

EXPOSÉ

Working title:

Governmental initiated Payments for Ecosystem Services (PES) Systematisation and performance assessment in the United States of America, United Kingdom and Germany

Claas Meyer

phone: + 49 33432 82-146
email: Claas.Meyer@zalf.de

PhD candidate in the junior research team CIVILand
Topic of the research group:
*The relevance and the innovation potential of the civil society for
payment systems for ecosystem and cultural landscape services*
www.civiland-zalf.org



Institute for Socio-Economics
Leibniz-Centre for Agricultural Landscape Research (ZALF) e.V.;
Eberswalder Straße 84, 15374 Müncheberg, Germany
www.zalf.de

Mentor:
Dr. Bettina Matzdorf

Supervisor:
Prof. Dr. Klaus Müller

Datum: 27.01.2010

Content

- 1 INTRODUCTION AND STATEMENT OF THE PROBLEM..... 3**
 - 1.1 CONTEXT..... 3
 - 1.2 PROBLEM AND DISSERTATION PROJECT 3
 - 1.3 CONCEPT 4
- 2 STATE OF THE ART..... 5**
 - 2.1 ECOSYSTEM SERVICES..... 5
 - 2.2 PAYMENTS FOR ECOSYSTEM SERVICES 6
 - 2.3 INSTITUTIONS, ES AND PES 7
 - 2.4 PES AND WATER RESOURCES 7
- 3 GOAL SETTING..... 8**
- 4 RESEARCH DESIGN AND METHODS..... 9**
 - 4.1 THEORETICAL APPROACH 10
 - 4.2 RESEARCH DESIGN OVERVIEW 12
 - 4.3 METHODOLOGICAL PROCEDURE AND MODE OF PRESENTATION..... 12
 - 4.3.1 *Dissemination of the ES idea*..... 13
 - 4.3.2 *PES schemes in the case study countries* 13
 - 4.3.3 *Institutional analysis* 14
- 5 TIME TABLE..... 15**
- 6 SOURCES 16**

1 Introduction and statement of the problem

1.1 Context

My PhD thesis stems from the project CIVILand. CIVILand is a junior research group that focuses on NGOs, foundations, and civil society initiatives dealing with financial incentives for environmental and cultural landscape services. The group is conducting empirical studies in Germany, Great Britain, and the US, in hope of raising a new perspective in the current international discussion on the Payments for Ecosystem Services (PES). The research of the group is based on the assumption that from a widespread economic point of view, environmental problems arise because air, water, soil, and other natural resources are considered as evident and available everywhere and everything that is accessible can be used. For several years now, attempts to change this mindset have been observed, especially based on the concept Ecosystem Services (ES), which aims to give natural provisions such as clean air, fresh water, and fertile soil an economic value. CIVILand examines how payment incentives and systems for ecosystem services can be developed. Although the overall project is focused on non-governmental initiatives, especially civil society initiatives, government induced programs are also included, presenting an important part. Research on governmental initiated programs in particular appears essential for understanding the structure and capability of the present overall PES structures, which are characterised by state schemes. The whole project is subdivided into seven subprojects. My subproject is aimed at categorising, understanding, and assessing the existing governmental PES and maybe making statements regarding a possible future development.

1.2 Problem and dissertation project

Based on the perception that the increasing human influences on nature and landscape need to be accompanied by focussed measures for protection, the last decade was characterised by the development of concepts, institutions, and instruments for guiding and managing the existing environmental problems. Beside regulatory law, economic instruments are also at the forefront. Its development is affected by research that is related to ecosystems and landscapes, public goods and property rights, public choice as well as environmental ethics. The provision of positive financial incentives for ecosystem services (PES) is an idea that emerged out of this development. The PES idea is built upon the ES approach. The definition for ES as well as the understanding of PES will be looked at because they are controversial. When the ES concept for example is used for tackling environmental problems, the non-commodity aspect becomes apparent and essential (Boyd/Banzhaf 2006) even though the broadest definitions of ES include commodities as well as non-commodities. The PES concept basically aims to create markets for non-tradable ES.

The protection of the environment as well as the preservation of common resources is mainly initiated, governed and financed by the state, due to the perception of environmental problems as public goods. Thus, as indicated above, the majority of the existing PES is also governmental founded and

implemented. At first glance most of the governmental initiated PES in Europe are agri-environmental measures, which are characterized by the European common agriculture policy¹. In contrast, a confusing broad range of initiatives from different fields can be found in the United States.

There is ample and increasing literature regarding PES, but most of the cases are examined individually, especially the ones in development countries. Other studies compare or structure various measures concerning different features. However, an analysis that refers to the criterion “governmental initiated PES” in Europe and/or America, which gives an overview and a systematic analysis, and/or types and evaluates the present systems, and/or gives comprehensive as well as extensive explanations, and/or studies individual strengths and weaknesses could not be found. This may be due to the novelty of the PES idea and the unclear definition. My dissertation is designed precisely to fill the indicated knowledge gap.

