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Does nature have a value?

A Qualitative Study to Pinpoint Incentives for Implementing Valuation of Ecosystem Services

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Abstract

There is a growing consensus worldwide that human economies and human well-being rely on ecosystem services. The Economics of Ecosystem Services and Biodiversity [TEEB], a global initiative launched in 2007 as a response to a proposal by the G8 ministers, have suggested a five-step approach to improved stewardship of ecosystem services.

Applying these steps as a basis, the objective of this thesis is to pinpoint what incentives are needed for various actors in society to incorporate the value of ecosystem services in their decision-making. The purpose is to investigate if current incentives are triggering actors sufficiently so they recognize the true value of nature. If the current incentives does not fulfill their purpose, what are the obstacles, and how can one ensure that society recognizes the value? The focus of the analysis is put on policy makers and various governing bodies. The importance of individuals and private actors will also be investigated, as they are all significant in the process of incorporating the true value of nature and ensuring sustainable development.

Qualitative method is applied to investigate the perceptions and experiences of experts working in various fields within sustainable development and environmental economics. Interviews with four selected respondents is conducted. The analysis of the responses may supplement or expand our understanding of incentive theory.

The study discovers that the opinions on ecosystem services valuation differ. Some respondents believe it to be more widespread than others, while some believe small-scale implementation is the way to go rather that large-scale. Several agree that incentives for policy-makers encourage short-term thinking, which is not always a good match when dealing with complex issues such as environmental degradation. Suggestions are made to certain areas as to where obstacles can be met and overcome, such as increasing transparency, challenging misconceptions and seizing windows of opportunity.

Contents

CONTENTS **4**

1. INTRODUCTION **7**

1.1 BACKGROUND 7
1.2 LITERATURE REVIEW 9
1.3 OBJECTIVE 11

2. INCENTIVE THEORY **13**

2.1 MATERIAL INCENTIVES 13
2.2 SOLIDARY INCENTIVES 14
2.3 PURPOSIVE INCENTIVES 14
2.4 NATURAL AND COERCIVE INCENTIVES 14

3. METHODOLOGY **16**

3.1 INTRODUCTION 16
3.2 RESEARCH QUESTION 16
3.3 OBJECTIVE 16
3.4 SAMPLE DESCRIPTION 17
3.5 CRITIQUE 17

4. REFORMING SUBSIDIES **19**

4.1 INTRODUCTION 19
4.2 DEFINITIONS AND ASSUMPTIONS 19
4.3 ENVIRONMENTALLY HARMFUL SUBSIDIES 19
4.4 SUBSIDY REFORM IN POLITICAL ECONOMIC THEORY 21
4.5 SUBSIDY REFORM IN INCENTIVE THEORY 23

5. ADDRESSING LOSSES THROUGH REGULATION AND PRICING **27**

5.1 INTRODUCTION 27
5.2 DEFINITIONS AND ASSUMPTIONS 27
5.3 GUIDELINES TO ADDRESSING LOSSES 28
5.4 REGULATORY OPTIONS 31
5.5 PRICING OPTIONS 32
5.6 REGULATION AND PRICING IN POLITICAL ECONOMIC THEORY 35
5.7 REGULATION AND PRICING IN INCENTIVE THEORY 36

6. REWARDING BENEFITS THROUGH PAYMENTS AND MARKETS **40**

6.1 INTRODUCTION 40
6.2 DEFINITIONS AND ASSUMPTIONS 40
6.3 PAYMENT FOR ECOSYSTEM SERVICES 41

6.4 Rewarding Benefits in Political Economic Theory 47
6.5 Rewarding Benefits in Incentive Theory 47

7. INVESTING IN ECOLOGICAL INFRASTRUCTURE 50

7.1 Introduction 50
7.2 Definitions and Assumptions 50
7.3 Maintenance, Restoration and Rehabilitation 51
7.4 Initiatives and Costs 52
7.5 Innovative Options 53
7.6 Investments in Political Economic Theory 55
7.7 Investments in Incentive Theory 56

8. SUGGESTED SOLUTIONS 58

8.1 Introduction 58
8.2 Changing Human Behavior 58
8.3 Reducing Lobbying Efforts of Special Groups 60
8.4 Recognizing Range of Options 60
8.5 Improved Targeting and Design of Existing Policy Measures 61
8.6 Seizing and Creating Windows of Opportunity 61

9. CONCLUSION 62

9.1 Limitations and Further Research 63

REFERENCES 64

APPENDIX 70

Table of Figures

Figure 1 - Services Provided by Different Ecosystems 9
Figure 2- Example of Environmentally Harmful Subsidy 21
Figure 3 - Equilibrium Level Subsidies 23
Figure 4 - MBI Classifications 30
Figure 5 - Deciding types of MBIs 33
Figure 6 - Example of Biodiversity Offsets 35
Figure 7 – Illustration of PES 42
Figure 8 - Generic outline of PES stakeholders and their interactions 43
Figure 9 - Benefit-Cost Ratio Ecosystem Restoration 52

List of Acronyms and Abbreviations

BBOP - Business and Biodiversity Offsets Programme

GPP- Green Public Procurement

MA – Millennium Ecosystem Assessment

MBI – Marked-Based Instrument

OECD – Organization for Economic Co-operation and Development

PES – Payment for Ecosystem Services

TEEB – The Economics of Ecosystems and Biodiversity

UNEP – United Nations Environment Programme

WAVES – Wealth Accounting and the Valuation of Ecosystem Services

WfW – Working for Water

1. Introduction

A country could exhaust its mineral resources, cut down its forests, erode its soils, pollute its aquifers, and hunt its wildlife and fisheries to extinction, but measured income would not be affected as these assets disappeared. (Repetto et al. 1989)

A growing tendency within the field of economics is the recognition that human economies and human well-being rely on natural capital storage and ecosystem services. The Millennium Ecosystem Assessment (2005) defines an ecosystem as "a dynamic complex of plant, animal, and microorganism communities and the nonliving environment interacting as a functional unit" (pp. 5). Ecosystem services are the benefits people obtain from ecosystems. These services include *provisioning services* such as food, water and timber; *regulating services* that affect the climate, regulate floods, disease and water quality; *cultural services* that provide recreational and spiritual benefits and *supporting services* such as soil formation, photosynthesis and nutrient cycling. (See Figure 1). Underlining the relationship between the economy and ecosystem services, The Economics of Ecosystems and Biodiversity [TEEB] (TEEB, 2010, pp. 7) describes the flows of ecosystem services as the "dividend" that society receives from natural capital. Maintaining stocks of natural capital allow the sustained provision of future flows of ecosystem services, and thereby help to ensure enduring human well-being. Estimations from 2010 say that ecosystem services deliver essential services worth between US $21-72 trillion a year compared to the 2008 World Gross National Income of US $58 trillion (United Nations Environment Programme, 2010). Yet in 2010, nearly two-thirds of the earth's ecosystems are considered degraded as a result of damage, mismanagement and failure to invest and reinvest in their productivity, health and sustainability (ibid.)

1.1 Background

The damage to global ecosystems and biodiversity is acute and accelerating with the overarching driver being pressures from rising consumption and production. Without accounting for the value of ecosystem services, we make the problem worse and may risk missing potential solutions. Farley, Kemkes & Koliba (2010, pp. 2070) believes that current economic incentives encourage rapid degradation of the natural capital and that ecosystem services are being neglected as a result of this.

In order to sustain these services one need to understand how they function and how they are affected by changing conditions. Natural capital plays a dual role; one can convert natural capital into raw material input essential to economic production or it can be left intact and provide humanity with crucial ecosystem services. However, few ecosystem services are traded in an open market or are given explicit prices, and land-use change decisions are unfortunately often decided on the basis of a 'there is no price, hence no value' approach (TEEB, 2011, pp. xxviii). Recent development within the field has made it possible to design and create markets in domains of the economy where they are missing or inefficient.

The list of the services provided by ecosystem services is endless, and their monetary values have been calculated in some areas. According to Eliasch (2009), halving deforestation rates by 2030 would reduce greenhouse emissions by 1.5 - 2.7 GT CO_2 per year, thus avoiding damages from climate change estimated at more than US $ 3.7 trillion in NPV terms. Co-benefits from forests' ecosystems are not included in these numbers. The recreational and aesthetic value of a forest or any other ecosystem is harder to put in monetary terms than the emission reduction from trees, but models for doing so have been developed, mainly through the Total Economic Value [TEV] approach (Pearce & Warford, 1993, referred to in Kettunen et al. 2010).

However, progress on implementing these models and measures on a larger scale seems to be moving slowly, and is in some instances nonexistent. The true value of natural capital is missing from decision indicators, accounting systems and prices in the market. Thus, biodiversity and ecosystem losses that can easily be felt on "the ground" can go unnoticed on national or international levels. This thesis will thus not focus on the specific approaches of valuation. It will focus on the available options for introducing the value of nature in policy making, and find the incentives for applying them within the context of authorities, policy makers and private and public actors.

Figure 1 - Services Provided by Different Ecosystems

	Forests	***Oceans***	***Cultivated/Agricultural Land***
Environmental Goods	- Food - Fresh Water - Fuel - Fiber	- Food	- Food - Fuel - Fiber
Regulating Services	- Climate regulation - Flood Regulation - Disease regulation - Water purification	- Climate regulation - Disease regulation	- Climate regulation - Water purification
Supporting Services	- Nutrient cycling - Soil formation	- Nutrient cycling - Primary production	- Nutrient cycling - Soil formation
Cultural Services	- Aesthetic - Spiritual - Educational - Recreational	- Aesthetic - Spiritual - Educational - Recreational	- Aesthetic - Educational

(The Millennium Ecosystem Assessment, 2005)

1.2 Literature Review

The UN's Central Framework for the System of Environmental-Economic Accounting (SEEA) published in 2014 is described as a "multi-purpose system that generates a wide range of statistics and indicators with many different potential analytical applications" (unstats.un.org, 2014). It is an extension of the beliefs that gross domestic product is an outdated and misleading measure, and that alternative measures should adjust for depreciation in physical assets (Stiglitz, 2006). It does not contain specific tools as to how this should be done, but rather works as a system in where one can monitor the interactions between the economy and the environment.

The Wealth Accounting and the Valuation of Ecosystem Services [WAVES] partnership aims to promote sustainable development by ensuring that natural resources are mainstreamed in development planning. Through studying and cooperating with key government agencies, they are developing an institutional framework for environmental accounting. By identifying critical natural resource policy issues through studies, they will form a work plan with components consisting of the roles of agencies and strengthening technical capacity (Wavespartnership.org, 2014). From there the goal is to tailor approaches to the particular partner countries, which to date consists of seven developing countries with the project's finances coming from developed countries.

The international initiative TEEB has published several reports of what needs to be done to implement effective measures of natural capital accounting and valuation of ecosystem services. Thus, they take steps that are more specific and suggest measures that policy makers can pursue. TEEB - in National and International Policy Making (2011) - recognizes a five-step approach to improved stewardship of ecosystem services, which this thesis is based upon. These five steps are: 1) Recognizing Value, 2) Subsidy Reform, 3) Addressing Losses through Regulation and Pricing, 4) Rewarding Benefits through Payments and Markets and 5) Investing in Ecological Infrastructure. Policy measures and instruments to achieve goals are discussed in length followed by examples of (un)successful measures from around the world. However, the book does not discuss how incentives for policy tools are triggered to achieve more effective implementation and execution.

How to recognize value is analyzed and discussed in Kettunen et al. (2010) through the TEV-approach. The distinction between direct and indirect values and frameworks for placing nature's values in monetary terms is discussed in a wide range of literature. The future benefits of a natural resource constitute an option value, a concept first introduced by Weisbrod in 1964 (Dziegielewska, 2013). Since then, the idea has developed into a widespread and acknowledged framework for integrating the values of natural capital.

The report Study Supporting the Phasing out of Environmental Harmful Subsidies, published by the Institute for European Environmental Policy (2012) gives a thorough insight on one of the steps suggested by TEEB; Reforming Subsidies. The OECD (1998; 2005; 2007a) has developed tools for governments to identify and assess these subsidies, and provides a framework for assessing whether a removal of a subsidy will benefit the environment. Yet, these tools does not look at what triggers a change of thought and direction within policy

making, and does not look at the incentives needed for government to utilize the developed framework.

Bryan (2013) investigates TEEB's step four: Rewarding Benefits through Markets and Payments by looking at incentives in land-use and management. Studying how incentives affect land use and how land use affects payments for ecosystem services, he provides us with a great insight in how market mechanisms and other incentives can both have positive and negative effects on ecosystem services. However, as with the previous noted literature, he does not cover how these incentives are implemented, and what it will take for more policy makers to realize the value of such incentives.

1.3 Objective

The thesis is based on TEEB's five-step approach to Improved Stewardship of Natural Capital (2011). Through qualitative analysis and research, the goal is to pinpoint challenges to TEEB's suggested solutions by analyzing the incentives of authorities, policymakers and public and private actors. By analyzing the obstacles through incentive theory, and by analyzing the data collected, the aim will be to understand why these obstacles occur, and what can be done to overcome them. Different political economic theories will be presented underway to supplement and underline strengths or weaknesses in incentive theory.

