



UNIwersytet Jagielloński
w Krakowie

Wydział Biologii i Nauk o Ziemi
Instytut Nauk o Środowisku

**Private Land in Biodiversity Conservation:
Characterizing and Analyzing Stakeholders' Attitude**

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Rozprawa doktorska

wykonana pod opieką

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Instytutu Nauk o Środowisku

Kraków 2015

The scholarship of the author was provided by the project “*Launching interdisciplinary doctoral studies programme in ecology in English and increasing the didactic potential of the staff of the Institute of Environmental Sciences at the Jagiellonian University*”, which was co-financed by the European Union under the European Social Fund



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Cover layout: Sristi Kamal and Sanjay Gurung
Printed: FHU SEZAM, Kraków

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Abstract

Biodiversity conservation has traditionally relied on protected areas as its functional units; however, the continuing decline in global biodiversity has led the conservation field to explore other options, private lands being one of them. Although it is unlikely that private lands will be able to support the global biodiversity on its own, it can definitely complement the existing protected area model as private land consists of the larger proportion of global terrestrial land. However, integrating private land into conservation strategies is complicated by the nature of land ownership and the inherent socio-economic traits associated with the land. The effectiveness of conservation actions is a function of human and social dimensions of socio-ecological systems, such as stakeholders' willingness and capacity to participate. Therefore, in order to identify the conservation opportunity among stakeholders, the research goal was to examine stakeholders' attitude toward biodiversity conservation on private land and to assess factors that influence this expressed attitude. The primary case study site was Poland, where the only form of private land conservation is the regulatory form inside of protected areas. Additionally, the status of private land conservation in Poland was contrasted with that in the US as an example of a country where private land conservation has evolved significantly in comparison to Poland. The entire research consisted of three stages that used social sciences methodology which were qualitative (literature review, in-depth interviews), semi-qualitative (Q methodology) and quantitative (questionnaire survey) in nature.

Private land conservation will rely as much on institutional support as it does on landowners' willingness to participate. Hence, the first phase of the research explored institutional perspectives toward biodiversity conservation on private land along with its challenges and potential opportunities. A total of 25 in-depth interviews were conducted with managers of institutions involved in private land conservation in the US and in Poland. The results highlighted how perspectives are influenced based on experience and presence of adequate policy tools. In case of US, voluntary private land conservation is supported by financial and other policy instruments by institutions in both private and public sector. This is an indication of recognition of the role of private land in biodiversity conservation. Additionally, managers were more aware of non-monetary factors that predispose a landowner to undertake conservation actions. In contrast, Poland had minimal recognition for private land conservation and managers considered such lands to be contiguous with the protected area it was a part of. Voluntary private land conservation was equated with privately protected areas and they perceived little effectiveness of such a strategy in Poland. Managers focused more on financial tools as the potential solution for regulated private land conservation. Finally, the lack of a strong presence of civic sector organizations to support such a strategy was apparent in Poland.

The presumption of managers in Poland in the exploratory research that financial incentives are the main motivations for landowners to engage in conservation indicated a need for examining the actual predominant attitudes among the primary stakeholder groups in Poland. This was done using a specific tool called Q methodology that helps quantify qualitative information and still allows for qualitative interpretation. The Q study was conducted with 28 respondents from different stakeholder groups, namely protected area agencies, municipal offices, NGOs and private landowners. Three main attitude groups emerged among all stakeholders: one group did not support obligatory biodiversity conservation on private land because they perceived it as a financial burden for landowners and loss of their authority over their own land. The second group of attitude supported biodiversity conservation on private land for ecological reasons and did not believe in relying on landowners' voluntary actions to conserve important resources. They did not perceive any substantial loss for landowners in the process. Finally, the third group of attitude acknowledged the importance of private land in conserving biodiversity but expressed hesitation because of the trade off in terms of property rights for landowners. They believed that the current policy and institutional structure did not support such a conservation strategy.