1.3 Concept

I will (i) categorise the main structural elements of ES and depict where within the United States and European Union governmental programs and policies the exposed idea can be found. After that, I will (ii) systemize the existing governmental PES and assess how they work. Therefore I will be comparing the instruments of the case study regions Germany, Great Britain, and the United States of America. Finally I will (iii) focus on similar PES programs that are aimed at water services in the different case study areas to determine in a detailed manner the strengths and weaknesses of these particular instruments. Thus my dissertation will start at a very broad overall level regarding the dissemination of the concept “ES” within the case study countries and end at a small scale level with the consideration of individually comparable PES schemes.

Ultimately my research will give specific statements regarding the idea, the construction, the strengths and weaknesses, and the potentialities of state initiated PES by focussing on the differences between the countries, which are characterised by variation in nature, population, culture, individual preferences, and legal as well as administrative system. The composition of the different study areas at hand promises interesting findings. On the one hand there is the disparity between the EU and the United States, with their diverse economic, environmental and agricultural ideas, and policies. This consequentially leads to different peculiarities in the PES concepts and systems. On the other hand there are the common law influenced countries like Great Britain contrasted by Germany with their respective Roman and Germanic shaped written law and federal administration. Despite their differences, Germany as well as Great Britain is obliged to implement the EU policies within its system. Therefore the questions of impacts or non-impacts for the different systems as well as reason and implications arise.

¹ The Common Agriculture Policy (CAP) is a system of European Union agricultural subsidies and programmes.

2 State of the art

2.1 Ecosystem Services

According to Gómez-Baggethun et al. (2009) the origins of the modern history of ecosystem services can be traced back to the late 70s. Westman (1977) and Ehrlich/Ehrlich (1981) in particular should be mentioned. From the 90s onward, there have been more and more publications on the benefits of natural ecosystems (Turner et al. 1998, Daily 1997, Constanza et al. 1997, de Groot et al. 2002, Wallace 2007, Boyd/Banzhaf 2007, Fisher et al. 2009, Gómez-Baggethun 2009). The Millennium Ecosystem Assessment (2005) contributed to putting the ecosystem services firmly on the policy agenda.

There are different definitions and categorizations (Daily 1997, Millennium Assessment 2005, Boyd/Banzhaf 2007, de Groot et al. 2002, Constanza et al. 1997, Fisher et al. 2009) of environmental services and functions. The initiating and one of the most comprehensive studies done is the attempt to value the world's ecosystem services and natural capital by Constanza et al. in 1997. For the ecosystem services of the entire biosphere they estimated US\$ 16-54 trillion per year. The study was conducted to show that ecosystem services provide an important part of the total contribution to human welfare. One of the broadest definitions that emerged, which is the basis for different ES typcasts, originated from the Millennium Ecosystem Assessment Report (2005: 26): *“Ecosystem services are the benefits people obtain from ecosystems, which the MA describes as provisioning, regulating, supporting, and cultural services...Ecosystem services include products such as food, fuel, and fibre; regulating services such as climate regulation and disease control; and nonmaterial benefits such as spiritual or aesthetic benefits. Changes in these services affect human well-being in many ways.”* Critics saw many problems concerning the broadness and mediocrity of the different ideas and definitions.

A discussion on what ecosystem services are and how to value which ecosystem services emerged over time in response to these problems. Turner et al. (1998) tried e.g. to specify the idea by Constanza et al. and to hint at difficulties, referring especially to the scale problems of valuating. One of the main problems is according to Wallace (2007: 1) that the distinction between mix processes for achieving services and the services themselves is not always clear and/or a distinction is not made. Thus some definitions include the processes (measures) as ecosystem services. This finally may result in counting a measure twice in the valuation because the measures are often relevant for more than one final service (end). Therefore some authors (Boyd/Banzhaf 2007, Wallace 2007) narrowed and concretised the definition of services to achieve certain applicability. For example Boyd/Banzhaf's definition is

based on two main insights: the isolation from non-ecological contributions for final goods (ends)² and the idea that economic accounting is concerned with ecological end-products and not the far larger set of intermediate processes and elements. Thereby an attempt was made to create a concrete set of ecological elements to be counted. By contrast, Fisher et al. (2009) referred to the ecological character of the service but included ecosystem organisations or structure as well as process and functions in its ES definition (by separating services into intermediate and final ones), if the humans benefited from it. Furthermore Fisher et al. (2008) described the problems of integrating the ecosystem service research in the policy process.