Natural Capital valuation is in my eyes no longer a radical proposal. It does have a controversial nature as of the purpose of its use and this is where the controversy lies today. Conservatives seek to use it to "commodify" nature. Liberals or progressives worry more about the equity effects of valuing, and how environmental services are flowing. (Respondent)

TEEB's suggested step one; Recognizing Value is analyzed in a comprehensive amount of published material and research, and will therefore not be the main focus of this thesis. The remaining four steps is analyzed separately, as the economic tools they entail will trigger different incentives with different actors. First, TEEB's suggested economic tools for step 2-5 will be discussed. Second, the tools presented will be analyzed based on incentive theory and compared to the ideas of political economic theory and the collected data. As the incentives behind each political instrument will be analyzed separately, the theory presented in part 2 will only cover the background of incentive theory, its basics and different classifications.

The first part consists of Section 2 and 3. Section 2 presents incentive theory, and aims at placing the comprehensive theory of incentives into the setting of policymakers, while research methodology is covered in section 3. All the remaining sections will have their own presentation of the theory relevant for further discussions.

The second part consists of section 4-7, and will look at TEEB's suggested steps for improved stewardship of ecosystem services. Section 4 presents the economic and social rationale for subsidy reform, while the importance of addressing losses through regulation and pricing is covered in section 5. Rewarding benefits through payments and markets are discussed in section 6 and the opportunities lying in investing in ecological infrastructure are presented in section 7.

The final part will consist of Section 8 and 9, where section 8 will compare the findings from the above sections and look at suggested solutions to obstacles discovered. Last, the conclusion will be presented in section 9.

2. Incentive Theory

B.F Skinner, the founder of radical behaviorism believed that human free will was an illusion, and that all human actions came as a result of the consequences of that action. Believing one could build a better world through modification of behavior, he is considered one of the 20th century's most influential psychologists (The New York Times, 1990). Incentive theory states that an incentive is a reward; tangible or intangible, that is presented after the occurrence of an action, with the intention of causing that behavior to occur again. By replacing coercive techniques with positive procedures, Skinner believed people could advance towards a more humane world (B.F Skinner Foundation, 2014).

Studies have shown that positive rewards that are received immediately after an action occurs increase the chance of the action to occur again (www.khanacademy.org, 2014). Locke (1968) has also shown that hard goals provide a higher level of performance than easy goals and specific hard goals produce a higher level of performance than a "do your best" goal. In the context of this paper, this poses a challenge, as benefits from political action do not occur immediately, but takes time to permeate a system and provide results.

The paper *Incentive Systems: A Theory of Organizations* (Clark & Wilson, 1961, p. 134) distinguishes between three categories of incentive systems; material, solidary and purposive. Although the paper was written to explain incentive systems within an organization, the categories of incentives presented can be transferred into the setting of incentivizing policymakers, governments and citizens. Clark and Wilson define the different incentive systems as follows.

2.1 Material incentives

Material incentives motivate people through the promise of tangible rewards, i.e. rewards that have monetary values or can easily be translated into ones that have. In the setting of looking at policymakers, these incentives will be called *financial incentives* for simplifying the trail of thought. When acknowledging the costs and benefits by accounting for natural capital - and through this, conserving ecosystems - financial incentives exist and regulations can be implemented.

2.2 Solidary incentives

Solidary incentives are more closely linked to morals and ethics, and are essentially incentives where the rewards come in the form of intangible assets, e.g. knowledge, happiness, motivation or awareness – assets that have no direct monetary value, or cannot easily be translated into ones that have. Furthermore, solidary incentives are derived from the act of association. In the perspective of this thesis, these can be considered *moral incentives*. Aspects of morality are quite diverse and varies from one society to the next, and it is difficult to define morals of society in general. (Whatiseconomics.org, 2014). Moral/solidary incentives may thus refer to an individual's or group's own conscience, and the discussion throughout the thesis will define different moral incentives where it is deemed necessary.

2.3 Purposive incentives

Like solidary incentives, purposive incentives are also intangible. However, they derive mainly from the ends of association rather from the simple act of associating. In organizational theory, these incentives can be found in the goals of an organization, and is something the employees strive to help achieve. In the context of this thesis, one can imagine these purposive incentives to be regional or international schemes and goals that a country provides. Various private and public actors thus strive to help fulfill their part in an overall, international goal. On a local basis, the purposive incentives can be seen as pressures from e.g. a country's parliament, NGO's or citizens, all of whom are raising their voice to ensure that a government is keeping its promises or changing its ways for a more sustainable development.

2.4 Natural and Coercive Incentives

In addition to the definitions provided by Clark and Wilson, the website Whatiseconomics.org provides us with two additional groups of incentives, namely *natural* and *coercive* incentives. The two can be seen as opposites. While *natural incentives* are based on the human curiosity; "What will happen if I do this", the *coercive incentives* emphasize the consequences of not doing something. Although the name "coercive" can imply personal incentives such as blackmail, the parallel one can draw to the incentives of policymakers is one of importance. Examples, such as the fear of not being re-elected if a politician changes popular policies, can be considered an obvious coercive incentive. On a more comprehensive level, short-term thinking, permeated into much of today's policy making, has triggered (by environmentalists,

for example) a slow change in which policymakers realize that changes need to be done in order to slow down climate change, secure food resources and preserve biodiversity.

3. Methodology

3.1 Introduction

Through studying existing literature and qualitative analysis, the overall goal is to find the obstacles and opportunities that lie within policymaking options in the field of valuation of ecosystem services. Qualitative analysis is chosen to gain a detailed insight of the topic as an extension to existing literature. By analyzing the mechanisms behind policy measures, initiatives and public/private opposition, I aim at pointing out incentives for policy makers and private actors to take the next step and implementing valuation methods and recognizing the value of natural capital and ecosystem services. As a small part of the population holds the experience and knowledge required to be able to analyze the problem, they are selected through judgmental or purposive sampling. The disadvantages of a qualitative study with a small sample size are considered carefully, and the research design aims at neutralizing these the best way possible. Decisions taken to ensure the results obtained are as accurate as possible are many. Both are described in the following.

3.2 Research Question

Through the qualitative research approach, the goal of the study is to figure out what the obstacles are for existing incentives to be effective, and what can be done in cases with lacking incentives. Judgmental sampling is used to identify respondents who all satisfied the criteria of having a higher educational degree and long-term experience with sustainable development. This method is chosen because only a limited number of individuals in the population possess the trait/knowledge of interest. Through interviews with the selected respondents, the goal is to enable us to pinpoint where the obstacles lie. By combining this with existing incentive theory and political economic theory, the aim is to pinpoint the lack of, or misdirected incentives in policymaking today. Further, the goal is then to suggest changes that can trigger the right incentives with different actors so that valuation of ecosystem services will be a natural part of decision making for authorities, individuals and public and private actors.

3.3 Objective

The overall goal of this research is to either find data that supplements existing theory, or to find data that confirms (or refutes) the various theoretical frameworks used in this thesis. The chosen method of collecting primary data is qualitative analysis through interviews with

experts on the subject of natural capital accounting and ecosystem services. Due to the sampling criteria and the nature of the research question, insight from interpretative phenomenological research is used. Although the research methodology does not allow for a full phenomenological approach, the insight used is that the objective is to pinpoint the obstacles as experiences by the respondents. Their personal perceptions of the situation will be the base of the research instead of an objective record of the current situation.

3.4 Sample Description

The sample has been quota sampled, with four respondents, all of whom *are chosen* based on educational level and current work within the fields of sustainable development. They all have a doctoral degree in either environmental economics or sustainable development. Two of the respondents work office jobs, while the two other do both office jobs and field work. None of them interacts with each other and they are all asked the same ten questions through a questionnaire, which will be sent by *email*, found in the Appendix. They are given two weeks to answer the questionnaire, and their names and responses have been *anonymized.* Using a deductive approach, the questions are framed broadly in order to allow for a variety of insights. An interesting aspect of this research will be to explore the differing opinions between those working in the field and those only working in more theoretical/analytical jobs. If opinions are differing on an issue, both opinions will be included in the text and further discussion will follow.

The following statement will be used to introduce the respondents to the questions:

> *Implementing valuation methods for natural capital accounting and ecosystem services is a process with little specific political effort on a larger scale.*

Through this statement, a specific stance is taken towards the lack of political incentive to implement natural capital accounting methods.

3.5 Critique

A potential risk to this study is the inherent danger of low quality or uncomprehensive answers. In addition, since the sample size is very low, little attempt at generalizations will be made. At best, "*moderatum* generalization" (Payne & Williams 2005) can be attempted. However, since the main goal of the study is to find supporting or refuting arguments to existing theory, there is little need to draw generalizations.

Furthermore, since the respondents are asked to answer a questionnaire, rather than a face-to-face interview, there will be no possibility of asking for explanations that are more detailed, underlying opinions or alternative elaborations. This is why the questions are framed as broadly as they are – to open up to all possible opinions, relevant to this paper.

Two aspects of the research risks bias. The first is the lack of randomization when obtaining the sample. Misrepresentation of the entire population will limit generalization of the results. As already discussed, little attempt at generalization will be made. Another aspect is the approach of including a statement before asking the questions. This essentially incorporates researcher bias, and because of this, the questions could lead the respondents into answering in accordance with the initial statement. It can be hard or nearly impossible to evaluate the reliability of the experts. Based on first-hand experience with all of the respondents, the author of this paper strongly believes the integrity of each individual assures honest and precise answers, regardless of the initial statement.

Judgmental sampling entail low levels of reliability together with the high level of bias. As the researcher selected respondents based on their characteristics, there is little probability that other researchers will be able to generate the same results by carrying out the same experiment. However, due to the small sample size and thus little attempt at generalization, the results will provide indicated focus areas rather than definitive results. Due to the limited time and resources available for this research, suggestions for further research would be to use a larger sample of respondents within various areas of the field.

4. Reforming Subsidies

4.1 Introduction

Despite effort to reduce, phase out or reform subsidies in some countries, overall subsidies remain high. Subsidy reform or removal has the potential to increase economic efficiency, reduce the fiscal burden and alleviate environmental pressures. Production subsidies serve to reduce costs and increase revenues, and below-cost pricing for natural resources provide incentives for higher use, production and consumption of subsidized resources (TEEB, 2011, pp 261). As a result an increase in environmental damage can occur, as well as restriction in development and use of more sustainable technologies. In a global perspective, agricultural and fisheries subsidies are of most concern.

However, not all subsidies are environmentally harmful. This section will first look at the ones who are, and at how comprehensive subsidy reform can find outdated subsidies that fail to be cost-efficient. Through this, freed funds can be directed to areas in more dire need of funding such as Payment for Ecosystem Services, which are covered in section 6. Last, this section will analyze the incentives in play for various actors when considering subsidy reform.

4.2 Definitions and Assumptions

There is no universally accepted definition of a subsidy, but due to its broad scope and its policy context, I will use OECD's definition: "A result of a government action that confers an advantage on consumers or producers, in order to supplement their income or lower their costs" (OECD, 2005). Estimations throughout the OECD countries assumes $400 billion is transferred to different economic sectors (ibid.). My main goal will not be to debate whether subsidies are an efficient policy tool or not, but to look at the subsidies that can have negative effects on the environment and if incentives for overcoming these are inefficient or lacking.

4.3 Environmentally Harmful Subsidies

Subsidies distort prices and resource allocation decisions, and can, as a result have negative effects of the environment that are unforeseen, undervalued or ignored in a policy making process (ibid.) These will be referred to as Environmentally Harmful Subsidies (EHS). The definition of EHS is the same as the one given on subsidies, but with an addition: "(…), but in doing so, discriminates against sound environmental practices". All production and

consumption activities have the potential to harm the environment through e.g. emissions, wastewater and depletion of resources. Therefore, a more narrow definition is "a subsidy to a sector that leads to higher levels of pollution, waste and emissions that what it would without the support" (ibid.). The latter definition will be the basis of the following discussions. These subsidies can be critical drivers of harmful activities, and these damages to ecosystems and biodiversity occur as a result of one or both of the following reasons:

1) By underpricing the use of natural resources, or

2) By increasing production.

(TEEB, 2011, pp.263-292)

Known examples of these are fuel tax rebates and artificially low energy prices that stimulate the use of fossil fuels, agricultural subsidies that can lead to overuse of pesticides and fertilizers and support for commercial fishing that can result in overexploitation of fish stocks (OECD, 2005).

Not all subsidies are harmful to the environment, with the prime example being subsidies that correct specific market failures as the example of subsidized rail transport. Other examples are that of paying farmers to plant trees to reduce agricultural runoff and removing marginal land from production to provide habitat for wildlife (ibid). This method of rewarding benefits through payments is covered more thoroughly in section 6.

The challenges for phasing out EHS are several, and the obstacles for effective subsidy reform throughout the world are many. By analyzing the obstacles through theory of political economy and legitimacy and through incentive theory, the aim will be to understand why these obstacles occur, and what can be done to overcome them.

Figure 2- Example of Environmentally Harmful Subsidy

Example of Environmentally Harmful Subsidy

At the coast of the Surat Thani Province in Thailand, more than half of the 1.100 hectares of mangrove swamps have been cleared for commercial shrimp farms. Although harvesting shrimp is a lucrative undertaking, mangroves serve as nurseries for fish and as barriers for storm and soil erosion. Following the destruction of local mangroves, villagers experienced a decline in fish catch and suffered storm damage and water pollution.