The three groups of attitude highlighted the potential conservation opportunity in Poland for private land conservation. However, capitalizing on this conservation opportunity would require adequate policy tools, and framing such tools in turn require a better understanding of factors that influence landowners' expressed attitude. The exploratory research in Poland and US identified some inherent landowner characteristics as well as some external factors that influence landowners' attitude toward private land conservation. This research tested the hypothesis that certain intrinsic and extrinsic factors influence landowners' disposition to private land conservation by conducting questionnaire survey with 318 landowners in Poland through random selection across three different types of protected areas. The assessment focused on documenting landowners' opinion on the inclusion of private land in biodiversity conservation and correlating this expressed attitude with their socio-demographic and economic factors. Additionally, some external factors such as type of protected area and exposure to restrictions were taken into account. The study revealed that except for the level of education, and their conservation ethic, none of the socio-demographic and economic factors had any influence on a landowner's support (or the lack of it) for private land conservation. However, external factors such as type of protected area and restrictions did have an influence. Thus, unlike voluntary conservation on private land, landowners' inherent characteristics become secondary to external influence such as imposed restrictions in shaping their attitude when it comes to regulatory private land conservation. The results also identified landowners' expectation of a better distribution in decision-making power of protected areas with private lands within its boundaries.

This research thus highlighted that even though private land conservation is very nascent and restricted in Poland, there is conservation opportunity among people to extend

and expand it. However, any effort to enhance private land conservation in Poland will require substantial modification in the current environmental policies (that do not focus on private land in regulatory or voluntary form), institutional structures of governance (which is currently a centralized, top-down approach) and these needs to be complemented by a strong civic sector support and appropriate incentive tools.

CHAPTER 1: Introduction and Research Overview

1. Introduction

1.1. Biodiversity Conservation and Private Land

Global biodiversity loss has been a persistent problem and it has witnessed severe acceleration in the past few decades (UNEP 2010). The occurrence of biodiversity and its subsequent loss is not uniform across the world. Biodiversity hotspots mark areas of rich biodiversity but they are also representative of places with fragile biodiversity that has already been subjected higher anthropogenic threats (Conservation International 2014). Observing the map of global biodiversity hotspots map, most places occur in the tropical and sub-tropical regions of the world and this region overlaps mostly with developing countries that are still trying to deal with other serious issues such as poverty, education, gender equity and developmental pressures to meet the demands of developed countries (Lenzen et al. 2012; McShane et al 2011). Thus, loss of biodiversity is often connected to social and economic issues of people that co-exist with it.

Irrespective of the differing rate of loss of biodiversity globally, literature from across the world is in consensus on the importance of species diversity to maintain the ecosystem services and cater to human well-being and provides a summary (Naeem et al. 2009; Schulze and Mooney 1993; Tilman 1997). Simultaneously, researches in the past two decades show that biodiversity loss reduces the productivity and sustainability of natural ecosystems, and their ability to provide goods and services that are important for the sustenance of humans (Cardinale et al. 2012; Diaz et al. 2006). The Millennium Ecosystem Assessment Report (MEA 2005) estimated that 10-30% of the mammal, bird and amphibian species are threatened with extinction due to human actions. Loss of biodiversity is consistent in its structural (that is, ecosystem, species and genetic diversity) as well as functional forms (ecosystem functions) (UNEP 2010). This has been largely attributed to the persistent, and sometimes intensifying, anthropogenic pressures of habitat loss and degradation, climate change, over-exploitation and unsustainable use of resources, pollution and alien invasive species (CBD 2014). International efforts to halt this exponential loss of biodiversity accelerated after the Rio Summit in 1972 and the subsequent formulation of the Convention of Biological Diversity (CBD) in 1992 where a significant number of countries expressed their concern and commitment to mitigate and curb the loss of biodiversity. This resulted in the surge of tools and strategies to protect biodiversity; however, the predominant solution to the problem of biodiversity loss has been the establishment of protected areas in places of ecological importance (Robbins et al. 2006).

The network of protected areas, identified based on their utility, uniqueness and endangerment of the natural resources they hold, mark the cornerstone of effective global biodiversity conservation strategy. The CBD has 168 signatory countries committed to working at a global scale on a conservation goal to establish and manage ecologically representative protected areas (CBD 2014). The World Database on Protected Areas (WDPA), which is a joint endeavor between United Nations Environment Programme (UNEP) and the International Union for Conservation of Nature (IUCN)'s World Commission on Protected Areas (WCPA), tracks the progress of these protected areas in meeting international biodiversity conservation targets (UNEP-WCMC 2014). Protected areas also form the core of efforts to conserve the various services that nature provides including supporting, provisioning, regulating and cultural services (as defined by the Millennium Ecosystem Assessment) for their impact on human well-being (MEA 2005). Thus, protected areas can be considered to be the functional units of biodiversity conservation, and it is therefore unsurprising that their numbers have significantly increased globally in the last two decades (Robbins et al. 2006).