2.2 Payments for Ecosystem Services

PES schemes may be relatively new but PES research has already become an important area of investigation in the last five years. Many papers that analysed PES from various aspects had been published lately (Fisher et al. 2009, Kemkes et al. 2009, Vatn 2009, Kosoy/Cobera 2009, Muradian et al. 2009, Pascual et al. 2009, Roland et al. 2009). Just as there are different perceptions regarding ES, there are also different understandings of PES. Mayrand/Paquin (2004: ii) stated generally that PES *“seek to support positive environmental externalities through the transfer of financial resources from beneficiaries of certain environmental services to those who provide these services or are fiduciaries of certain environmental resources”*. The most common definition of PES was given by Wunder et al. (2008). He defined PES as follows: *“A PES scheme, simply stated, is a voluntary, conditional agreement between at least one ,seller’ and one ,buyer’ over a well defined environmental service – or a land use presumed to produce that service”*. But this is only one definition. Overall, PES is understood in a broader sense than defined by Wunder in other documents. With regards to the statement by Mayrand/Paquin (2004: ii) the lack of a common definition reflects the great diversity of the existing models and furthermore generates confusion and lack of clarity as to which schemes should be considered as PES.

The PES concept was reviewed from various aspects (Whitten et al. 2003, Mayrand/Paquin 2004, Ravnborg et al. 2007, The Katoomba Group et al. 2008, Wunder et al. 2008, Engel et al. 2008). PES was basically surveyed and the differences, similarities, strengths, weaknesses, and limitations of different schemes and its implementation were analysed. Ravnborg et al. (2007) e.g. looked especially at PES with regards to pro-poor options for development support, whereas The Katoomba Group et al. (2008) and Engels et al. (2008) focused on the development of payments for ecosystem services deals and the design of the schemes. Only a few studies discussed the impacts of the origins of the PES schemes – public or private sector initiated – on their performance. One of these studies is by Wunder et al (2008). In this study, they systematically compared PES and found differences between user-financed and government-financed PES programs. Through this an analysis framework showing

² „Once ecosystem services are combined with other inputs, such as labour and capital, they cease to be identifiable “ecological”.” (Boyd/Banzhaf 2006: 23)

factors that affect the effectiveness and efficiency of PES was developed. The significant differences can be summarised as follows: user financed programs were often better targeted, more closely tailored to the local premises, had better enforcement mechanisms and less side-objectives. Up until now, the comparison of different governmental initiated schemes against the backdrop of diverse state structures could not be found.

2.3 Institutions, ES and PES

Environmental and Resource Economics, whose origins trace back to the 1960s, expanded the scope of analysis for neoclassical economics through the development of methods for valuating and the internalisation of economic impacts on the environment in decision making. According to Gómez-Baggethun et al. (2009: 4) the New Economic of Ecosystems emerged from these ideas underpinning a line of argumentation that stresses societal dependence on natural ecosystems. Hence ecosystems are seen as economic values. Economic values and valuation processes in this context are assumed to be culturally constructed and act as value articulating institutions (Vatn 2005, Gómez-Baggethun et al. 2009). Whitten et al. (2003) developed a framework to meet the conditions for market creation for ES on an institutional economics basis. He defined a market as *“the bringing together of a buyer and a seller so that they can voluntarily trade property rights”* (Whitten et al. 2003: 7). He especially referred to different transaction costs of various policies and their crucial relevance for the introduction of markets. Also Mayrand/Paquin (2004) and Wunder (2008) referred to the importance of transaction costs for the effectiveness, equity, and efficiency of the PES schemes. Vatn (2009) conducted a new comprehensive study evaluating PES using institutional theory. He assumed that the establishment of markets for ES was a demanding process of social and political construction. He explained that the development of the ES markets is characterized by a the high level of transaction costs of allocating environmental services, the transaction cost reducing nature of hierarchies and communities, and the embeddedness of the allocation mechanisms in sets of different social organizations (Vatn 2009: 7).

2.4 PES and water resources

Many important ES are related to water resources. For example 63% of 167 PES schemes that were reviewed by Ravnberg et al. (2007) dealt with hydrological services. Thus various studies on water resource related PES observing various aspects can be found, such as the ES “water quality” in Madagascar (Wendland et al. 2009), different water-related services in the Netherlands (de Groot/Hermans 2009), payments to compensate downstream externalities in Kenya (Jack 2008), PES in common pool resource management in Kenya (Fisher et al. 2009) etc. According to de Groot/Hermans (2009: 2761), the existing reviews and guidelines generally considered three dimensions as important in developing the schemes: hydrology, economics, and institutions.