Calculations by Sathirathai and Barbier (2001) demonstrated that the value of the ecological services that would be lost from further destruction of the mangroves exceeded the value of the shrimp farms. They estimated the economic value of mangroves in terms of local use of forest resources, offshore fishery linkages and coastal protection to be in the range of $27,264-$35,921per hectare. In contrast, the economic returns to shrimp farming, once they are corrected for input subsidies and for the cost of water pollution, are only $194-$209 per hectare. However, as shrimp farmers are heavily subsidized and do not have to take into account the external cost of pollution, their financial returns are typically $7,706.95-$8,336.47 per hectare.

(Tietenberg & Lewis, 2014, pp. 27)

4.4 Subsidy Reform in Political Economic Theory

One central feature from Marxist analysis of political authority and legitimacy is that the political and economic systems in any system are so closely linked that one of them cannot be studied apart from the other (Birch, 2007, pp. 100). To understand the challenges for reform of subsidies, and EHS in particular, one must understand the incentives and motives of policy makers. A key presumption in economic theory is that individuals act in their own self-interest, maximizing their own utility based on the information they have, also known as (bounded) rationality. Yet, political economy recognizes that individuals, in this setting the voters, care about the well-being of fellow citizens and about the environment. Based on this, one can assume that politicians derive satisfaction from implementing socially valuable policies.

4.4.1 Policy Makers

The OECD (2005) points out that the behavior of politicians is defined by governing in a way that maximize well-defined objectives and may include both altruistic and egotistical motives. Thus, when assuming that voters care for the well-being of other citizens and the environment, policy makers must include this in their decisions.

When discussing subsidy reform, policy makers are motivated by different objectives. Ideological objectives, social well-being, ethics and the wish to be re-elected are all part of a complex approach to implement reform. When assuming policy makers include the opinion of voters in their decision-making, it is important to look at how citizens think and respond to changes in policies. If the citizens expect that their power over their elected representatives can shape propositions and regulations, one must look at their incentives.

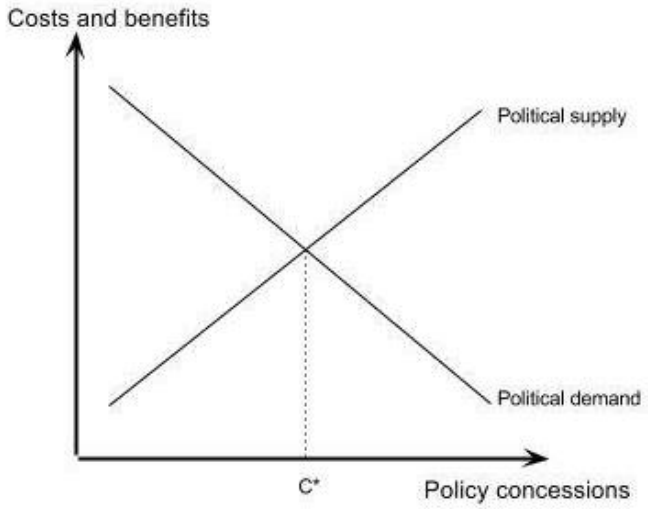
4.4.2 Citizens

When looking at this from a citizen's point of view, objectives closely related to financial incentives occur. Citizens who are affected by government regulations are often affected financially, and may try to influence the policy makers by signaling their opinions and beliefs through different channels. Lobbying, political campaigns and voting are the main communication channels. Empirical evidence suggests that interest groups communicate their demands in three ways (ibid.): providing information to legislators; lobbying to gain access to key politicians and policy makers; and political contributions paid to political parties or individuals.

In the report "Environmentally Harmful Subsidies: Challenges for Reform" (ibid.) the authors describe the manner in which policies are set as an implicit political market where citizens signal their demand and the government responds with policy supply. The example they provide us with is that of an EHS to one specific sector, a situation that will be explored under financial incentives in section 4.4.1. As the policy contains benefits that one group of people receive, this group may be willing to increase efforts and resources to indicate their preferences to the policy makers. The greater the cost of signaling their preference to policy makers, the lower the level of effective demand for the policy. Thus, the demand curve for policy concession will be a downward slope. For policy makers, the willingness to supply policy favors will increase with political benefits as well as other benefits received from

implementing the policy, and their supply curve slope upwards. The equilibrium level of subsidies to the specific sector is determined by the intersection of the two curves:

Figure 3 - Equilibrium Level Subsidies



(OECD, 2005, pp. 60)

4.5 Subsidy Reform in Incentive Theory

4.5.1 Financial Incentives

One cannot discuss financial incentives within subsidy reform without looking at the effectiveness of subsidies as a policy tool. Economists generally agree that subsidies are inefficient and expensive; imposing a burden on government budgets and taxpayers. Thus, the most obvious incentives for phasing out EHS are increases in economic efficiency and a reduction in the fiscal burden. One example of these effects is found in the agricultural sector, a heavily subsidized sector in OECD-countries with subsidies estimated at 1.2% of GDP in 2002 (OECD, 2005). A removal or reduction in agricultural support could in the short-term cause more environmental damage as farmers/producers would exploit sensitive land areas in order to recuperate the economic loss they would have suffered. The long-term effects would however, be economic, environmental and social benefits (ibid.). By subsidizing farmers/producers, higher production is induced, which will reduce the market price for the goods. This in turn will lead to an increased demand for governmental support from producers in the sector. Yet, in many countries, agriculture subsidies are implemented, with increasing international competitiveness as the main reason.

It the current economic context in Europe the need for budget savings can drive reductions in EHS, allowing for reallocation of resources or savings. This can be a financial incentive for authorities, but depends on effective regulation and markets for it to be approved by the polluters.

4.5.2 Financial vs. Coercive Incentives

The different incentives from both policy makers and receivers of subsidies are intertwined. What can be perceived as a financial incentive from a receiver's side, as the example of agriculture subsidies, can be seen as a coercive incentive from the government's side. One may imagine that the strength of farmers, political disagreements or fear of not being re-elected makes them ask the question; what will happen if I do not give subsidies? This trail of thought makes the incentives to continue subsidies a coercive incentive, rather than a financial incentive. Nevertheless, how do we know which incentives are superior in decision-making?

4.5.3 Moral Incentives

The most obvious incentives for policymakers to take action in regards to preserving ecosystem services, is that of preserving resources for future generations and to halt the current change in the Earth's climate. More people around the world are getting involved and start demanding change for less pollution, larger investments in green technology and better effort from authorities. The immediate threats shown in the latest IPCC assessment (2014) should cause a pressing need to implement reforms and policies to address these issues. With this basis, moral incentives have a soft transition into coercive incentives. The known threats should induce a sense of "What if we don't do anything", pressing regulations on the agenda.

4.5.3.1 Placing a Value on the Future

The relevant question in this situation is "how do we value the future?" a heavily debated question. The dilemma is not necessarily "do nothing" or "do everything right now", but the value one place on uncertainty and future generations will decide how much we are willing to invest right now. Some of the respondents expressed an opinion that short-term thinking and short-term electoral processes led to politicians not prioritizing environmental issues in general. Some believed this was due to a combination of lack of knowledge of environmental issues, knowledge of economics and the actual cost of implemented initiatives.

One respondent, analyzing the topic from the perspective of the US stated:

I'm not sure political incentives to be re-elected – i.e. focus on local, short-term issues in the US case are necessarily wrong. They just are not a good match for dealing with long-term, complex issues like environmental degradation.

Another respondent expressed optimism, and did not believe short-term thinking was a current obstacle, answering: "[…] The World Bank and the whole institutional apparatus of climate change are pushing hard for this within the thinking of the "green economy" and further referring to the initiatives of WAVES and TEEB."

An economic tool to evaluate investments done today and their future benefits is net present value calculations together with the Ramsey rule. Although originally thought of as a way to value climate change, the discussions on the topic makes a relevant case for understanding the challenges in sheer long-term thinking when the future is uncertain.

The Ramsey Rule: $\rho = \eta g + \delta$

The rule includes four parameters: the discount rate ρ, the relative aversion to inequality η, the rate of impatience δ, and the growth rate of the economy g. When estimating the net present value of an investment, the discount rate plays a crucial role, and this parameter has caused large discussions in the field of climate economics. A too high discount rate will result in too little investment in mitigation because a high discount rate implies that few investments will have a positive NPV. Using a too low rate will result in too much immediate investment in mitigation. Criticism has been raised against a discount rate too high. It creates a NPV of future **damages** that is less than the NPV of e.g. new green projects. It will thus not be socially desirable to invest in, say, solar, wind or biofuel technologies (Gollier 2011). Additionally, it is essential to recognize that the further into the future we go the less certain we are about economic growth and opportunity cost of capital (Conceição, Zhang & Bandura, 2007/2008).

4.5.4 Purposive Incentives

Purposive incentives may work as a driver to make up for the seemingly weak moral incentives driving a change. In organizations, these incentives are overall goals that all employees strive to achieve. In this setting, one can interpret these incentives as regional or international agreements on mitigation or other efforts to reduce emissions and transform to a greener economy. Known international examples are the Kyoto protocol and the EU's "20-20-20" targets. Regional unions such as the European Union have initiatives and targets for all its

member states. By committing to reduction in emissions, investing in green jobs and technology, the EU provides member states and their authorities a purposive incentive to reach the goals.

5. Addressing Losses through Regulation and Pricing

5.1 Introduction

As already noted and as will be see further on, reforming subsidies and rewarding benefits are important components of policy reform as their measures are explicitly designed to avoid ongoing losses. Yet, these actions are not enough on their own. Losses often occur as the cost of damaging ecosystem services are hidden or distorted. Polluters and resource users rarely meet the real cost of the damage they cause and often pay nothing at all (TEEB, 2011, pp 303). A subsidy reform will often leave one part worse off than before, be it in a social, economic or environmental way. Although the subsidy reform section aims to eliminate environmental damages through better-targeted and efficient reforms, one cannot exclude the possibility of an unsuccessful or miscalculated subsidy reform. Decision makers and resource user will only consider losses if, and when confronted with the real costs involved.

This section will first look at how policy measures should be designed in order for private and public actors to be incentivized into incorporating biodiversity values into their decision-making. Then it will look at specific regulatory options and market-based instruments to show how better exploit these tools. Last, the incentives these tools triggers in various actors will be analyzed.

5.2 Definitions and Assumptions

Arthur Pigou's public interest theory of regulation is based on two assumptions (Shleifer, 2005, pp 440). The first assumption is that unhindered markets often fail because of the problems of monopoly or externalities. Second, governments are benign and capable of correcting market failures through regulation. According to Shleifer, this theory has been used as a framework for what governments should do, as well as a description of what they actually do. There is no set limit for what a government can regulate. They control prices, impose safety standards, regulate jobs, regulate issuances and so on. The theory has been subject to criticism; most market failures fix themselves without government intervention and if not, private litigation can address conflicts. Another criticism is that government regulators are incompetent, corrupt and captured, and regulations would just worsen situations.

George Stigler looked further, and studied the effects of regulation instead of assuming them. His regulatory capture theory states that "regulatory capture happens when a regulatory

agency, formed to act in the public's interest, eventually acts in ways that benefit the industry it is supposed to be regulating, rather than the public (Carpenter & Moss, 2014)

Overall criticism of regulation will be excluded for now. The goal is to look at specifically aimed regulations to prevent environmentally damaging activities. Criticism of certain types of regulation, their features and the incentives to remove or implement them will be discussed when relevant. Nevertheless, Pigou's and Stigler's theories should be kept in mind when discussing advantages and disadvantages of regulation.

Second, market-based instruments will be analyzed as an alternative and/or as part of a policy mix containing both specific regulations and flexible MBIs. As both have their pros and cons, a mix of the two may prove optimal.

5.3 Guidelines to Addressing Losses

To address the full costs of loss due to environmentally harmful activities, a coherent strategy is needed. This strategy should form the backbone of new biodiversity policies and needs policy instruments that reflect as well as incorporate the cost of losses. TEEB (2011, pp 304) recommends three principles, which should guide the choice and design of policy instruments:

1) The polluter pays' principle (PPP)
2) The user/beneficiary pays principle (BPP)
3) The full cost recovery principle (FCR)

These key principles have the ability to encourage private and public actors to incorporate biodiversity values into decision-making and investment strategies. Through this, they can stimulate efficiency and technical innovation. Before looking into specific regulation and pricing options, a short description of the three is given.

TEEB's guideline to improve the stewardship of ecosystem services names regulation and pricing as main tools. Further on, market based instruments that include pricing will be separated further to account for quantity control.

1) The Polluter Pays' Principle

As suggested by its name, the polluter pays principle is a practice where those who produce pollution and harmful emission should bear the cost of managing it. Thus, the emitter will be held responsible for paying for the damage done to the natural environment. Companies

emitting harmful or potentially harmful substances will find themselves forced to internalize the cost of waste disposal making the cost of production fully reflected in the price of goods and services. Through this, the externalities of economic activity on society and nature are prevented. The principle is used as a foundation in environmental policy within both the OECD and the EU (Lucia, 2008). Bugge (1996, referred to in Lucia, 2008) identifies four benefits of PPP: economically, it promotes efficiency; legally, it promotes justice; it promotes harmonization of international environmental policies; it defines how to allocate costs within a state.

The affirmation of PPP can be seen in the 1992 Rio Declaration, Principle 16, which states:

> *National authorities should endeavor to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment*.

The principle can be implemented through two different policy approaches: *command-and-control* (regulations) and *market-based* (such as taxes, charges, fees) (Lucia, 2008). The command-and-control approach relies on detailed regulation followed by an ongoing inspection program; it includes both performance and technology standards. For an improved stewardship of ecosystems services, tools such as prohibitions, restrictions, requirements and standards are all part of a regulatory framework.