The protected area model, however, has faced criticism on several grounds. Together, the global protected areas network covers only 15% of the world's terrestrial area (UNEP-WCMC 2014) and even though these areas are identified based on their biological diversity and fragility, nevertheless, considerable proportion of the global biodiversity occur outside of this 15% of land area (Stein et al. 2010). Also, it is often economically unsound for governments to designate each ecologically prioritized area as a protected area. Additionally, protected areas are susceptible to human activities such as downgrading, downsizing and degazettement (Mascia et al. 2014). Hence, protected areas alone have not been able to solve the fundamental issue of biodiversity loss and achieve global and regional targets such as the CBD 2010 target and the EU 2010 target. This has led the conservation field to shift its focus toward developing alternatives that can complement the existing protected area model, such as the inclusion of private lands in conservation strategies (CBD 2014; Mora and Sale 2011). Private lands cover a significant portion of the global terrestrial area and often contain ecologically prioritized species and habitats (Bean and Wilcove 1997; Polasky and Doremus 1998). Species with wider home range, migratory species as well as species with specific breeding or feeding characteristics often seek out places that meet their requirement and can spend significant proportion of their life span on non-public lands (Stein et al. 2010). Also, studies show that the decline in number of scheduled protected species is more rapid on private lands than on public lands (Noss et al. 1997; Theobald and Hobbs 2002). In such cases, including private lands in conservation strategies becomes imperative for a holistic effect of conservation efforts on protected areas. Although conserving private lands to protect biodiversity have been prevalent in history, its record and recognition had been sparse mainly because of the scale of such initiatives and lack of coherence in such efforts (Knight et al. 1999). However, this trend is changing. Conservation efforts on private lands have increased substantially in the last decade and across different continents, most visible of which has been in USA, the

UK, some countries in Latin America, Africa and Australia (ELI 2003; Figgis 2004; Krug 2001; Ma et al. 2012; Sims-Castley et al. 2005). IUCN in its recent 2014 World Parks Congress officially recognized the role of private land that has been set aside as conserving biodiversity by designating them as Privately Protected Areas. (Stolton et al. 2014). It also recognized such areas as an essential component of meeting CBD's Aichi Biodiversity Target 11.

Private land conservation, by its nature, depends largely on landowners and the institutions that support these initiatives (Zorondo-Rodriguez et al. 2014). Motivations for landowners to participate may vary based on their characteristics, but it also depends on the type of private land conservation tool (Ernst and Wallace 2008; Farmer et al. 2011; Kabii and Horowitz 2006). It should also be acknowledged that use of private land for biodiversity conservation is inherently complicated by its nature of ownership and the rights associated with it (Paloniemi and Tikka 2008). Besides landowners' characteristics and motivations, conservation opportunity, which is the capacity and willingness of people to participate in conservation, also depends on the type of conservation tool that is introduced (Raymond and Brown 2011). This may also be the reason why private land conservation has witnessed more success in voluntary efforts than with involuntary tools such as regulations or displacement.

Although private land conservation has made significant progress, challenges do persist in plenty. Most efforts are context specific and so are the challenges; however, primary challenge is to balance efforts on the fine line of respecting landowners' authority and property rights while meeting conservation targets (Knight et al. 2010). Thus, *the goal of this research is to examine the status of private land conservation in a specific context, identify the challenges and assess factors that influence the conservation opportunity for biodiversity conservation on private land within that particular context.* The research chose the primary research context as Poland, where private land conservation is at its nascent phase of regulatory conservation. This provided an opportunity to analyze the imperative requirements for private land conservation and hypothesize a path for its progress as a conservation strategy in the country. Additionally, it also explored private land conservation in the US, to assess the influence of voluntary tools in promoting biodiversity conservation on private land.