In our case study regions especially, various water related PES could be found. One of the most well known American water-PES-examples is the protection scheme for New York's drinking water in the Catskills region (Valatin/Coull 2008). In addition, several wetland mitigation bank systems also exist (Valatin/Coull 2008, Tabatabai/Brumbaugh 1998). Moreover cap and trade systems based upon a "Total Maximum Daily Load" also operate in many parts of the country (Valatin/Coull 2008). In the UK and Germany the EU Water Framework Directive (2000) is basically the most important water policy that sets the quality goals to be achieved. A wide range of programs deals with the enhancement of the water quality. For example in England different incentives aimed at reducing diffuse water pollution from agriculture can be found (Horsey 2006). A comparison of different water related schemes with reference to the aspect of governmental initiation has not been found so far.

3 Goal setting

The main goal of the study at hand is to produce substantiated statements regarding the presence, the structure, the performance, and the problems of governmental initiated PES within the three research regions (Germany, Great Britain, United States of America). My hypothesis is that **there are certain institutional aspects which result in either good or bad performance of governmental initiated PES**. Thus my overall research questions are:

- Which governmental initiated PES schemes exist within the research regions?
- How do the governmental initiated PES perform?
- What are the institutional aspects of good and bad performance?

Due to the observation that with increasing research on the ecosystem service concept, interest has grown in the design of market based instruments (Gómez-Baggethun 2009), **I assume that PES is a crucial instrument for implementing the ES idea and thus governmental initiated PES could often be found where the ES idea has reached policies**. Therefore it seems useful to focus on the basic idea behind the ES concept and examine where this idea appears in the respective legal and administrative documents to find out if, how, where and why the internal conception has reached governments. This fundamental knowledge will enable one to detect and understand where and why the state uses PES schemes. This gives rise to two additional and more precise research questions:

- What are the essentials of the ES concept?
- Where in the EU and US governmental policies and laws can the ES concept be found?

As mentioned above, the identification of the governmental uses of the ES concept is in my opinion the basis for the identification of governmental initiated PES. To tackle the present uncertainty concerning the definition of PES, the main ideas of PES will be presented here. My first task will be the structuring of a basic PES concept and subjective definition for my scientific work to determine

which elements to look for. After that the concept will be searched for in the national government programmes of the case study regions. Based on Wunder et al.'s (2008) findings regarding the different performance of various schemes, **I would state that (more or less) successful PES schemes can be found and the success of the scheme depends on certain necessary and sufficient conditions.** The differences between the case study regions are a matter of particular interest, given the comparative nature (between countries) of this study. This gives rise to the following research questions.

- What are the essentials of the PES concept?
- What PES schemes exist in Germany, Great Britain, and the United States?
- How are the PES schemes performing? Do they work successfully?
- Are there necessary and sufficient conditions for a successful performance?

Finally certain payment systems will be studied and the pursuant governance structures will be examined more precisely. Based on Vatn's (2005) statement about the institutional character of economic values, **I assume that differences in institutional arrangements particularly are the crucial conditions for the success of a PES scheme.** Therefore the different PES focussing on the Ecosystem Services "Water quality and quantity" and fulfilling different conditions will be analysed in a comparative institutional analysis. The "water services" were chosen as the relevant unit of investigation because many PES schemes include these services, at least in an indirect manner. The framework for the analysis will be based on the knowledge of necessary and sufficient conditions for a successful performance of PES gained by answering the previous research questions. The sets of criterions, e.g. transaction costs, incentive structures etc., will be chosen in the research process. Further research questions are as follows:

- What are the different institutional arrangements for payment schemes for the ES water quality and quantity?
- Which institutional arrangements perform successfully?
- What are the reasons for successful performance?

4 Research design and Methods

In the following chapter I will describe my research design, the methods in use and the mode of result presentation. At first (i) an introduction to the new institutional economics, which represents my guiding theoretical principles will be given. After that (ii) a graphical overview of my research design and the research process will be described. Finally (iii) the given overview will be specified, where reference to the individual steps of the research design and the mode of presentation will be made.

4.1 Theoretical approach

Theoretically my thesis will draw on the **New Institutional Economics (NIE)**. According to Monsees (2008) the term includes such different approaches as transaction cost economics, property right theories, and principal-agent theories. Sometimes the new political economics as well as constitutional economics are also embraced. Since it is difficult to ascertain which aspects of these broad theories could be important and determining within my research, I will describe, explain and define the main cornerstones. During the research process my aim is to focus on some important aspects of the chosen case studies and take them as the basis of my analysis.