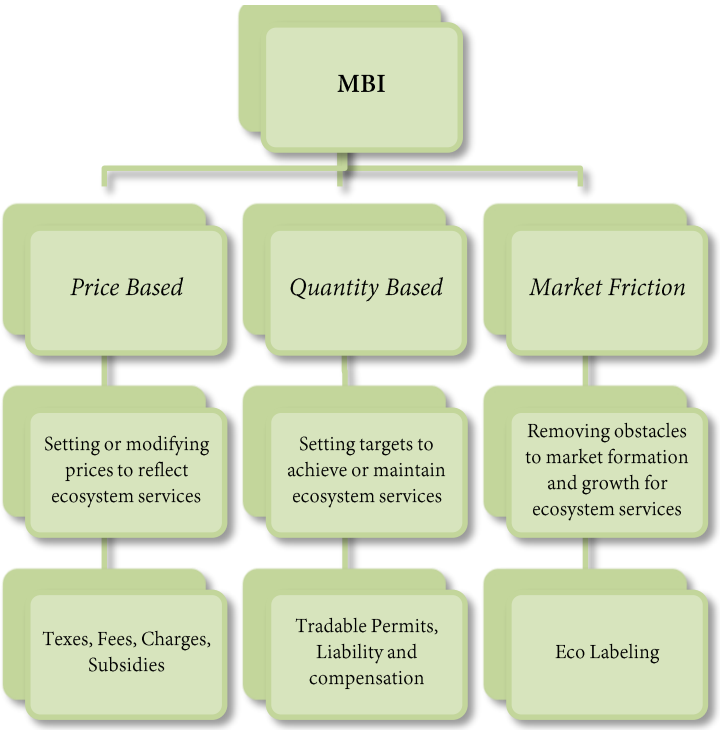
The market-based approach utilizes economic incentives through processes that mimic or alter market conditions. The market-based instruments [MBI] works in three ways:

- Control prices
- Control quantity
- Set liability rules and can be adjusted to discourage harmful activities

(TEEB, 2011, pp. 317-330)

Examples of market-mimicking instruments are tradable permits and methods that establish property rights or remove barriers for trading (Farber, 2006). Imposition or removal of taxes or subsidies are instruments that alter market conditions by changing cost or demand conditions. Figure 4 below illustrates the classifications:

Figure 4 - MBI Classifications



(Braüner et al. 2006)

MBIs are designed to have a more straightforward effect on the supply and demand conditions of individuals and companies and thus being able to change the incentives available. In addition, they provide more choices in selecting the most cost efficient option, thus MBIs have an advantage over more explicit directives such as regulations. In section 6.2, it is shown that some instruments like taxes, fees and auctioned licenses have the ability to generate revenues from conservation efforts. The use of these successful MBIs require significant effort, and criticism is raised on their effective- and usefulness. As Whitten et al. (2007) points out:

Markets encourage innovation and profit seeking behavior. Effective MBIs are designed to replicate these strengths. To do so they must be designed to overcome the 'market failures' that have prevented an effective market from emerging for the desired environmental outcome.

2) The User/Beneficiary Pays' Principle

This principle is considered a variant of the Polluter Pays' Principle. It revolves around the idea that an agent/recipient that has benefited from a harmful action has a duty to address this harm. In the extended versions of the PPP, a specific example is that of water regulation. Polluters pay not to pollute water, while users/beneficiaries should pay to receive the service of clean water. However, on the subject of climate change, advocates for this principle argue that those who have benefited from emissions of greenhouse gases should compensate those currently harmed by previous emissions by paying the cost of mitigating further emissions. While the basis of the PPP can be integral in most people's concept of morality, the same for BPP may not necessarily true.

3) The Full Cost Recovery Principle

The third principle relies on the idea that the full cost of environmental services should be recovered from the entity that benefit from a service. For the actors providing a service, the principle states that through sources like fees, charges and donations, the cost of providing a service or product can be recovered. This principle is already implemented in various sectors throughout the world, in e.g. electricity, energy and water where the full cost of the product is placed on the consumers. According to the European Environmental Agency (2013), this can only be justified under the conditions that (i) the infrastructure covers (close to) 100% of the territory/population, and (ii) that all user categories contribute financially. If the requirements are not met, it may be preferable to apply a specific tax or charge that makes beneficiaries pay as much as possible in proportion to the benefits they derive.

5.4 Regulatory Options

The importance of a strong, underlying regulatory baseline cannot be understated. Regulations have long been a commonly used instrument for environmental protection. By establishing protection objectives, reducing pollution and hazardous action, and trigger urgent environmental improvements, regulations have proven to be a valid tool. By providing a tight regulatory framework, governments can establish market based policies like trading schemes and biodiversity offsets and banking. The framework will provide a reference point for these instruments, and a solid monitoring and enforcement factor is needed.

TEEB (2011, pp. 307-316) recognizes three main types of regulations for decreasing losses of biodiversity and ecosystem services:

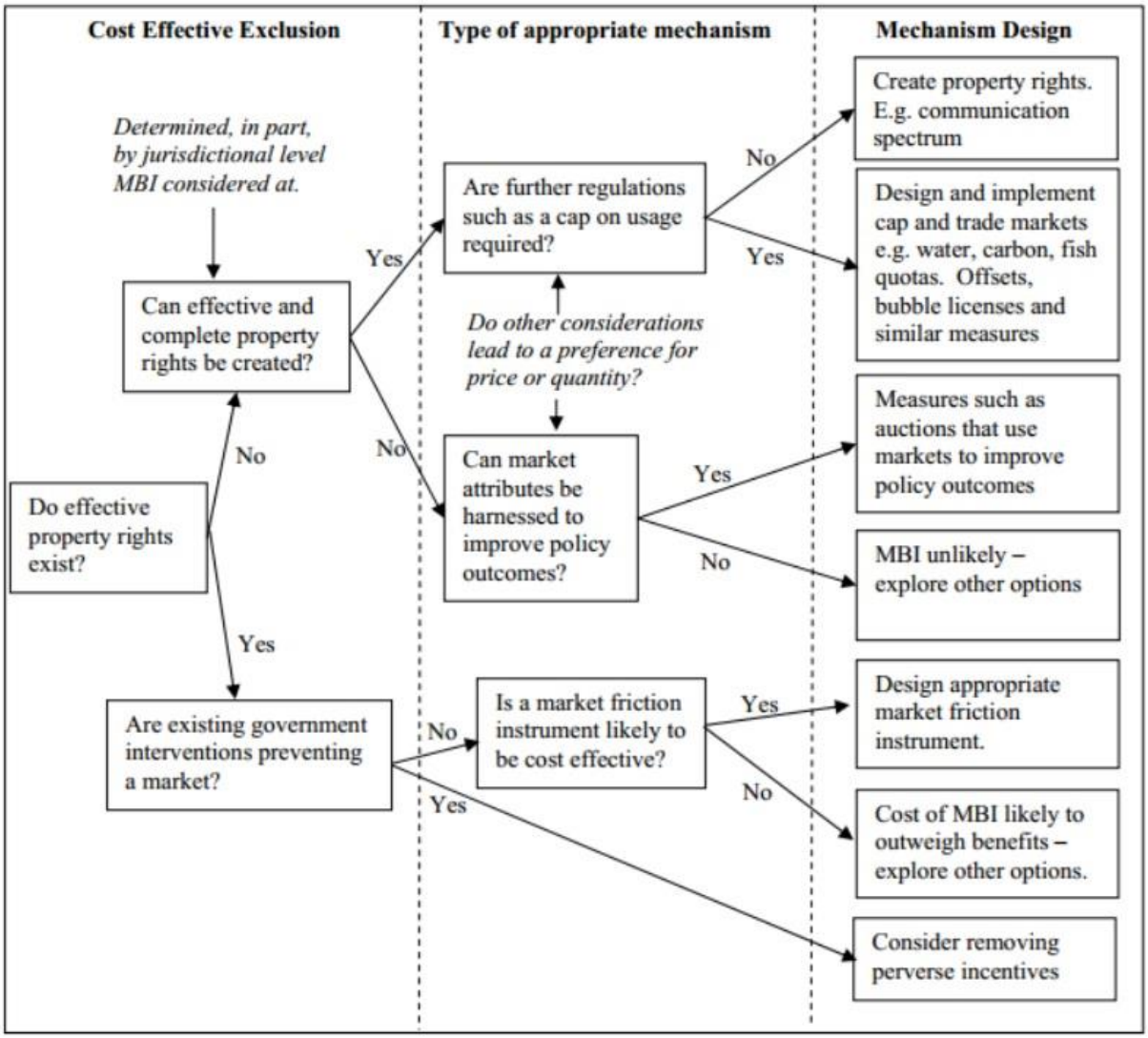
1) Regulation of emissions
2) Regulation of products
3) Spatial planning

Regulations of emissions include standards for emission, ambient quality and technical practices like performance (for example air quality management) or management practice. Regulation of products sets restriction of product use. Examples of this are preventing illegally logged timber, eliminating poaching of endangered species and establishing production standards like certificates or best practice codes. The third type of regulation, spatial planning, is a regulation of land uses that has direct implications for ecosystem services. These regulations often occur on a local or regional development planning level, establishment of protected areas provide an example of implemented policies. The way these regulatory measures can alter incentives is analyzed in section 5.6 and 5.7

5.5 Pricing Options

Market-based instruments works through the three mechanisms shown in the section on "Polluter Pays' Principle". By being able to set more accurate prices by changing market mechanisms, the MBIs can prove a powerful tool in addressing the losses experienced by exploiting natural resources and ecosystem services. Which MBI that should be implemented and, if they should, depends on several factors as Figure 5 below shows an example of. Property rights will be covered in section 6.2.4.

Figure 5 - Deciding types of MBIs



(Whitten et al. 2007)

5.5.1 Offsets and Biodiversity Banks

One of the examples of a growing MBI is *biodiversity offsets*. Aimed at the private sector, the offsets are defined as: "Measurable conservation outcomes of actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken." (Business and Biodiversity Offsets Programme, [BBOP], 2014). Offset benefits arise from actions to protect habitats at risk or to restore degraded or destroyed habitats. *Biodiversity banks* then create a market-based instrument by turning offsets into tradable assets

BBOP states that "A biodiversity offset is a way to demonstrate that an infrastructure project can be implemented in a manner that results in no net loss or a net gain of biodiversity" and

some programs have been successfully developed. The US wetland-banking project is one example of one such well-developed program. Driven by the Clean Water Act, wetlands and stream offsets are created by restoration, enhancement, creation and preservation. Anyone affecting a stream or a wetland buy credits from a mitigation banker who preserves an area of wetland to generate biodiversity benefits. The market for wetlands and stream offsets in the US was in 2010 estimated to have a yearly volume of $1.3 – $2.2 billion (ecosystemmarketplace.com, 2010)

There are many advantages of biodiversity offsets and banks. Number one being that it helps balance development and conservation. The offsets contribute to mainstreaming biodiversity into business and regional planning, and by making private actors buy offsets; they generate funds that are used for conservation. It also reduces habitat fragmentation and is more cost effective than avoidance and mitigation. However, there are disadvantages to this approach as well. Offsets can only deliver benefits where there are significant areas of remaining habitat. These habitats must be worth maintaining, unprotected and likely to remain so in the future, and subject to significant levels of loss and degradation (ibid.). These "requirements" may be one of the reasons why the US wetland banking has been so successful. One can also criticize that the system only displace threats from one area to another. TEEB (2011, pp 310-318) underlines that "banks and offsets are best suited when addressing moderate residual impacts on biodiversity components that are replaceable and can be conserved or restored using known techniques within a reasonable time frame."

Figure 6 - Example of Biodiversity Offsets

Offsetting deforestation in Flanders, Belgium

With a forest index of only 10.8 %, Flanders is one of Europe's most heavily deforested regions. The Flemish government has therefore prioritized protection and preservation. To prevent further decrease in valuable forest areas, three main principles apply:

1) Deforestation is in principle banned.

2) When permitted, an authorization is required.

3) An authorization may not be delivers without compensation (Afdeling Bos and Groen, 2002)

Compenstion consists of paying a 'forest preservation contribution' of €1.98/m2 for coniferous forest and €3.96/m2 for indigenous deciduous forest. The Flemish authority uses the revenues to buy land for afforestation (Vlaamse Regering, 2001). By 2007, deforestation was almost completely balanced with official afforestation meaures (VBV, 2008). In 2008, 158 hectares were deforested under permit but only 152 hectares were created through afforestation. As the annual afforestation target of 769 hectares has not been met in recent years (VBV, 2009), the Flemish government has commited itself to revive and broaden the scope of the forest preservation fund (Commissie voor Leefmilleu, Natuur, Ruimtelijke Ordening, 2010)

(TEEB: In National and International Poilcy Making, 2011, pp. 312)

5.6 Regulation and Pricing in Political Economic Theory

The discussions regarding regulation- and market intervention methods revolves around the degree to which governments can intervene and on whom. Standard liberal political theory holds that citizens should have a voice on public affairs within a democracy. Although not obliged to participate, citizen concerns have the right to be heard by their governments, and to ensure their rights they can choose their “rulers”. The counterpart to the right to be heard is that all citizens in a democracy are subject to a constraint. Liberal political theory assumes that citizenship involves an exchange, where citizens exchange more security from the government in return for less freedom of action (Whitehead, 2002, pp. 165-166). The rule of law will protect critical aspects of personal and collective security and in return, citizens are obliged to abide by its provisions. The assumption presuppose an existence of an effective and impartial justice system, capable of interpreting legal principles as they apply in individual cases, thus

only a few cases can be attended to. Comparing this to the Polluter Pay's Principle can be relevant. As noted, PPP may be integral in many people's concept of morality. If implemented effectively, PPP follows the principle of liberal economic theory, as the governments constrain polluter's freedom of action in return for collective security. Without PPP, if polluters were free to do as they please, their actions would add a constraint on the rest of the population by damaging public goods such as clean air.

