1997, p.3)

> "*[ecosystem services] …represent the benefits human populations derive, directly or indirectly, from ecosystem functions*" (Costanza et al., 1997, p.253).
>
> "*the benefits people obtain from ecosystems*" (MA, 2005, p.4)

Ecosystem services are in the above definitions depicted as something that is useful for people and as a cornerstone on which humanity depends. However, the definitions of the concept are still under debate. Danley & Widmark (2016) argue that a simplified definition portrays society's dependence on nature in a clear instrumental way, but it tends to lose the complex edge of nature. The new concept NCP (Nature's contribution to people), developed by IPBES aims to encompass more aspects in its definition:

> *"NCP are all the contributions, both positive and negative, of living nature (diversity of organisms, ecosystems, and their associated ecological and evolutionary processes) to people's quality of life."* (Díaz, et al., 2018, p.270).

Although it seems similar to the definitions of ecosystem services, IPBES elaborates their definition further, but the core change could be seen as replacing the word *services* with *contributions*, and thereby enabling more aspects to be included. The most prominent new aspect of NCP is the focus on culture, which is thought to be the basis for all interaction with nature and thus needs to be reflected in a concept such as this (Díaz, 2018).

Ecosystem services and the language surrounding the concept creates a new way of viewing the relation between society and nature. I will exemplify this new view, by contrasting the concept ecosystem services with the more traditional expression nature conservation. The two expressions differ in that ecosystem services implies a general dependency between nature and society, whereas the expression nature conservation suggests nature as more distanced from society.

The expression "nature conservation" could be argued as sounding negative and something that reminds of constraint. Nature is viewed here as something to be conserved and protected, it proves a restriction for economic development for example. With the language of ecosystem services, this relation or link to society instead becomes the opposite where nature provides society with benefits, and the restriction is instead applied to how society manage these ecosystems that provide the services. This could according to Lele et al. (2013) be due to the language of ecosystem services that is stemming from the world of economics (e.g. the words *services* and *capital*). When portraying nature via this economical language, ecosystem services shifts the view of economic development being bad for nature, to nature being

something good and fundamental for economic development. Westman (1977) starts his article by posing the question of how to capture the value that a poet (William Wordsworth) ascribes to nature in his poems. How does one value the inspiration from nature and in turn the receiver's benefits from that poem? Westman argue in the article that even in the long run, it is not likely that quantitative measurements of nature will be compatible with these kinds of values. This suggests that there are aspects of nature he deemed suitable for calculation and quantification, but that all the values we derive from nature are not possible to express in instrumental terms. This echoes to more recent work done by for example IPBES regarding the non-material values humans derive from nature (Díaz et al., 2018).

Erlich & Mooney (1983) introduce in their article *Extinction, Substitution and Ecosystem Services* the concept of "living substitutions" when writing about ecosystem services (Erlich & Mooney, 1983). Substitution is a term stemming from economics that describe the relationship of goods where one good can replace (substitute) another if it contains the same properties and function, for example aluminium for plastics (Tilton, 1984). What Erlich & Mooney (1983) is saying, is that the extinction of one species could theoretically be substituted by another species that function in a similar way, thus preserving the same ecosystem services but with a different species. This illuminate two points; i) their article seems to be influenced by the thought patters of neoclassical economic theory, which translates to an instrumental approach to nature, ii) species extinction at the time was such an unavoidable occurrence that the solutions did not seem to revolve around saving or protecting species and biodiversity, but substituting them with something else. In the article, Erlich and Mooney (1983) state that "*humanity has been gambling with its future by saving fewer and fewer of the parts"* (pp. 252), referring to species in ecosystems. This language underscores the tone of the article, that portrays nature as a machine with instrumental parts and pieces that can be substituted to fulfil certain functions. The article also restricts ecosystem services to physical changes in ecosystems. Non-material services such as culture are not mentioned in the article, instead focus is placed on the physical aspects of nature. The notion of substitution within nature has continued to modern thoughts of ecosystem services, where some of the more "simplistic" services such as flood protection or noise protection are thought to be technologically substituted. The article by Erlich & Mooney is one example of how our use of language change the way we think about nature, which in the end impacts how we interact with it.