Unlike the appreciations of the neo-classic mainstream, the NIE understand institutions as not neutral regarding allocations. Important representatives in the field of NIE research that are different in their focus are: Ronald Coase (1937), Harold Demsetz (1967), Douglass North (1992), Oliver Williamson (1985), and Elinor Ostrom (1990). Starting from the assumption of methodological individualism in NIE, some basic classic presumptions were modified –bounded rationality, opportunism, and transaction costs particularly were taken into account. The fundamental objects of analysis are **“institutions”**, **“organisations”**, **“transactions”**, and **“property rights”**. (Monsees 2008)

The **“institutions”**-concept describes a variety of concepts within the social sciences and a coherent definition could not be found (Vatn 2005: 9). In the course of the new institutional economics, institutions are understood as ‘the rules of the game’. North defined them as *“rules of the game in a society or, more formally, as humanly devised constraints that shape human interaction”* (North 1992: 3). Such institutions rule interactions on different levels and concern global processes as well as interpersonal relations. Furthermore they can be informal or formal and codified or non-codified. (Schlüter 2001: 5)

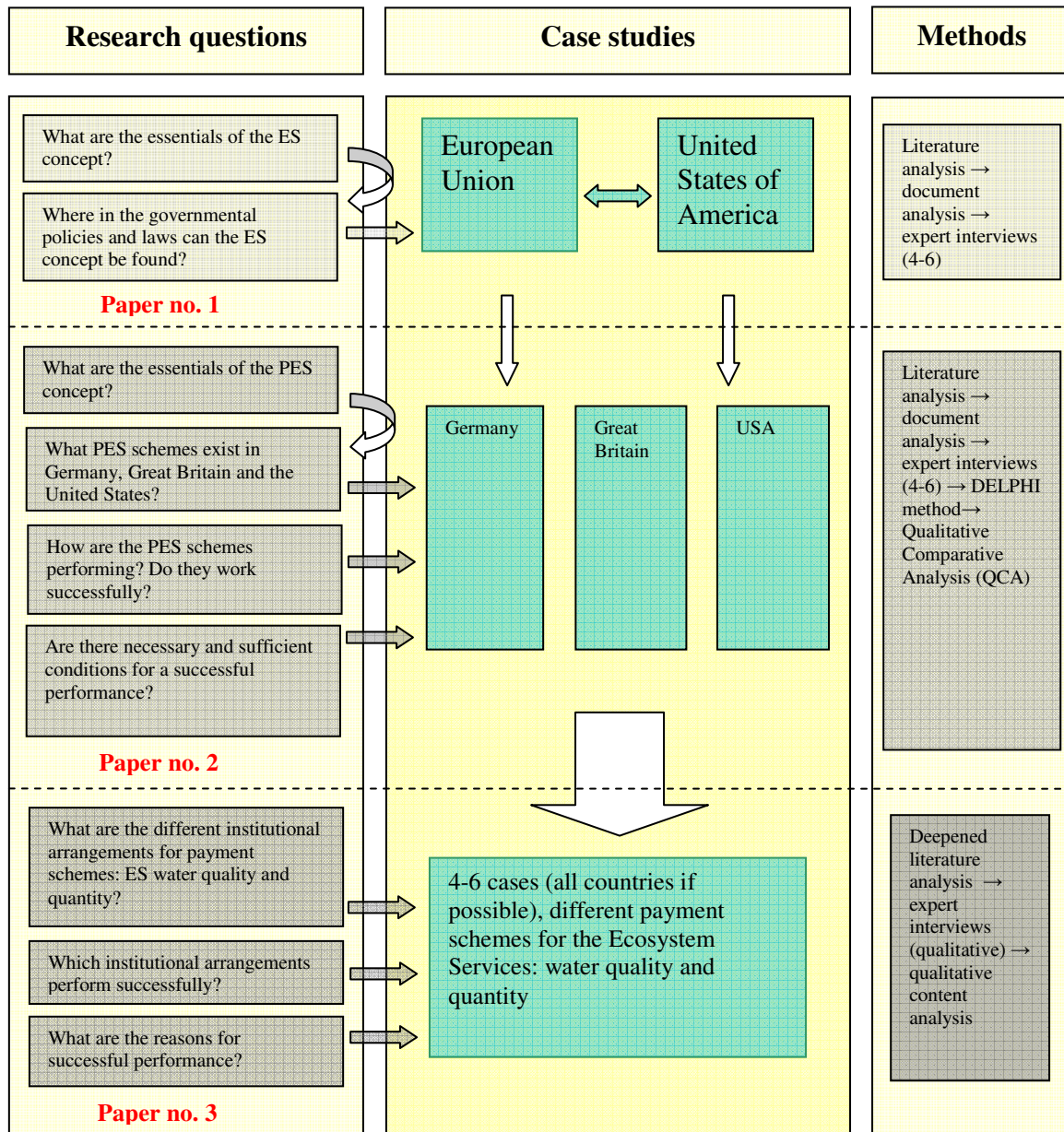
“Organisations” are understood as the ‘players of the game’ (North 1993: 1). North (1992: 5) stated that they are made up of groups of individuals, who are connected with each other through common targets. He adduced for instance public bodies, economic legal entities etc. in his arguments. The institutional matrix as framework condition determines which organisations would emerge. On the other hand the organisations influence the development of the institutional frame (North 1993: 1, North 1992: 5).