Both the "public interest theory" and "regulatory capture theory" perceive regulatory measures as supply in response to a demand. However, they differ in regards to whom this demand stems from. The first theory states that regulation is supplied as a response to demand of the public for correction of inefficient or inequitable market practices, while the latter hold that supply is in response to demand from special interest groups struggling to maximize the income (Posner, 1974). If the latter is true, powerful interest groups may oppress the aspect of equality. This violates with e.g. Durkheim's sociological perspective, where good citizens are those who learn to behave with civility towards each other, and with restraints towards the public authorities that uphold their rights (Whitehead, 2002, pp. 166). These theories all assume a functional institutional framework and citizens that practice appropriate forms of self-limitation. As we will see in the next section, without a just institutional framework, incentives may be altered to exacerbate environmental damage.

5.7 Regulation and Pricing in Incentive theory

MBIs such as taxes, fees, fines, charges, commercial licenses, tradable permits, quotas and liability rules all send out economic signals. Thus, they have the potential of changing incentives available to private and public actors when they make decisions regarding resource use. This can contribute to a more effective and efficient management of biodiversity and ecosystem services (TEEB, 2011, pp. 301). Researchers on the field agree that incentive measures in particular need to be designed with the specific characteristics and needs of the targeted communities and ecosystems in mind (Braüner et al. 2006). Although MBIs may have an advantage over pure regulatory measures (control-and command), and economists consistently agree on this (Stavins, Keohane & Revesz, 1998), a combination of the two can be needed.

As the purpose of this section is to analyze tools for addressing losses, the policy instruments looked at will mainly be those placing a financial burden on a private or public actor. Instruments for payments to these actors will be analyzed in section 6.3.

5.7.1 Financial Incentives

Nearly all of the different kinds of regulations and MBIs will spur new financial incentives. Price based instruments like taxes, fees and charges will determine a price for the use of an ecosystem. Regulations on emission can force private actors to invest in newer technology or equipment.

The theory is that if the right price signals are given through MBIs, actors are allowed free choice and the flexibility to act in the manner that benefits them most (Braüner et al., 2006). Imposing taxes, charges and fees are direct incentives, and can be positive or negative depending on whether they are removed or imposed.

Individuals will adapt to changes by choosing the behavior that cost them the least. However, even if this behavior is what benefits the environment the most, one cannot tell if permanent changes in behavior have occurred. If applying extra costs to a private actor for polluting through a carbon tax, financial incentives arise in internalizing their externalities, thus reducing their expenses on the tax as much as possible. For emission targets, investments may need to be done to ensure a private actor meets the targets, introducing a short-run financial burden. For governments, raising revenues through these instruments is a clear financial incentive, but it may be opposed by public opinion and fear of not being re-elected.

5.7.2 Financial vs. Moral Incentives

As market-based instruments leave actors free to choose between reducing their emissions or paying the price of polluting, it is not safe to presume that the first is the chosen option. Inflation can erode dissuasive effects of a tax or a fee. Without the certainty that the rates are continuously reviewed and adjusted, the cost of reduction vs. the cost of paying the price can be minimal. For countries without strong institutions and regulatory regimes, the choice of paying the price can be the easier option. Inflation may only be one small part of the problem.

5.7.2.1 Developed vs. Developing World

A whole economy has developed for illegal activities that leads to environmental degradation and damage. Cambodian farmers can get 250 times their monthly salary for selling a dead

tiger; illegal loggers in the Atlantic Forest in Brazil can make US $75 per tree they harvest, but face only a deterrence of US $6.44; illegal dynamite and cyanide fishing in the Philippines earn fishermen an average of US $ 70.57 per trip, while the value of deterrence is only US $ 0.09 (TEEB, 2011, pp 333), and the list goes on. The wide number of examples all seems to be a problem in developing countries, with few examples from developed countries. With the promise of substantial profits from poaching or other illegal activities, taking the risk is tempting. Without the basis of a strong and justice institutional framework, these situations can be hard to deal with.

However, for countries with such institutions the choice can be seen as an ethical or moral one. Many private actors have well-developed corporate social responsibility standards, but if the price of polluting only has marginal financial implications, uncertainty arise. Thus, one can consider this situation to initiate a moral dilemma, where one should consider the implication of ones' operating choices as part of a greater good. Whether this happen or not will depend on factors such as knowledge, overall objectives and goals, short- vs. long- term thinking and many more. Distrust in private sector actors is revealed through one of the respondents, who states:

Certainly, there are political lobbying issues by large corporations that inhibit natural resource valuation. Companies are better at long-term planning, economics, and analysis than most politicians. Thus, they are acutely aware of the real costs of natural resources and what it would cost them if governments began to tax such resources as carbon; clean water; forests; and ocean resources.

Section 7.5 will look at alternative incentives for private actors to preserve the environment through innovative techniques.

5.7.3 Coercive and Natural Incentives

The "what will happen if I don't do this" mentality does not necessarily only occur when estimating an individual's value of the future. Social norms can be seen as both a coercive and natural incentives, and can be effective in changing human behavior. Experiments in development- and aid work have proven that peer pressure, or the fear of "standing out" can have effects on human behavior. As Coster explains in The New York Times (2014): "[…] our happiness isn't just a function of what we eat, drink and consume: it's also our image to others, and our reputation". The article points to two drivers of adaptation. The first is strong

opinion leaders in a community that can have an influence over others, getting other people to mimic their behavior. Secondly the article states: "[…] the idea of peer pressure: if you know that you're being observed, and the community accepts this behavior as healthy, that peer pressure factor can be a big driver of adoption". Although these observations were made on the subject of development work, the parallels drawn are not far-fetched. Some of these ideas were also reflected in the qualitative research. On the question on whether he/she thinks *lack* of political incentives is a reason for the slowly moving progress of valuation of natural capital a respondent answered:

Yes, there are few incentives, in the US system, for politicians to a) think long-term; b) address very unpleasant issues; c) stand out from the crowd as a leader; or d) be proactive rather than reactive in their policy-making.

Perhaps the idea of a more engaged population could be the trigger needed to address several of the points made by the respondent. Without the moral obligation to meet the demands of the public, little or nothing can be expected to happen.

5.7.4 Purposive Incentives

Parallels can also be drawn to subject of purposive incentives. While the occurrence of coercive or natural incentive may easier apply to individuals or private actors, the purposive incentive of meeting the goals of an international agreement can be applied in a governmental or policymaking setting. Initially, if a coercion of achieving the goals arises, the reforms may prove of no or little use. If politicians or other actors oppose these goals and their required policy measures, the effects will be absent. If politicians follow guidelines to gain international recognition, the peer pressure effect can come into play.

6. Rewarding Benefits through Payments and Markets

6.1 Introduction

Subsidy reform, regulations and different market-based instruments are well-known policy tools that have been used for several purposes, not just for addressing biodiversity losses. This section however aims at looking at innovative tools that can provide long-term incentives for conservation efforts. They may not be suitable as the only policy option, but in a policy mix with the tools analyzed earlier, they have the potential to make markets recognize the value of biodiversity.

The main purpose of this section is to look at Payment for Ecosystem Services [PES] and its potential and challenges. As this instrument often depend on defined property rights, this will also be studied. Finally, the various incentives triggered through PES will be analyzed.

6.2 Definitions and Assumptions

In this section, economic instruments also play a central role to valuing nature's public services to society. The difference from section four is that section five looks at how to distribute public funds by rewarding conservation efforts. Innovative tools like PES have the ability to provide incentives for long-term conservation through targeted payments schemes, greener tax, contracts and market mechanisms (TEEB, 2011, pp. 179). As new approaches may require changes in existing rights to manage, access or use resources, sound property right practices will play a crucial role. Unfortunately, many parts of the world does not have well-developed property rights, and thus challenges of distributing them will occur. As PES and other innovative tools are founded on a basis of redistribution, they may prove suitable for combining biodiversity and ecosystem conservation with poverty reduction. The challenges from poorly defined or lacking property rights will be discussed in section 6.3.4. Economic instruments still play a vital role as they can target nature's public service to society. Tax exemptions can function like a PES to reward conservation efforts. While PES is a direct payment for a service, a tax exemption is effectively a non-payment (ibid.). As taxes, charges and fees are covered in section four, the aim is mainly to analyze PES as a mechanism to conserve ecosystems and biodiversity as well as other potential instruments.

6.3 Payment for Ecosystem Services

6.3.1 About

PES systems aims at changing the economics of ecosystem service provision by improving incentives for land-use and management practices that supply services. PES is defined as:

> *A **voluntary** transaction where a **well-defined** ecosystem service [ESS] (or land use likely to secure that service) is "bought" by at least one ESS **buyer** from at least one ESS **provider**, if – and only if – the ESS provider secures ESS provision (**conditionally**).*
> (TEEB, 2011, pp 182).

However, the swap of money for a delivered or maintained environmental service is not enough. UNEP and Forest Trends (2008) underlines that

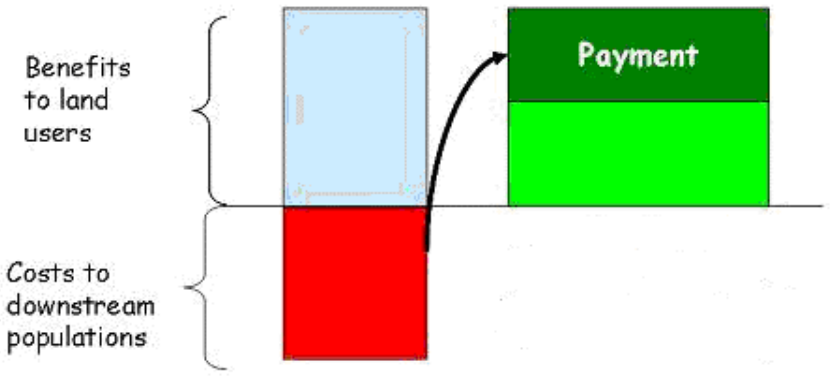
> *[…] the key is that the payment causes the benefit to occur where it would not have otherwise. That is, the service is "additional" to "business as usual," or at the very least, the service can be quantified and tied to the payment.*

The most famous example of PES is the Reducing Emissions from Deforestation and Forest Degradation (REDD +) reached at the 2010 Cancun meeting of the UN Framework Convention on Climate Change. As of 2008, Wunder divided PES into four environmental service types: carbon, watersheds, biodiversity, and landscape beauty.

PES, which is a market-based tool, alter the costs and benefits of adopting different practices. PES aims at making conservation-focused land use more profitable for private owners/user with additional benefits for society (TEEB, 2011, pp. 183). An example is land uses with high levels of tree cover. These areas can help regulate water flows in a watershed and reduce the risk of catastrophic flooding or landslides. When land users or owners do not receive any compensation for providing environmental services, these services are usually ignored in making land use decisions. Often, this can lead to land use decisions that are socially sub-optimal (World Bank, 2011). PES cannot be understood without analyzing how the policy incentives interact with the social processes that influence practice adoption (Garbach, Lubell & DeClerck, 2012).

For preserving services upstream, Pagiola (2006) has developed figure 7. The figure illustrates how the cost (externalities from upstream production) to a population downstream could be removed by paying upstream population to conserve the land.