The business approach to ecosystem services through e.g. TEEB, Business@Biodiversity and other constellations portrays in their work a standardized and instrumental view of nature. TEEB, for example, express their structured approach on how to reach their goals as follows:

"*… following a structured approach to valuation that helps decision-makers recognize the wide range of benefits provided by ecosystems and biodiversity, demonstrate their values in economic terms and, where appropriate, suggest how to capture those values in decision-making*." (TEEB, 2018b, p.1)

It is also easier for companies and institutions to relate or make sense of the language that is used in ecosystem services (e.g. capital, services, stock of flows) rather than conventional conservation. This is argued by Lele et al. (2013), where they discuss the language surrounding ecosystem services, and more particularly the words *services* and *capital,* which are taken from the world of economics and imposed on nature. By using this "translation", ecologists can communicate with economists in a more efficient way. The application of words stemming from economics may, however, have repercussions on the way ecologists think about nature, with the implication that ecologists might adopt an economical way of thinking. Economic development and conservation of nature could be argued as dichotomies, as mentioned earlier, but through this shift of language, the tone of the debate changes to how conservation and the value of nature is not seen as a problem for development, but rather as a prerequisite. One way to exemplify this is by contrasting the economic value of a wetland's ability to retain water and prevent excessive flooding, versus a housing project on the same wetland. The housing project would create monetary revenue and social benefits for people, but at the same time limit the previous benefits provided by the wetland. This creates a basis for analysis of benefits provided by the two possible options. The benefits of the housing project in this example could perhaps not be justified when compared to the potential damages (of removing the wetland) created by flooding for example. The discussion regarding this example illuminates the shift of discourse for the wetland being a restriction for the housing project, to the wetland containing lots of benefits that the housing project cannot outweigh.

5.2 Ecosystem services as commodification of nature

Commodification is a concept that describes the notion of non-marketed goods being transformed into tradable units, and thereby changing the relationship towards this new good (Gómez-Baggethun & Ruiz-Pérez, 2011). One could make the argument that the commodification process of nature within ecosystem services started in the early days of the concept's development with e.g. Erlich & Mooney (1983) describing nature as made up of substitutable components. At the time, there was little indication of payments for ecosystem services (PES) or other market-based methods in relation to ecosystem services. Through the systematic and instrumental approach to nature developed by Erlich and Mooney (1983), the concept successively became drawn into the economic theory of pricing. Linking the concept ecosystem services with the

concept of natural capital paved the way to the payments for ecosystem service approach. In Costanza & Daly article "*Natural capital and sustainable development"* from 1992, nature is described as "*a stock that yields a flow of valuable goods or services into the future"* (Costanza & Daly, 1992, p.38). Costanza & Daly (1992) argue that seeing nature as a form of capital, and implementing accounting to that natural capital is vital for achieving sustainability. The ideas of portraying nature as a flow of natural capital and introducing accounting with regards to ecosystem services was further developed in the aforementioned article by Costanza et. al (1997) titled *The value of the worlds ecosystem services and natural capital.* This article can be considered as a threshold for the development of the commodifying aspect of nature that opened up for more work in pricing ecosystem services. The notion of pricing different ecosystem services paved the way to the payment for ecosystem services and ideas of creating new markets for ecosystem services, such as e.g. markets for carbons sequestration through e.g. the UN initiated REDD (Reducing Emissions from Deforestation and Forest Degradation) program where voluntary or fictive markets for carbon sequestration are implemented in order to promote action towards protecting ecosystem services within forestry (International Financial Corporation, 2016).

One of the main methods when it comes to valuing certain ecosystem services is the notion of "willingness to pay" (WTP) (Costanza et al., 1997). This method entails surveying people's willingness to pay for a certain ecosystem service to continue producing its services (including immaterial services such as cultural or spiritual values). WTP is also used in the article by Costanza et al. from 1997, where the monetary value of the world's ecosystem services is assessed. As an example when assessing aesthetic value from forest, they write "*… if the forest offered none-marketed, aesthetic, existence, and conservation values of $70, those receiving this non-market benefit should be willing to pay up to $70 for it."* (Costanza et al., 1997, p.255).