“Transactions” could be the transfer of goods or services over a technical definable interface as well as a transfer of property rights (Richter/Furubotn 1999: 523). **“Transaction costs”** are firstly understood as friction costs, especially defaults and delays (Williamson 1985). Institutions were developed to decline these transaction costs. The development of institutions is costly. The costs of the

institutional formation, implementation, maintenance, and adjustment are also seen as transaction costs (Beckmann 2000).

“Property Rights” is defined as *“a claim to a benefit (or income) stream that the State will agree to protect through the assignment of duty to others who may covet, or somehow interfere with, the benefit stream”* (Bromley 1991: 2) or focussed on the property holder and the degree of protection afforded as *“the individual’s ability, in expected terms, to consume the good (or the services of the asset) directly or to consume it indirectly through exchange”* (Barzel 1997: 3).

4.2 Research design overview



4.3 Methodical procedure and mode of presentation

My thesis will be composed of three main parts, answering groups of research questions in each part and following different methodological strategies. The findings of each part will be presented as a paper for publication. Finally, the parts will be put together and evaluated coherently for the thesis. The first part deals with the ES concept and its dissemination in European and American laws and policies. The second part will inventory the existing PES within the case study countries (Germany, Great Britain, 2 American states) and search for factors of a successful performance. The third part examines the impacts of the institutional arrangement on the performance of PES.

4.3.1 Dissemination of the ES idea

The main ideas of the ES concept will first need to be worked out. Therefore a broad literature review will be conducted to extract the essence of the ES concept. The essential variables are the fundamentals for building up a framework for assessing the respective state documents. The framework will be applied to the different laws and policies of the case study regions: United States of America (national level) on the one hand and the European Union (EU level) on the other hand. The application of the framework will be based on the German classic legal interpretation methodology, which draws on four different approaches: the **grammatical interpretation approach**, the **systematic interpretation approach**, the **historic interpretation approach**, and the **teleological interpretation approach** (Larenz/Canaris 2010). The application of these four approaches will require an in depth document analysis, drawing on environment laws, administrative regulations, and protocols of accordant parliamentary debates. Expert interviews with a few “key actors” (probably 6 at the maximum) will be conducted to find out the appropriate governmental documents. Optionally, further interviews may be performed to verify and deepen the document analysis outcomes. In this case, my “key actors” will be persons who have worked on the respective documents for a longer time. The expected outcome is an overview regarding the pursuant state policies that draw on the ES concept.

4.3.2 PES schemes in the case study countries

The analysis of the essentials of the PES concept requires another broad literature review with regards to the understanding of the PES concept. First and foremost, a specified PES definition for my dissertation will have to be worked out. After that, single schemes in the case study countries will have to be sorted out based on this definition. The case study regions are Germany, Great Britain, and the USA. The identification process is dependent on a document analysis and explorative expert interviews. For the document analysis I will draw back on the outcomes of the ES research, since it is assumed that PES schemes are often found where ES concepts are implemented. The expert interviews shall be conducted in combination with the interviews regarding ES schemes.

A framework will be developed based on the collected facts to structure and systemise the functions and performance of the PES schemes. The framework will focus on the institutional structure of the PES schemes and the institutional setting around it (see above: chapter 4.1). If the functioning and the institutional settings are not accessible by document analysis, further expert interviews will be conducted. The success of the PES will be examined with the **“Delphi method”**. The Delphi method was developed in the 50s to assess the impact of technology on warfare (Linstone/Turoff 1975). It is an interactive forecasting method that is dependent on the estimation of experts. The experts have to answer a few rounds of questions, whereby an anonymous summary of the forecasts will be provided following each round of questions. The method can also be used to give aggregated estimations of present impacts instead of only generating forecasts. This is the aim in my analysis – to give an aggregated validation result on the success or non-success of the schemes using the Delphi method.

The “experts” interviewed within the study are from the appropriate authorities and governmental agencies working on the development, implementation, monitoring, and evaluation of the PES schemes. This part of the study will reveal how the single schemes work and whether they are successful or not.

Finally the outcomes, generated within the interviews, the document analysis as well as the “Delphi method”, will be examined using **Qualitative Comparative Analysis (QCA)**. Initially it must be assumed that the existing governmental PES in the case study region will display mid-level case studies (approx. 30-50 schemes). QCA (developed by Charles Ragin) is thought of as a bridge between qualitative and quantitative methods. The method in particular is recommended for the analysis of such mid-level case studies. It proceeds from given variables and aims to identify certain patterns from specific circumstances. Therefore necessary as well as sufficient conditions will be determined. (Schneider/Wagemann 2007). In this case institutional structures and the success, both analysed within the working steps described above, shall be the determining variables. The expected outcomes are basic statements that reveal variables that could be responsible for the success of governmental initiated PES.