Figure 7 – Illustration of PES

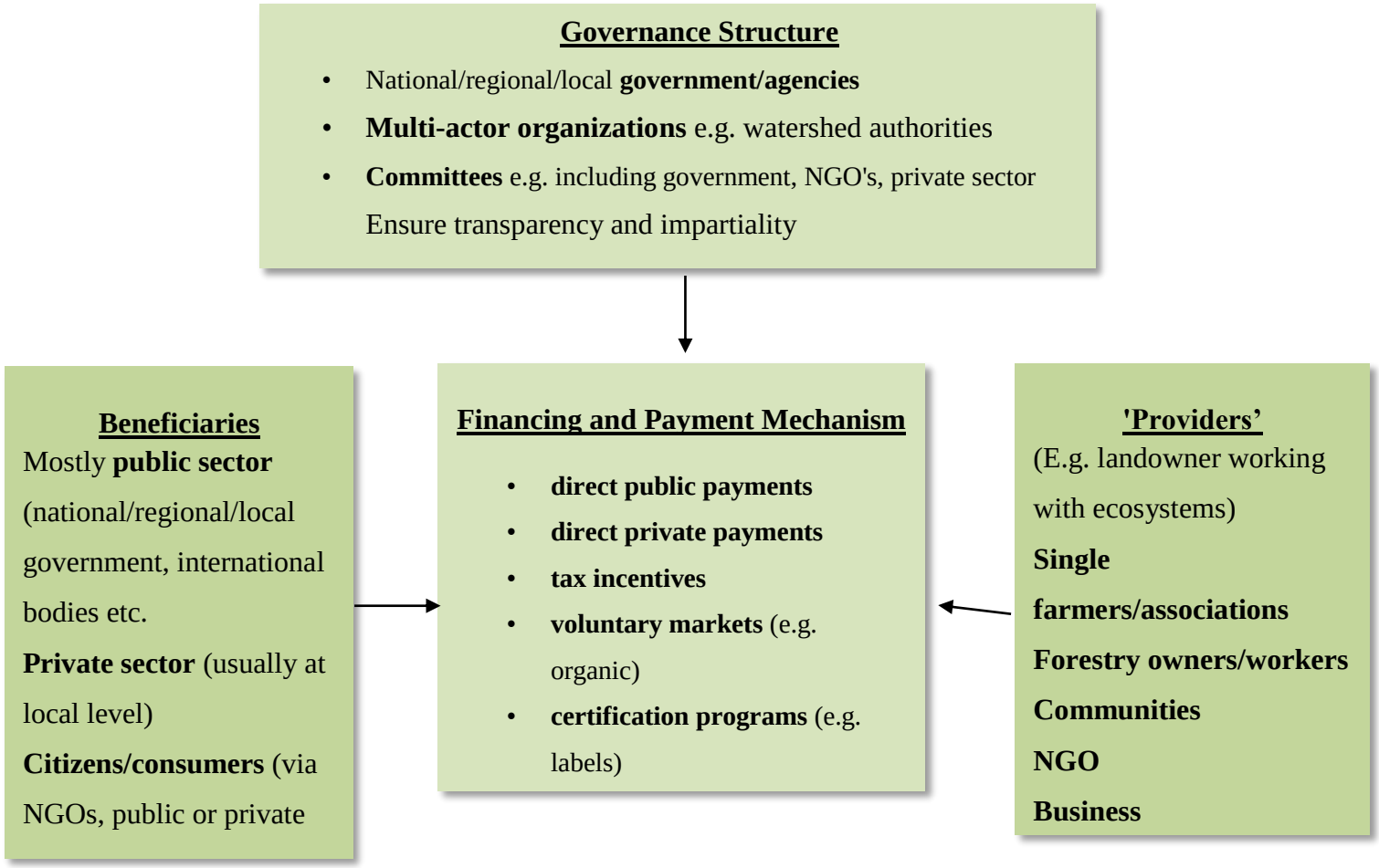


(Pagiola, 2006)

6.3.2 Structure and Application

As figure 8 below shows, there are many ways to structure a PES-scheme. The scale of application may depend on the beneficiaries, the providers and the spatial relationship between them (TEEB, 2011, pp. 186). For a local service like crop pollination, a local PES makes sense, while for a national service like pest control, one could argue for national government initiatives like PES or legal measures.

Figure 8 - Generic outline of PES stakeholders and their interactions



(Pagolia, 2003; TEEB, 2011)

6.3.3 Opportunities and Challenges

PES has the potential to be highly sustainable, but as the World Bank (2011) underlines, this cannot be based on whims of donors or NGO's. It needs a basis in the self-interest of service users and providers. By making the value of ecosystem services more explicit, incentives for over-exploiting or conversion can be modified or reversed. Although the voluntary aspect is a key to the effectiveness of a scheme, the World Bank (2011), TEEB (2011) and the OECD (2010) all recognize the essential role of a legal/regulatory underpinning. Private actors can also offer a potential to complement public funding, but the willingness to pay of beneficiaries are often not enough to cover start-up or operating costs. This can be due to a "free-rider" mentality or simply due to lack of knowledge on the values provided by ecosystems. In these situations, governments may need to provide extra incentives.

Critics who say that PES is a "second best" solution argue that beneficiaries have the right to enjoy ecosystems that would have been freely available in the absence of damaging activities (ibid.). The best solution in this argument would thus be for a stricter regulatory framework to make polluters pay. A counter-argument is that PES can be more cost-effective than strict law enforcement. It can also be more progressive in the case where providers are relatively poor, and it can secure additional benefits beyond legal requirements.

The largest constraint to PES-schemes is the distribution of property rights. Some also argue that PES will not work in developing countries or countries with weak institutions. These two constrains can be related to each other, and will be looked at in the following.

6.3.4 Property Rights and Institutional Structure

6.3.4.1 About

Tietenberg & Lewis (2014) defines property rights in governing natural resources as "a bundle of entitlements defining the owner's rights, privileges, and limitations for use of the resource". Ostrom (1990; 2005) found that successful natural resource management is not always achieved solely through assigning private property rights. She found that successful management of common goods, more often than not, depend on local initiated regulations, the enforcement of these and of a connection to the land or the resource. Bromley (1998) underlined the importance of "recognizing that property relations over land and related natural resources must be understood as part of the larger institutional structure of a society".

Both Ostrom and Bromley recognizes property rights as an integral part of policy development, and TEEB (2011, pp. 63-69) gives three arguments in support for this. First, for reasons of equity, an important policy goal is the fairness of distributing rights between individuals, groups, etc. Second, accounting for distributional issues in PES-schemes makes it more feasible to meet other goals such as poverty alleviation and other Millennium Development Goals. Third, policy changes usually bring winners and losers. If the distributional challenges are fully considered in designing policies, chances of successful implementation is improved by reducing opposition from the losing part. Other socio-economic objectives such as employment can also be supported through the design of a PES-scheme. South Africa provides one such example, as will be shown in 6.3.4.3

From a purely economic point of view, well-defined property rights can produce efficient allocations in a well-functioning market economy (Tietenberg & Lewis, 2014). An efficient property rights structure has three characteristics:

1) *Exclusivity:* All benefits and costs accrued as a result of owning and using a resource should accrue to the owner, and only to the owner, either directly or indirectly by sale to others.
2) *Transferability*: All property rights should be transferable from one owner to another in voluntary exchange
3) *Enforceability*: Property rights should be secure from involuntary seizure or encroachment by others
   (ibid.)

When well-defined property rights are in place, an owner of a resource will have powerful incentives to use that resource efficiently as a decline in the value of a resource implicates a personal loss. Private property rights is not the only possible way of defining entitlements to resource use, and all the different types create rather different incentives for resource use. Three other possible property rights regimes are:

1) *State-property regimes* – where the state owns and control the property
2) *Common-property regimes* – where the property is jointly owned and managed by a specific group of co-owners
3) *Open-access regimes* – where no one owns or exercises control over the resources (has given rise to the "tragedy of the commons")
   (ibid.)

6.3.4.2 Challenges

What is worth noticing from the above is that the characteristics of well-defined property rights applies for a *well-functioning market economy*. Imperfect market structures such as monopoly and government failure can play a role in inefficient resource allocations and thus environmental problems. Parks and forests are an example of a state-property regime, but problems with both efficiency and sustainability can arise when bureaucrats' incentives diverge from collective interests. Some of the respondents pointed at nepotism and corruption as factors causing lack of political action.

The challenges of institutional structure and lack of optimism for developing countries concerning PES-schemes are common in the valuations of biodiversity literature. The economic arguments for dependence on good governance are many. It is needed to avoid bias or misuse of economic values in decision-making; to make sure implemented measures are effective and transparent. Lack of formal markets, no available capacity to regulate initiatives and illegal actors (such as illegal mining, logging, hunting.) all pose a threat to effective implementation of such initiatives. All these factors reduce the optimism concerning effective PES-schemes in developing economies.

Costa Rica and Mexico have pioneered PES-schemes in developing countries, showing that the challenges can be overcome (TEEB, 2011, pp. 186). However, these two countries are not considered the poorest countries in the world, ranking 62 and 61 respectively on the UNDP's human development index in 2013 (Human Development Report, 2013). South Africa rank no. 121, and may provide a better example as to how meet the challenges for developing countries, and an experimental approach in Uganda (ranking no. 161) aims at pinpointing challenges and solutions to these. (See 6.3.4.3)

6.3.4.3 Opportunities

Other international experiments and research are aiming at finding further solutions to these challenges. A good example currently being carried out in Uganda is an experiment designed by the International Institute for Environment and Development and carried out by Forest Trends and The Katoomba Group. The experiment is testing if Payment for Ecosystem Services can help promote good land stewardship through a randomized trial experiment in 140 villages and 1400 households. All households gets training in sustainable land use, while only half of the participants are paid for their contribution. The experiment is expected to end in April 2014, and the data derived from the four year long project aims at figuring out how to overcome difficulties such as traditional forest rights, the frail institutional framework and lack of formal PES markets. In addition, the project aims at engaging both local leaders and communities (Creating New Values for Africa, 2011).

As noted in 6.3.4.1, South Africa provides a large-scale PES-scheme where employment rates have increased in promoting sustainable land management. The Working for Water program (WfW) protects water resources by stopping the spread of invasive plants (Wunder, 2008). With more than 300 projects, WfW have employed around 20.000 people per year, 52% of them women. The participants are provided with skills training, health care and HIV/AIDS

education. Even though the scheme is not paying landowners to provide an ecosystem service, it is considered a PES-scheme in that municipal government is contacting workers to manage public land in a sustainable manner.

Experiments like these and several others gives hope in, if not solving the problems, pinpointing areas of which improvement can be made and progress can be seen.

6.4 Rewarding Benefits in Political Economic Theory

As for regulation and pricing, intervention from governments are the main area of discussion. The degree of intervention and at whom the intervention should be aimed at is debatable. Yet, for rewarding benefits, it may be easier to gain public acceptance than for addressing losses. Even though a PES-scheme and a tax exemption for conservation efforts have a similar financial outcome, the former can gain public acceptance faster, as one would rather be rewarded for an effort than paid for a service rendered. This thought is footed in political legitimacy theory, stating that welfare policies adopted by modern governments protect their legitimacy (Birch, 2007, pp. 103). Working and paying income taxes provides you with health services, education and roads. Yet, legitimacy of political and economic systems cannot be considered separately. The legitimacy of specific policies can elicit support or protests and cynicism, thus understanding these are crucial. Fiscal instruments such as subsidy reform can be used to provide incentives for conservation effort, and are recognized to go hand in hand with e.g. implementation of PES-schemes (OECD, 2005). By removing conflicting market distortions like an EHS, PES-schemes are allowed to produce clear and effective incentives. As figure 1 showed, subsidies to shrimp farmers undermine the value of mangrove forest to such an extent that farming is the only option. If these subsidies were to be removed, a PES-scheme for conserving the mangroves at their calculated value could produce clear incentives for conservation. As already noted in section 4, subsidy reform can lead to public protests or disapproval, and the acceptance of subsidy reforms can be weighted by introducing new incentives for conservation efforts through e.g. PES-schemes or tax exemptions.

6.5 Rewarding Benefits in Incentive Theory

As for regulations and MBIs, new incentives will spur when rewarding benefits. As regulatory measures and MBIs are often based on the PPP or BPP principles, they introduce incentives through “stick” rather than “carrot”. Through section 6 it is shown how mainly PES-schemes, but also tax exemptions, offer rewards for wanted behavior. This approach implemented alone

or in combination with a punishment or a "stick" has the prospect to gain public approval easier than a policy measure consisting of a pure punishment approach.

6.5.1 Financial Incentives

6.5.1.1 Individual Level

As will be discussed under moral incentives, financial incentives can change behavioral patterns. The clear financial incentives lies in PES-schemes with direct payment to participants conserving an ecosystem or an environmental good. Incentive theory suggests that positive rewards will increase the chance of an action occurring again, and successful PES-schemes have proven this true. For the success of good PES-schemes to continue after payments stop, investment in human capital and capacity building is essential to ensure a safe change in human behavior.

6.5.1.2 Local Level

REDD+ provides an example of different incentives on a local or international level. The financial incentives lie in the financing of developing countries efforts from developed countries. One respondent believed short-term thinking to be more prevalent in developing countries stating: "The political incentives work to reward returns over a short future time. This is most so in low-income countries and/or countries with unstable regimes".

With international funding earmarked to conserve rainforest the objective of REDD+ is to contribute to reduction in greenhouse emissions and biodiversity preservation. Local governments in receiving countries can focus their monetary efforts on reducing poverty and other socio-economic challenges, while the financing from developed countries goes to preserving the rainforest. The preservation, if successful, will lead to positive socio-economic effects as shown in South Africa. Many of the most bio diverse areas in the world are found in developing countries, and international initiatives can hider degradation when these are not prioritized at a local government level. However, the most open example of a failed initiative to preserve biodiversity is the Yasuní National Park in Ecuador. The Yasuni-ITT initiative setup in 2007 to manage the preservation of the park asked foreign investors for US $3.6 billion in contributions. It only reached US $13 million in donations and US $116 in pledges (The Guardian, 2013). The set goal contribution was to compensate for lost income for drilling in the oil rich national park. When the goal was not reached, the Ecuadorian president found himself forced to abandon the ambitious plan and stop the moratorium on oil drilling.

6.5.2 Moral Incentives

PES-schemes induce financial incentives through direct payments to protect environmental amenities; while tax-exemption do the same through indirect payments (see 6.4 & 6.5). The timeline of PES-schemes has not been discussed, but many existing programs are limited in duration (Kerr et al., 2013). If the payments have failed to change preferences or facilitated learning, participants are likely to return to pre-payment behavior. Evidence suggests that group identity has a positive effect on contributions, as presumed earlier in section 5.7.3. Kerr et.al. found that PES have positive short-run effects on participant's contribution, while the long-run effects where not significant after a finished program. PES projects designed to enhance social norms and group identity would thus be more effective at promoting pro-social behavior possibly even after the incentive payments disappear. By designing schemes that consider these factors, moral incentives can be trigger to a larger extent and thus increasing the chance of a successful program.