Although there exist different ways of approaching nature via the concept of ecosystem services, there is an economical basis beneath. The idea behind imposing economic frameworks and to some extent markets onto the world of nature, is to be able to include nature and ecosystem services in decision-making. The so-called market failure of not being able to include the value of nature has been argued as being the main contributor to ecological degradation (Kallis et al., 2013; Gómez-Baggethun & Ruiz-Pérez, 2011). By including nature inside the economic system and thus society, ecosystems and their different services become transformed from subjective values to liable economic values. When discussing the issues of commodification of nature, Gómez-Baggethun & Ruiz-Pérez (2011) argue that commodification neglects the complexity of nature and its ecosystems, and that it "... *is manifested by the masking of critical processes underlying the production of*

*ecosystem services behind the homogeneity of monetary figures, thereby transforming a symbolic value into an objective and quantifiable relationship." (*Gómez-Baggethun & Ruiz-Pérez, 2011, p.621). The language of economics transforms nature on the whole to an accountable economically sensible or rational thing within the ecosystem service approach. The economical language provides for example the ability to compare and value nature against other interests in societal development or policy-making. The alternative, which would be not to value nature in economic terms, appears as the less rational option and would mean that nature simply never would be able to compete with other interests in societal development (Kallis et al., 2013).

The underlying intent with the development of the concept ecosystem services could be argued as creating a ground for internalizing so called externalities that are not yet valued within the present day economic system. A piece of forest is generally valued for its timber content, but there are several other values that are neglected such as people's relation to the forest, erosion protection, storm protection, identities, historical aspects, memories, beauty etc. The emergence of e.g. TEEB, which key aim is to mainstream the economics of nature, created an institutional roadmap for the economics and commodification of nature to be possible to reach governments and institutions. Undertakings such as the MA and TEEB provides both legitimacy and pressure from above, which influence policy-makers to prioritise in directions that are based on the economics of nature.

Farley (2012) argues that one should consider the risks inherent in creating market-based approaches to ecosystem services particularly regarding issues related to injustice. According to Farley (2012) markets generally respond to purchasing power, which in turn means that wealthy people's preferences will present themselves in large numbers within the market while poor people's preferences are essentially ignored. This certainly comes into play when considering the WTP-method for estimating values on ecosystem services. Worst case scenario could be that wealthy people ultimately decide on what ecosystem services are of importance, since they possess the purchasing power. Farley 2012 does however say that "*many conventional economists do use the concept of ecosystem services in their efforts to commodify nature, but this is a function of the discipline, not the concept."* (Farley, 2012, p.48), indicating that the concept itself allow for the possibility for commodification of nature, but it is dependent on the discipline or user.

6. Discussion on implications for human-nature relations

Humanity in the second half of the 20th century became aware of the planetary limits, and economics seemed to be the rational method of assessing how much pressure humanity could afford to put on the planet. Nature needed to be included in the web of economical rules in order for it to be saved. The problem seemed not to be that the economic system had been *too* involved in creating the ecological degradation, but that economics wasn't involved enough. The notion of including nature into economics correlates with the time when ecological economics began to emerge in the late 1980's, where the trust to the financial markets was quite high (Guerry et al., 2015).

Nature could via the ecosystem service approach be considered as a machine, something that is possible to move and shift around, change parts and so on. The notion of substitutability can be seen as a starting-point for this line of thinking, where functions of ecosystems or species in ecosystems theoretically could be substituted, either technologically or with other species. This sort of thinking might develop a simplistic relation to the complexity of nature and its ecosystems, basically losing many values and aspects. A simplistic and instrumental relation to nature is apparent when looking at some of the examples presented in previous chapters regarding food and old trees. Food could either be seen as a quantifiable measurement of calories that sustain human life, or it is seen as something part of human culture, identity, locality, spirituality etc. An old tree in a garden could either be viewed as a quantifiable instrument for carbon sequestration or timber production, or it is can be seen as a perception of time, memories, spirituality, culture etc. There is a huge discrepancy between these views, and they are informed by two very different approaches to human-nature relations. If the instrumental view (in the extreme cases presented here) is the favoured relation to nature, then we risk neglecting views that are important to us.