1.2. Private Land Conservation in Poland

Poland presents as an interesting study context as a country in transition from its troubled communistic past to a progressive future as an EU member state since 2004. As a member state, Poland has to abide by the EU regional policies in all sectors, including biodiversity conservation. The EU member states were unsuccessful in meeting the EU biodiversity target of 2010 which led to the renewal and setting of a new set of targets to be met by 2020 (EC 2014). Although the principal goals are described at the regional level, its

implementation and practical application relies largely on transferring these principles into national conservation policies. Protected areas have been prevalent in Poland's recent history and now their numbers have witnessed a sudden increase due to the implementation of Natura 2000 (GUS 2013). However, the ongoing debate in the international domain on the efficiency of public protected areas to mitigate biodiversity loss is also applicable in Poland.

Biodiversity conservation in Poland has relied mostly on the protected area model and therefore, private land conservation is restricted to regulatory form on private lands that lie within the administrative borders of protected areas. Private lands have received very little focus on its potential to contribute to biodiversity conservation in Poland, an indication of which is the fact that there is very limited data available on private lands within protected areas. The Central Statistical Office of Poland (GUS) provides information on private acreage only within national parks, and not for other forms of protected areas. Additionally, very limited academic and popular literature exists on this subject in Poland. This research would be the first source of information on the status of private land conservation in Poland.

Historically, limited focus on private lands for conservation efforts can be attributed to the fact that relatively small proportion of private lands existed within the protected areas. However, the introduction of Natura 2000 in Poland has changed this dynamic dramatically (Grodzinska-Jurczak et al. 2012). Natura 2000 occupies almost 20% of the country's land area and is speculated to overlap with considerable acreage of private lands. The increasing human-nature conflicts related to the designation and implementation of Natura 2000 is indicative of the fact that private lands need to be brought to the forefront of conservation policies now (Boltromiuk 2010; Grodzinska-Jurczak and Cent 2011). Additionally, Poland being a country in transition, it is expanding rapidly in all sectors which have resulted in increased development pressures (EEA 2011). Hence, the traditional protected area model might not be sufficient measure to protect the country's native biodiversity and adhere to EU Biodiversity Strategy 2020. However, bringing changes in the current approach to biodiversity conservation requires a prior understanding of the current challenges, stakeholders' perspectives and their attitudes toward such as conservation strategy. *This research attempts to provide a deeper insight into the causal relationships between existing approach to biodiversity conservation on private land and its effect on stakeholders' attitude.* It is also interdisciplinary in nature where the final outcomes and knowledge gained will contribute to both the disciplines of natural sciences and social sciences.

2. Research Objectives

Under the broader dictum of the research goal, specific research objectives were devised to successfully attain the goal. Within the purview of investigating the status of

private land conservation (globally, and specifically in Poland), documenting the institutional perspective of and analyzing the stakeholders' attitude toward it, the research objectives were formulated as follows:

Objective 1: Examine experts' view on the importance of private land for biodiversity and its conservation

- a. *Review current academic and popular literature to assess expert opinions on the global status of private land conservation.*
- b. *Investigate institutional perspectives on the challenges and opportunities involved in conserving biodiversity on private land by undertaking specific case studies (Poland and USA)*

Objective 2: Identifying specific classes of attitude among stakeholders toward biodiversity conservation on private land.

- a. *Document the differing groups of attitude prevailing among stakeholder groups involved in private land conservation in Poland*
- b. *Develop a typology of attitudes and characterize each attitude group using Q methodology*

Objective 3: Assessing factors that influence stakeholders' attitude in developing conservation opportunity on private land in Poland

- a. *Conduct a questionnaire survey among landowners whose land falls within the borders of protected areas*
- b. *Correlate expressed attitude toward conserving biodiversity on private land with socio-demographic and economic factors as well as some external factors such as type of protected area and level of restrictions.*

3. Research Methods

This is an interdisciplinary research where although the research object is nature conservation, the research subject is people and their attitudes. Therefore, different social sciences research methods were applied based on the requirement dictated by the research objectives. Each of the subsequent chapters present scientific publications that correlate to one of the mentioned research objectives, and each publication is a detailed description of the research method used in its particular context. At a generic level, qualitative and quantitative social sciences methodologies were applied namely literature review, in-depth interviews, Q methodology and questionnaire survey.