7. Investing in Ecological Infrastructure

7.1 Introduction

A transition into a green economy is a current issue on the international agenda. Some argue that "green economy" is a misleading and vague phrase that is only given substance when our economic approach prioritize investment in ecological infrastructure (Society for Ecological Restoration, 2012).

It is usually much cheaper to avoid degradation than to pay for ecological restoration. For biodiversity, this is said to be particularly true; species that go extinct cannot be brought back. In the light of need for action and investments in adaptation to climate change, investments in restoring degraded ecosystems are highly and directly relevant to many affected policy sectors.

Conservative measures from 2007 estimate that investments of around US $100 billion are needed per year to restore Earth's basic life support systems. This sum is relatively modest compared to the high costs associated with ecosystem degradation and the financial incentives that result in environmentally damaging activities (Brown, referred to in Society for Ecological Restoration, 2012)

7.2 Definitions and Assumptions

First, this section will look at how investing in maintenance, restoration and rehabilitation of damaged or degraded ecosystems can augment renewable natural capital. To transition into a green economy and to comply with environmental legislation, investments in environmental infrastructures is a critical approach. Investing in ecological infrastructure covers a wide range of options. Restoration, rehabilitation and reallocations are all possible investment initiatives. Investments in man-made infrastructures such as water supply and wastewater treatment and management will still be important for most countries when focusing on releasing pressures on nature and improving human health and life quality. In addition, these investments are providers of jobs and local economic development, thus fulfilling other socio-economic goals. The opportunities in private orderings will not be excluded, as progress in several fields has shown potential in preserving the environment. One should be open to the possibilities of transferring this progress into public regulatory measures or other policy instruments.

Second, this section will look at new and innovative investment options arising in the fields of e.g. insurance through bonds, private consumption through certifications and green public procurement [GPP] through taking advantage of their purchasing power to influence markets. These solutions all have the power to alter markets, and could therefore be covered under section 6. Labeling and certifications are shown as MBIs in the lower right box in figure 4. They are however covered in this section as most initiatives are not yet highly developed, and their permanent effects on markets and consumers are still unknown.

7.3 Maintenance, Restoration and Rehabilitation

7.3.1 Maintenance

The term maintenance covers a wide range of options, many of which are self-evident. While the introduction of restoration and rehabilitation depends on an ecosystem's level of degradation, maintenance does not. Maintenance includes e.g. providing natural habitats in its current state through measures such as regulating the use of an area. By attending to sanctuaries for e.g. birds, one can contribute to controlling insects in agricultural areas and thus reducing the need for artificial control measures such as pesticides.

7.3.2 Restoration

For smaller special scale damage, restoration is feasible. With a healthy surrounding environment of species composition and function, it can be enough to invest in "passive restoration" where ecosystems are set to restore themselves. This will require a series of political decisions and trade-offs, and thus cannot be considered a passive process at all (Clewell & McDonald, 2009). Active steps to "jump-start" and accelerate restoration can be necessary if self-generation is not possible within a reasonable time-period. Interventions to "jump-start" can be planting seeds or trees, removing polluted soil, reintroducing keystone species or adjusting the hydrological conditions (TEEB, 2011, pp 405). Both a complete passive restoration and one with starting help will require reduction or modifications in human use and pressure, thus depending on political action and consumer will to be successful. Through clarifying objectives and priorities before starting such a program, this can be carried out. These solutions to successful implementation will be looked at in section 8.2.1.

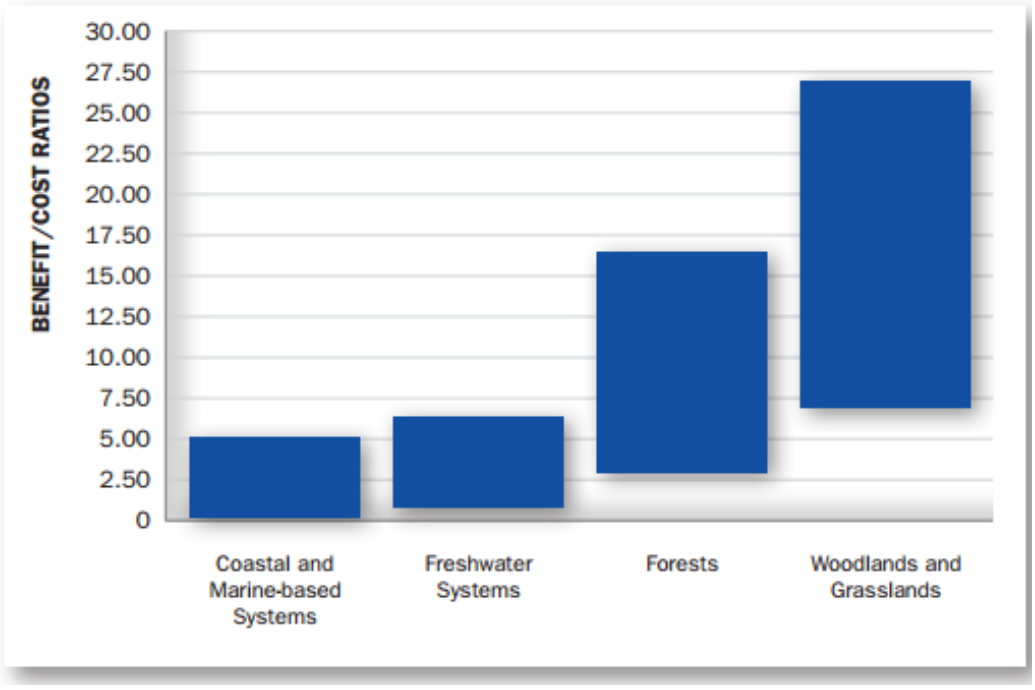
7.3.3 Rehabilitation

Rehabilitation implies a more whole and severe transformation. Where ecosystems have crossed the threshold of irreversibility, one may consider rehabilitation as a more realistic alternative than restoration (ibid.). This approach cannot repair the ecosystem to its pre-disturbance state, but action will help it recover its best. Examples of such rehabilitation can be seen in previous mining sites, where replanting and reintroduction of flora and fauna can bring the landscape towards pre-mining conditions.

7.4 Initiatives and Costs

As nature provides us with quality services at a lower price than man-made or analogue systems, the economic benefits from maintaining or restoring ecosystems can be higher than the costs. Figure 9 shows the benefit-cost ratio of ecosystem restoration across major ecosystems. The values are shown in 2007 US $/ha.

Figure 9 - Benefit-Cost Ratio Ecosystem Restoration



(Blignaut et al. Referred to in Society for Ecological Restoration, 2012)

Some of the programs looked at in the section on PES-schemes provide useful examples of how maintenance and restoration can provide values. The Working for Water program initiated in South Africa (see section 6.2.4.3) has expanded and developed into a prototype for

developing countries, and perhaps developed countries as well. Investment-schemes that are not based on PES are also widely expanding. The Red Cross in Vietnam has worked with local communities to restore mangrove forest in northern part of the country. As seen in Figure 1, mangroves provide a wide range of services, like storm protection and maintaining fisheries. Since 1994, nearly 12.000 hectares of mangroves have been restored at a cost of approximately US $1.1 million. Estimations say that this investment has saved US $7.3 million in dyke maintenance alone. In addition, some 7.750 families have benefited from the restoration through income generation, reduced vulnerability and improved nutrition from restored fish populations (ibid.)

Initiatives such as the ones provided above can be initiated from various actors. The case of WfW was initiated by the South African authorities, while the case of Vietnam was initiated by an NGO. The opportunities for small-scale restoration investments are plenty, and according to TEEB (2011, pp. 408) thousands of projects are carried out each year. The challenge of this lie with what Aronson et al. (2010) found when looking at over 20.000 case studies and paper of such projects. They surprisingly found that only 96 of these studies could provide meaningful cost data on restoration. While some only provided aggregated costs, others only provided labor and capital costs. To decide whether investments are worthwhile from an economic perspective, one needs to compare the benefits of services provided by ecosystems with those of technically supplied services - and the cost to provide them (TEEB, 2011, pp. 411).

7.5 Innovative Options

7.5.1 Cat Bonds and Species Swap

Insurance companies can exemplify the innovative development within private actors. Catastrophe bonds (Cat Bonds) and similar insurance products against natural disasters and extreme weather events have developed into a success. Through South-East Asia, Mexico, Turkey and Chile (Keucheya, 2014) this approach is saving a country from large expenses after natural disasters. By spreading the risk of a future costly event, the event will become a smaller economic burden when it occurs. As a further development of the insurance sector's involvement in environmental damages, derivatives called *species swaps* have been introduced to the market. These derivatives are based on the risk of the extinction of species. Through the swaps, incentives for private actors are triggered. They enter into an agreement

with e.g. a municipality or a state to work toward conserving a species, which is affected by their production activities. If the amount of animals in the area is kept steady, the municipality or state pays interest to the private actor. If the opposite happens and the extensiveness of the species is reduced, the private actor is bound to pay the municipality or state money so that they can take action to save the species (Mandel et al. 2010, referred to in Keucheya, 2014).

7.5.2 Certifications and Ecotourism

Some goods and services have market mechanisms that reflect the values of biodiversity. The trend of ”green” products is growing and reflecting an increasing awareness among consumers and producers. Still, for many sectors and companies, conservation is seen as a liability rather than a potential source of revenue (TEEB, 2011, pp. 231). To make sure investments are done in this field one rely on regulations, proper management systems, pressure from consumers, NGOs, and other shareholders. Large companies choosing to direct their purchasing power towards sustainable production practices can have a large impact on trade and production practices.

Certification of products is well established for many goods and services today, sustainable forest products and sustainable fisheries have well known certifications. Much of coffee, tea and chocolate in stores have one or more logos on them, certifying that sound developmental and environmental practices were used during harvesting and production. The same goes for cosmetics, a sector increasingly trying to market their products as palm oil free. Still, proper certification depend on capacity, resources and incentives to participate. Certifying forests in developing countries constitute a challenge, as much of the above-mentioned factors are missing.

Tourism has lagged behind other sectors in establishing a formal certification process, although many initiatives to change this have been taken. In the last two decades, 23 biodiversity hotspots saw an increase in tourism of over 100 per cent (Christ et al. 2003). The footprint of tourism on biodiversity is serious, and a growing focus on ecotourism can be seen. Certification of ecofriendly accommodations and experiences are on the rise. However, the narrow market segment ecotourism focuses on can pose a challenge. An example can be seen in how training poachers to become guides is a widespread initiative in African countries, and preserve the environment by reducing poaching and saving possible endangered species. Yet, the market for this is small. African safari trips are not something a large share of the population is entitled to, due to the price.

The barriers to certification of goods and services are many. First, the cost and complexity of implementation is a large one. This may be insignificant for large companies, but for smaller scale businesses, the cost may pose a large obstacle. Second, studies done in the EU show a low willingness to pay amongst consumers for certified products (TEEB, 2011, pp. 238). Certification of products may reflect values important to one group of consumers, but not to others.

7.5.3 Green Public Procurement

Lastly, the indispensable role of governments cannot be overlooked. Green Public Procurement [GPP] means that public purchasers take account of environmental factors when buying products, services or works (ibid.). Implementation of such practices at all government levels have the ability to achieve rapid results in reducing pressures on biodiversity. This is due to their vast purchasing power – from supplies for offices and canteens, to construction and transportation materials. These procurements can directly expand markets for environmentally friendly products and services. Through facilitating eco-innovation, GPP can create economies of scale and contribute to companies moving up the learning curve, put new products on the market and create green jobs. Advancement in this field can already be seen by looking at the European Commission, who are encouraging their member states to shift to 50 per cent of purchasing to GPP by 2010 (ibid.) The Netherlands set an ambitious goal of 100 per cent by 2010, the result of which is not yet known.

Challenges with GPP standards include that of difficulties of making the criteria measurable and transparent. It takes time to develop comprehensive criteria, imposing a cost. A solution could be to start with the products with the highest impact such as timber, food and technology (energy, metals and minerals). These three products represent good opportunities to reduce biodiversity impacts while representing a significant share of public expenditure. (ibid.)

7.6 Investments in Political Economic Theory

The reasoning of investments from governments can be analyzed from many perspectives. One that is relevant not only for investments, but also for regulations-, taxes and other discussed measures, is the Investment Theory of Party Competition developed by Thomas Ferguson (Ferguson, 1995). As an alternative to conventional, voter-focused theories, Fergusons' theory states that given how money driven political systems are expensive to

ordinary voters, policies are created by a competing coalition of investors, not voters. According to the theory, political parties are created entirely for business interests, and are separated by the different interest factors from different sectors. The factors can be favoring of labor – vs. capital-intensive industries and free-market vs. protectionist businesses. Whether this theory holds or not, if existent even to a smaller degree, it can pose challenges to the investment options where governments are needed to take the lead. As seen with subsidy reform, strong lobbying groups can halt policy efforts. Industries with a lot of money and will can perhaps work to stall e.g. GPP by offering authorities cheaper supplies. In a scenario with the black and white picture where private actors only aim to maximize profit at whatever cost on one side, and environmental and developmental NGO's on the other, if it all comes down to financial efforts, the first will win.

However, the picture is not black and white, but the theory underlines issues that can arise in many states when special interest groups have the money, will and influence to change the direction of policy measures.