4.3.3 Institutional analysis

Based on the work before, PES schemes (4-6) that deal with the ES water quality and/or quantity will be sorted out. Furthermore the QCA will provide insights into the importance of certain variables. Thus new theses regarding the impact of certain institutional arrangements on the success of certain PES may be postulated. For the validation of the hypothesis, a framework will be built for the institutional analysis. The crucial factors to be considered theoretically and for the framework will arise from the previous QCA as well. The examination will draw on qualitative expert interviews. The interviews will be interpreted using the **Qualitative Content Analysis** by Mayring (2000). Certain computer programmes (e.g. *ATLAS/ti*) will be applied for the analysis. Expected outcomes would be profound statements regarding the advantages and disadvantages of certain institutional arrangements for the success of PES schemes.

5 Time table

	2009	2010	2011	2012	2013
Dissemination of the ES idea					
Explorative expert interviews					
ES concept (concept of multifunctionality)					
ES - document analysis					
Interpretation					
Paper publication					
PES schemes in the case study countries					
Explorative expert interviews					
PES definition					
Identifying PES schemes (identifying US case study states)					
Analytical Framework					
Analysis and Delphi method					
QCA					
Paper publication					
Institutional Analysis "Water PES"					
Identifying case studies / Framework institutional analysis					
Expert interviews					
Qualitative Content Analysis					
Paper publication					
PhD Thesis					
Introduction and conclusion					
Final revision					
Travels					
UK travels					
USA travels					

6 Sources

- Barzel Y. (1997): *Economic Analysis of Property Rights*, 2nd edn. Cambridge University Press, Cambridge.
- Beckmann V. (2000): *Transaktionskosten und institutionelle Wahl in der Landwirtschaft. Zwischen Markt, Hierarchie und Kooperation*. Berlin, Ed. Sigma.
- Boyd J., Banzhaf S. (2007): *What are ecosystem services? The need for standardized environmental accounting units*. *Ecological Economics* Vol. 63, 616-626.
- Bromley D.W. (1991): *Environment and Economy*. Blackwell, Oxford.
- Coase R. (1937): *The Nature of the Firm*. In: *Economica*, Vol. 4, 386-405.
- Costanza R., d'Arge R., de Groot R., Farber S., Grasso M., Hannon B., Limburg K., Shahid N., O'Neill R. V., Paruelo J., Raskin R.G., Sutton P., van der Belt M. (1997): *The value of the world's ecosystem services and natural capital*. In: *Nature* Vol. 387, 253-260.
- Daily G. (1997): *Nature's Services: Societal Dependence on Natural Ecosystems*. Island Press, Washington DC.
- Demetz H. (1967): *Toward a Theory of Property Rights*. In: *The American Economic Review* Vol. 57, 347-359.
- de Groot R.S., Wilson M.A., Boumans R. M J. (2002): *A typology for the classification, description and valuation of ecosystem functions, goods and service*. In: *Ecological Economics* Vol. 41, 393-408.
- de Groot R.S., Herman L.M. (2009): *Broadening the picture: Negotiating payment schemes for water-related environmental services in the Netherlands*. In: *Ecological Economics* Vol. 68, 2760-2767.
- Ehrlich P.R., Ehrlich A.H. (1981): *Extinction: the causes and consequences of the disappearance of Species*. Random House, New York.
- Engel S., Pagiola S., Wunder S. (2008): *Designing payments for ecosystem services in theory and practice: An overview of the issues*. In: *Ecological Economics* Vol. 65, 663-674.
- Fisher B., Kulindwa K., Mwanyoka I., Turner K.R., Burgess N.D. (2009): *Common pool resource Management and PES: Lessons and constraints for water PES in Tanzania*. In: *Ecological Economics*, doi:10.1016/j.ecolecon.2009.11.008.
- Fisher B., Turner K., Morling P. (2009): *Defining and classifying ecosystem services for decision making*. In: *Ecological Economics* Vol. 68, 643-653.
- Fisher B., Turner K., Zylstra M., Brouwer R., de Groot R., Farber S., Ferraro P., Green R., Hadley D., Harlow J., Jefferiss P., Kirkby C., Morling P., Mowatt S., Naidoo R., Paavola J., Strassburg B., Yu D., Balmford A. (2008): *Ecosystem Services and Economic Theory: Integration for Policy-Relevant Research*. In: *Ecological Applications* Vol. 18(8), 2050-2067.
- Gómez-Baggethun E., de Groot R., Lomas P.L., Montes C. (2009): *The history of ecosystem services In economic theory and practice: From early notions to market and payment schemes*. In:

Ecological Economics, , doi:10.1016/j.ecolecon.2009.11.007.

Horsey S. (2006): *Case Studies Aimed At Reducing Diffuse Water Pollution From Agriculture In England*. Department for Environment Food and Rural Affairs.