The ethical aspect of valuating of nature is, however, under critique. People object to the notion of putting a monetary value on things that contain intrinsic values. Lele et al. (2013) argue that the critique is not just about that the economic valuation of nature is too low, but that it is done at all. This was also noted within the critique of the 1997 article by Costanza et. al, where the utilitarian approach to nature and the uncertainties etc. was criticized alongside the general notion of putting a price on nature (Costanza et al., 2017). The sensitivity of e.g. putting a price on nature also shows the importance of considering the diverse human-nature relations that exist, and how these relations will be affected by different directions of development and methods surrounding ecosystem services. Different directions could open up for more inclusive perceptions of the concept (such as IPBES approach with Nature's

contribution to people (NCP)), or aiming for the direction leading to more instrumental, simplistic ideas.

As our relation to nature changes (becomes more distant to nature), we invent concepts like ecosystem services that frames the dependency and relation to nature in instrumental and economic terms. This framing makes the relation to nature compatible with the modern way of living, which could be argued as distanced from our impact and dependency on nature. Especially considering that the people of the world are urbanizing at a fast rate (The World Bank, 2018). There are however many people still living close to nature and living directly off it, which could lead to a clash between groups such as the urban and rural. Especially considering urban people tending to value nature intrinsically (nature should be saved for nature's sake, or how nature ought to be) whereas rural people tend to value nature for its ability to provide income and livelihood (Berenguer et al., 2005). Central experts deciding what ecosystem services are locally worth saving or supporting, could provide an example of a potential clash between urban and rural. One possible explanation to the potential clash could be the concept of ecosystem services being an indication of the urban imposing itself on local management and relations to nature in rural areas. This is directly relatable to Dryzek's (2013) explanation of administrative rationalism; that centralized expertize is favoured above the general citizen. Thus in this example, urban expertize imposing itself on the rural (perhaps local specific knowledge), creating tension and differences of opinion regarding nature. The concept ecosystem services could in this way entail a risk, however, the concept might at the same time provide people (especially in an urban context) with an understanding about considering nature as something vital to their well-being. This potential understanding might point to the concept being a necessary tool for establishing the importance of nature to the modern human.

According to Fairclough (2001), a so called standard language is necessary in order to reach unification within a discourse. This standard language eventually leads to better communication and people understanding the standard language. Through time and development of a discourse, what Fairclough (2001) call the "common-sense" will start to appear. This can be linked to our everyday lives, where we constantly try to make sense of the world, and when we manage to do so, it becomes the common-sense. It is something that automatically makes sense to us, because it is unified through discourse. I argue that the same phenomenon of common-sense can be discerned from studying the development of the concept of ecosystem services. There is an underlying approach within the concept of ecosystem services, which stems from the notion that it is irrational not to advocate the concept ecosystem services. It is irrational not to value all the services we receive from nature, and it is hard to disagree with this argument. The ecosystem service approach has in a way become the

standardized way of talking about environmental issues. The standard language stemming from economics including natural capital, services, stock and flows etc. could be seen as an exemplification of this standard language within the discourse. In Kallis et al. (2013), article entitled "*To value or not to value? That is not the question"*, the authors agree that there are dilemmas with the concept of ecosystem services that need to be further explored, particularly when it comes to monetary valuation. However, the authors argue that it makes no sense from any standpoint in not valuing nature where suitable. It is common-sense; of course we should value ecosystem services, because if we don't value them we will continue to neglect them is their main line of argumentation. The question instead becomes how to value, what to value in what way etc. The overall notion of the standard language and common-sense within the discourse of ecosystem services might generate a framing of nature that excludes other ways of interpreting and communicating nature.