7.7 Investments in Incentive Theory

7.7.1 Financial Incentives

7.7.1.1 Policy Makers

Authorities and governments play an indispensable role. Despite potentially high internal rates of return, investments in natural capital seem to have unrealized potential. With benefits from these investments often lying far in the future, governments are needed to provide financial incentives by paying for or subsidizing private activities such as reforestation. Governments also have the opportunity to directly invest public funds into restoration activities. By doing this, not only do they show that they are an initiator, but they can also trigger financial and moral incentives with private actors and citizens. Large-scale restoration projects may have costs that exceed benefits identified by private parties, and will therefore be dependent on governments to invest in them.

Investments in maintaining, restoring or rehabilitating ecosystems have direct positive incentives in that of supplying the population with ecosystem services. Maintaining a watershed or wetlands will conserve and improve water quality and availability. This is a service citizens most likely would expect and will thus support measures taken to protect these.

7.7.1.2 Private Actors

Certifications can improve a private actor's competitive position. It can create new markets, or access previously inaccessible markets; it can improve corporate image; boost employee morale and productivity; attract market shares and more. These points alone can trigger many types of incentives for private actors to invest in certifications. All of them can make private actors see the financial benefits in certifying their products. One can also argue that some, if not all, of these results can be expected for the other types of investments suggested above. Purchasing eco-labeled office supplies and organically grown food for canteens can boost moral and productivity with the employees. Numbers from the EU suggest that switching to all organically produced foodstuff in canteens, hospitals and schools would reduce phosphate release in fertilizers by 41.560 tons/year (TEEB, 2011, pp. 244).

Private actors operating in vulnerable areas can incorporate active risk management by investing in bonds or swaps. Not only does the spread of risk constitute a tempting financial incentive, but one can perhaps assume that the will of a company to do well will rub off on employees and customers, increasing profit.

7.7.2 Moral and Coercive Incentives

As for many other efforts of conserving and protecting ecosystem, moral incentives can be found in the human behavior. In this section, it is underlined how much influence governments can have by changing their procurement pattern and making certified products available on different markets. While arranging policy measures so that these options are viable to private actors are mostly financial, the moral incentives are more evident for individual consumers. When green products are more widespread on the market, chances for consumers to think about what the alternative to the green product is, may increase. If attentive to the production process, moral incentives of doing what is best for the environment can be triggered.

One can also draw a parallel to peer pressure (see 5.7.3). If more certified and green products and services enter the market, the pressure of doing what is right can arise. As opposed to the above example of educating one self and choosing the "right" because you would like to do what is right, the coercion of peer pressure can make consumers buy organic or certified products merely because it is expected of them.

8. Suggested Solutions

8.1 Introduction

Throughout this paper, we have seen which incentives are triggered with different actors. By knowing this, one can better design and tailor how initiatives and policies are implemented and ensure their effectiveness. The report *Study Supporting the Phasing Out of Environmentally Harmful Subsidies* by Withana et al. (2012), as the title entails, covers suggestions on how to overcome challenges within subsidy reform. Combined with the analysis of other obstacles, this report enables us to pinpoint what changes or measures need to be taken in order to achieve effective implementation with extensive support from various actors.

8.2 Changing Human Behavior

The most consistently mentioned obstacle of sustainable policy measures is that of changing human behavior. It is also one of the challenges that is hardest to overcome, which can be seen in the field of aid-work. Imposed changes will not give long-term effects without the affected parts seeing the purpose, and feeling ownership, of a project.

Agriculture subsidies provide a good example on challenges as to why it is difficult to enhance e.g. subsidy reform. Farmers/producers may have developed a culture of "entitlement" to subsidies, making this specific type of subsidy one that is difficult to straight out remove. This entitlement culture is not exclusively seen with agriculture subsidies. When looking at the receivers of a subsidy, we find that they tend to be concentrated on specific groups, which, due to this, will find lobbying profitable as described in section 4.4.2. The reason they would like to keep the subsidies may be many, and the power of their lobbying efforts to keep a subsidy may reduce the strength of the political will to remove it. Although solutions to reduce their lobbying power have been described, the relevant question is whether initiatives for EHS reform has changed their perception and culture of "entitlement".

Changing human behavior is said to be one of the most difficult obstacles to overcome in meeting challenges, and there is no certain way of knowing if it actually has changed. This goes especially for individual behavior. Groups within e.g. an organization may be prone to transition if one or more individuals lead the way. The effects peer pressure can have on

individuals have been looked at, and fear of not following social norms or living up to expectations is a strong human characteristic that may alter the way someone behave. The aspect of the human psychology will be of importance in the way forward. The two following suggestions are steps that can potentially contribute to affecting human behavior.

8.2.1 Increased Transparency

Low transparency is also one of the most consistently mentioned obstacles until now. With affected parts of a policy measure not knowing how it will affect them and what it will demand of them, resistance can easily develop. Increasing transparency from authorities to citizens can decrease voter opposition to subsidies, and thus make subsidy reform less damaging for governments. This is a suggestion that is highly relevant for all of the policy instruments looked at. Together with the suggestion to challenge misconceptions, (See 8.2.2) this has the potential to reach out to various actors and enable them to change or alter their perspectives.

There are several steps to achieve increased transparency, starting with effectively communicating the real impact of the status quo. For existing subsidies for example, this should be done both in terms of communicating its effectiveness (or the lack of), and its negative social, environmental and economic effect. When implementing regulations, market-based instruments or PES-schemes, communicating the status quo will also be important. The same goes for openness as to how the measures' associated costs and benefits are distributed amongst different actors. Communicating goals and objectives of a reform could trigger both moral and purposive incentives within some groups, thus generating more support for a suggested policy. After implementation of policy measures, regular evaluations should be a minimum requirement for increased transparency.

However, experts consulted by Withana et al. showed different opinions on how communicating efforts should be carried out. Some suggested using a more neutral approach when communicating, so that people would not get frightened. An example could be using the term 'subsidy' instead of 'EHS' to generate more discussion on the topic as well as collaboration with other institutions and actors. This way, governing bodies would avoid taking a moralist "know-all" position that could endanger them losing general support. However, other experts consulted disagreed, and believed in the power of sending a strong, explicit message using a stronger terminology with words such as 'phasing out' and 'eliminate'. What stance governing bodies should take on this is difficult to recommend, as different approaches most likely will have different effects on various groups of recipients.

8.2.2 Challenging Misconceptions

This important solution, simple in theory, says that one should 'debunk' popular beliefs by "present facts and figures in a neutral and easily understandable way" (ibid.). To present a situation and a policy in a neutral and understandable way should not be underestimated. The current rise of right- and left wing radicals in Europe can partially be explained by their ability to communicate their belief and policies in a manner that all people understand; they skip the advanced political expressions and rhetoric. Through this, one can appeal to groups that previously felt left out or not considered in political decisions.

By increasing transparency, one can challenge misconceptions that are particularly widespread amongst citizens. One extreme example of such a misconception is the example that according to popular belief, road pricing is just to torment car drivers. This is of course not the case, but through effective communication of the reasons behind such a policy, one can change peoples conception and gain more support in implementing similar measures.

8.3 Reducing Lobbying Efforts of Special Groups

Reducing the lobbying efforts of the special interest groups discussed in section 4 can be an important solution. However, in a democracy, restricting these rights is not a policy option. Suggestions made revolve around raising the voices of those who are disadvantaged by the status quo through e.g. increased transparency measures. Although covered when looking at subsidy reform, special interest groups are prevalent whatever the policy measure consists of. Parallels to the theory of party competition, which section 7.6 covered, can also be drawn. In countries with powerful lobbying groups, such as the US, actors investing in lifting the voice of those disadvantaged by the status quo can meet more obstacles than in countries with less powerful lobbyists.

8.4 Recognizing Range of Options

This solution is more and more prevalent, as innovative thinking and requirements for a more sustainable development arise. Subsidies are for example promoted by showing the public benefits they are supposed to bring. Even though it may be an effective instrument to achieve its objective, it is usually not the most *efficient* one (ibid.). For regulations, alternatives can be found in using more market-based instrument for the reasons discussed in section 5.3. Single

instruments or policy mixes may bring about behavioral change that is better for the environment and comply with the 'polluter pays' principle and is therefore more cost-effective. However, relying solely on the argument of environmental benefits may not be a solid approach, and one should include arguments of efficient public expenditure.

8.5 Improved Targeting and Design of Existing Policy Measures

As part of increasing transparency, it was mentioned that existing policies, its design and features should be regularly reviewed. This will enable many policies to better target its objectives; it can reduce wasted public money and perhaps reduce some negative social, economic or environmental impact. A change in design of e.g. tax exemptions have been implemented in Germany, where companies will receive a tax reduction if they increase their energy efficiency. Depending on their size, this can be done by introducing energy management systems or energy audits. Such a change in design could also be done by e.g. implementing conditional subsidies.

8.6 Seizing and Creating Windows of Opportunity

This part may prove especially relevant in today's fiscal situation, perhaps particularly in Europe and North America. Changes and reforms in policies can be driven by the need to respond to a fiscal situation to save public expenditure, and as Europe is still in the aftermaths of the 2008 financial crisis, a window of opportunity has risen. This does not only apply to fiscal crises. An environmental crisis struck Canada in 1992, when the Atlantic Northwest cod population abruptly collapsed and the governments declared a moratorium on fishery. This happened due to overfishing since the 1970's, and continuous subsidizing of one of Canada's longest living industries. The situation changed, almost overnight, leading to a substantial reform of subsidies to fisheries.

As most of the purposive and coercive incentives analyzed shows, pressure to comply with international standards and legislations can be a powerful argument to push for policy changes. One can also look at it in a smaller scale, and think that overlapping government interests for budget savings, innovation or addressing climate change can be drivers of change. All can bring a window of opportunity that needs to be taken when it arrives.

9. Conclusion

Through the study, we have seen how various policy instruments and private and public initiatives all have the ability to change and reinforce incentives with different parts of local, national and international communities. Incentives for pushing for subsidy reform and the phasing out of EHS' are mainly financial. By communicating how inefficient subsidies can redistribute benefits and save public expenditures, there is hope for phasing out EHS' and achieve a more efficient distribution of funds.

To address losses, unpopular policy instruments such as regulations, taxes, fees and charges may be required. These can potentially cause resistance from affected groups, and will require more than communicating the financial costs and benefits of them. As individuals often will adapt to changes by choosing the behavior that costs them the least, it needs to be ensured that this behavior is the one that is best for the environment, and that behavioral changes persist over a longer period of time. The fine line between moral and financial incentives can best be seen in developing countries with the examples of markets for endangered species and illegally logged timber. The moral incentives will not be triggered in these cases before a safe and trustworthy institutional framework is in place. After this, one can develop policy frameworks that allow fair penalties and distribution of funds.

Rewarding benefits entail many of the same incentives as addressing losses, but the financial incentives found are often opposite to that of regulations and pricing. Receivers of funds will put their effort into what they are paid for with proper monitoring, evaluation and clear goals. Authorities may need to release funds from one area of the economy to another, something that can be done through e.g. subsidy reform. Private and public actors can also play an important role, but may require help from authorities to cover start-up costs. Challenges are found especially in defining property rights, which often depend on institutional structure.

Investing in ecological infrastructure is an important step with possible efforts from all parts and levels of society. Governments can invest through GPP and trigger incentives with private actors to comply with the requirements and thus becoming more environmentally sustainable. By opening markets to green products and ensuring the credibility of eco-certifications, governments and private actors can trigger both financial, moral, purposive and in some cases coercive incentives with individuals within a society.

9.1 Limitations and Further Research

The beliefs and perspectives amongst respondents varied. Some had more faith in implementation of valuation efforts than others, and some believed more in local efforts than international efforts, and vice versa. The study was limited in time and number of respondents and generalization of results was not possible. Nonetheless, the study provided a deeper understanding of the existing obstacles as well as a supplement to current incentive theory. A suggestion for further research would be to expand the study to cover a larger share of respondent within different sectors of governing bodies, professionals and researchers to find where the specific obstacles to implementation lies, and what can further be done to overcome them.

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Appendix

Questionnaire:

As a Master student at the Norwegian School of Economics, my major in Energy, Natural Resources and Environmental Economics has led my master thesis onto the subject of Natural Capital Accounting and Valuation of Ecosystem Services. Your response will be of great importance in investigating how effective policy making on this topic can occur.

The purpose of my thesis is to investigate and understand the incentives that drives policy makers into implementing effective policies. By studying different areas of policymaking, I hope to investigate the obstacles of effective policies on the subject Valuation of Ecosystem Services.

Your response will be 100% anonymous, and used as part of a qualitative study. Your answers may be used to support my findings as well as deepen my own knowledge on the subject

Part 1: Background:

a) What is your educational background?
b) What is your professional background?
c) What is your current profession and what does your position entail? (Tasks, research, projects etc.)

Part 2: Recognizing the Value of Natural Capital and Ecosystem Services

Statement: *Implementing valuation methods for natural capital accounting and ecosystem services is a process with little specific political effort on a larger scale.*

- Do you believe *short-term thinking* among policy makers is a reason for this? Why/Why not?

- Do you believe *wrong* political incentives is a reason for this? Why/Why not?

- Do you believe *lack of* political incentives is a reason for this? Why/Why not?

Above you had to review some possible reasons for why large-scale implementation is moving slow.

- Do you think the reasons listed above is an important part of the lack of political action? Why/Why not?

- What other elements do you think play a role in the lack of political action?

- Do you have suggestions on how obstacles to implementation can be overcome?

- Do you believe large-scale implementation of natural capital valuation is a necessary step in securing future economic and human development? Why/Why not?