Jack B.K. (2009): *Upstream-downstream transactions and watershed externalities: Experimental evidence from Kenya*. In *Ecological Economics* 68, 1813-1824.

Larenz K, Canaris C.-H. (2010): *Methodenlehre der Rechtswissenschaft*, 4. Aufl. Springer, Berlin.

Linstone H.A., Turoff M. (Ed.) (1975): *The Delphi Method. Techniques and Applications*, Reading.

Mayrand K., Paquin M. (2004): *Payments for Environmental Services: A Survey and Assessment of Current Schemes*. Unisféra International Centre for the commission for Environmental Cooperation of North America, Montreal.

Mayring P. (2000): *Qualitative Content Analysis*. In: *Forum Qualitative Sozialforschung/ Forum: Qualitative Social Research*, 1(2), Art. 20. <http://nbn-resolving.de/urn:nbn:de:0114-fqs0002204>.

Millennium Ecosystem Assessment (2005): Ecosystems and Human Well-being: Biodiversity Synthesis. World Resources Institute, Washington DC.

Monsees J. (2008): *Governancestrukturen für Fließgewässer. Eine vergleichende Institutionenanalyse gewässerunterhaltender Verbände und Behörden*. Neue Studien zur politischen Ökonomie 3. Nomos, Baden-Baden.

North D.C. (1993): *Five Propositions about Institutional Change: A Framework of Analysis*. In: *Economic History No. 941200*. EconWPA. <http://ideas.repec.org/s/wpa/wuwpeh.html>.

North D.C. (1992): *Institutionen, institutioneller Wandel und Wirtschaftsleistung*. Tübingen, Mohr.

Ostrom E. (1990): *Governing the Common. The Evolution of Institutions for Collective Action*. Cambridge.

Ravnborg H.M., Damsgaard M.G., Raben K. (2007): *Payments for Ecosystem Services – Issues and Pro-Poor Opportunities for Development Assistance*. DIIS Report 2007/6. Danish Institute for International Studies, Copenhagen.

Schlüter A. (2001): *Institutioneller Wandel und Transformation. Restitution, Transformation und Privatisierung in der tschechischen Landwirtschaft*. Dissertation. Shaker, Aachen.

Schneider C.Q., Wagemann C. (2007): *Qualitative Comparative Analysis (QCA) und Fuzzy Sets. Ein Lehrbuch für Anwender und jene, die es werden wollen*. Verlag Barbara Budrich, Opladen & Farmington Hills.

Tabatabai F., Brumbaugh R. (1998): *National Wetland Mitigation Banking Study. The Early Mitigation Banks: A Follow-up Review*. IWR Report Working Paper. Institute for Water Resources, Water Resource Support Center, Alexandria, Virginia.

The Katooba Group, United Nations Environment Program (UNEP), *Forest Trends (2008): Payments for Ecosystem Services: Getting Started. A Primer*. UNON/Publishing Service Section/Nairobi.

- Turner R.K., Adger W.N., Brouwer R. (1998): *Ecosystem services value, research needs, and policy relevance: a commentary. Special Section: Forum on valuation of ecosystem services. In: Ecological Economics Vol. 25, 61-65.*
- Valatin G., Coull J. (2008): *Payments for Ecosystem Services. Findings and Perceptions from the USA. Report. Forestry Commission/ Forest Research.*
- Vatn A. (2009): *An institutional analysis of payments for environmental services. In: Ecological Economics, doi:10.1016/j.ecolecon.2009.11.018.*
- Vatn A. (2005): *Institutions and the Environment. Elgar, Cheltenham.*
- Wallace K.J. (2007): *Classification of ecosystem services: Problems and solutions. Review. In: Biological Conservation Vol. 139, 235-246.*
- Wendland K.J., Honzák M., Portela R., Vitale B., Rubinoff S., Randrianarisoa J. (2009): *Targeting and implementing payments for ecosystem services: Opportunities for bundling biodiversity conservation with carbon and water services in Madagascar. In: Ecological Economics, doi:10.1016/j.ecolecon.2009.11.002.*
- Westman W. (1977): *How much are nature's services worth? In: Science 197, 960-964.*
- Whitten S., Salzman J., Shelton D., Proctor W. (2003): *Markets for ecosystem services: Applying the Concepts. Paper presented at the 47th Annual conference of the Australian Agricultural and Resource Economics Society, Fremantle.*
http://www.ecosystemservicesproject.org/html/publications/docs/Markets_AARES2003.pdf
- Williamson O.E. (1985): *The Economic Institutions of Capitalism. New York, Free Press..*
- Wunder S., Engel S., Pagiola S. (2008): *Taking stock: A comparative analysis of payments for Ecosystem services programs in developed and developing countries. In: Ecological Economics Vol. 65, 834-852.*