The language used within ecosystem services which stems from economics could entail that people who are not otherwise engaged in environmental issues can contribute to and understand environmental issues. This might be one explanation to what makes ecosystem services as a concept popular; its ability to translate values of nature into values of economics – from one discourse to another by using the same standard language. The concept of ecosystem services could in this way help broaden the range of people who are "entitled to" dealing with and understanding environmental issues. The concept of ecosystem services could in this line of thinking also help to broaden the range of responsibility regarding environmental issues and impacts. The EU initiative of Business@Biodiversity could be an example of this. If ecosystem services become norm in the world of business, natural capital accounting and similar methods will be available to companies for evaluating their impact on the environment. If natural capital accounting is norm and a possibility within business, it will force companies to expand their responsibilities outside of company economics, and bring nature into the economic spreadsheets. People opposing nature conservation might be persuaded by the new set of arguments found in the ecosystem service approach. The notion of protecting or valuing nature being good for societal development, and better yet as Gómez-Baggethun & Ruiz-Pérez (2011) argue, stressing the individual's benefits from nature could create a new way to convince nature's importance. The shift from seeing nature as restrictive to nature as a service-provider for your benefit might provide more understanding.

7. Conclusions

The purpose of this thesis was to investigate the development of the concept ecosystem services, and to discuss what this development may entail for human-nature relations. The thesis shows that the concept of ecosystem services developed within academia in order to structure and be able to value nature inside an economic setting. Ecosystem services as a concept later travelled from academia to institutions and inter-governmental collaborations, and finally mainstreamed to local municipalities and society at large. The concept has through large scale institutional impacts such as the MA in 2005 later been transformed into a so-called buzz-word.

The mainstreaming and popularity of the concept ecosystem services is argued in this thesis due largely to the language surrounding the concept. The language entails a possibility to in instrumental and clear terms describe society's dependency on nature, and further build frameworks to illustrate and convey this notion. An important factor to consider regarding the language surrounding the concept ecosystem services, is that it stems from economics. This is arguably one important piece in what makes the concept suitable for implementation in societal development, because it is possible to translate the values of nature into socio-economics. Regarding the valuation, there are controversial aspects surround the concept, mainly where nature is priced with a monetary value. This is partly due to the insecurities of valuation, the lack of working methods (how to value immaterial values, e.g. the inspiration an author receives from nature), but also ethical aspects inherent in pricing nature.

Furthermore, this thesis reveals two discursive themes within the development of the concept ecosystem services. Through these themes I argue that the concept of ecosystem services has been developed as an instrumental link between nature and society, and that the concept opens up for issues regarding commodification of nature.

The instrumental link and commodification of nature risks developing a simplistic view of nature. This is because nature is "condensed" down to categories, in order to be easily calculated. In relation to this simplistic view, I explore the notion of ecosystem services being a way of approaching nature as a machine with removable and replaceable parts. The idea of substitutability in ecosystems is one example of this where theoretically one species could replace another if it contains the same function in an ecosystem. More consequences of the instrumental relation I argue, is that the concept of ecosystem services, despite its effort to be all-encompassing, still might neglect notions of culture, identity and locality etc. within nature. These immaterial values which are hard to place inside an instrumental framework often get overlooked.

Furthermore, the modern (often urbanized) way of living, tend to change our relation to nature which might explain how we invent concepts like ecosystem services that better capture our relation to nature. The economical language of ecosystem services creates an approach to nature based on an instrumental or utilitarian standpoint, making visible parts and pieces of nature and assessing how nature contributes to societal development and the economy. This modern view of nature might be efficient in communication, but if this way of viewing nature also is based on the simplicity explained earlier, we once again might neglect many values that are important to us. However, the language of economics also makes it possible for the concept to reach a greater audience, thus linking nature to the modern human. This link could be a way of making more people understand and become entitled to environmental issues. Furthermore, a relation to nature which is based on knowledge of the dependence between nature and society could be re-established. This is possibly due to the notion of communicating nature not in terms of a restrictive conservation, but as the basis for individual benefits as well as the pillars of societal development.

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