4. Site Selection

In order to collect primary data to address the mentioned research objectives, it was imperative to first select the study sites. The sites selection process was focused on private land conservation in Poland and guided by a set of criteria. As mentioned in the introduction, private land in biodiversity conservation in Poland is restricted to only the regulatory form inside of protected areas and hence, this research had to focus on protected areas with private land within its administrative borders. Poland has several forms of protected areas and in order to capture as much diversity as possible, the research opted to include three most predominant forms of protected areas: a national park, a landscape park and a Natura 2000 site. The Central Statistical Office (GUS)'s 2012 annual report on Environment provided the data for the site selection and an elimination method was followed. The elimination was based on three criteria: total land area of the protected area (larger parks were preferred in order to have higher probability of inclusion of private lands), percentage of private ownership (where not available, percentage of arable land was taken as an indicator of private lands) within the protected area, and minimal overlap with other forms of protected areas, especially the overlap with Natura 2000 sites. Based on these three criteria Biebrzański National Park (Podlaskie voivodeship), Skierbieszowski Landscape Park (Lubelskie voivodeship) and Dolina Górnej Wisły Natura 2000 site (Śląskie voivodeship) emerged as the selected sites. The same sites were consistently maintained for the entire research in Poland. Table 1 depicts the criteria of selecting each type of protected area and the sites chosen.

	National Park	Landscape Park	Natura 2000 site
Selection Criteria	<p>>15,000 ha as the size of the national park</p> <p>>15% of the national park under ownership of private landowners</p> <p>>10% of the national park under agricultural use</p> <p>Contains non-overlapping areas with Natura 2000</p>	<p>>15,000 ha as the size of the landscape park</p> <p>>50% of the landscape park is arable (arable land considered indicator of private land)</p> <p>Should not be part of a complex with a national park or lie (in any way) adjacent to it</p> <p><15% of its area under Natura 2000</p>	<p>>15,000 ha as the size of the Natura 2000 site</p> <p>>50% of the site is arable (arable land as indicator of private land)</p> <p>Site should be representative of both Habitats and Birds Directive</p> <p>Site should not be a part of, or adjacent to any other form of protected area</p>
Sites Selected	<i>Biebrzański National Park</i>	<i>Skierbieszowski Landscape Park</i>	<i>Dolina Górnej Wisły</i>

Table 1: Site selection criteria for this research and the three selected sites

5. Chapters

The following chapters present the various stages involved in this research, each stage provides a detailed description of its theory and existing knowledge, the research objectives, the methods, data analysis and finally the discussion on the results.

Chapter 2 relates to fulfilling part of research objective 1. It is a summary of the extensive literature review conducted at the initial phase of the research. The desk research on the global status of private land conservation culminated into a classification system for the different conservation strategies based on their conservation security and their tenure.

Chapter 3 presents the in-depth interviews conducted as the first phase of the exploratory research, with the aim of completing research objective 1. The interviews, which were conducted in Poland and in the USA present the institutional perspectives toward private land conservation and its challenges.

Chapter 4 meets the requirements to fulfill research objective 2. It is the second phase of the exploratory research, where a very specific methodology known as Q

methodology (developed initially for psychology but is now used in several other research domains) was used to develop a typology of attitudes prevalent among the primary stakeholder groups of private land conservation in Poland. This is the first research that used Q methodology in environmental research in Poland.

Chapter 5 is the outcome of meeting research objective 3. It presents the results of the quantitative research conducted through questionnaire surveys with private landowners residing within the three different types of protected areas in Poland. It draws on the relation between the expressed attitude of landowners toward private land conservation and their intrinsic (socio-demographic and economic) factors as well as external factors.

Chapter 6 is a conclusive summary of the author's holistic perspective on private land conservation in Poland's context.

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CHAPTER 2: Literature Review and Proposal of an International Classification System for Private Land Conservation

Biodiversity conservation on private land can be an effective and crucial strategy to halt the global biodiversity loss; however discussion and focus on private land and its role as a conservation strategy has only been a relatively recent trend. If private land conservation with its complex dynamics and interactions was to be analyzed as this research hoped to, it was imperative to first examine the current status of private land conservation at a global scale and take account of the different initiatives that are being explored across the world in order to extrapolate its future trajectory. Hence, an exhaustive desk research was undertaken, which included scientific literature and publications as well as popular media, to examine the global strategies that are being explored for conserving biodiversity on private lands. This stage of the research also highlighted the lack of cohesion and accountability of current efforts in private land conservation. Subsequently, the literature review resulted in the proposal of a classification system for the various strategies used in private land conservation based on the conservation security they provide and the tenure of this security. The classification system was structured to mirror the current International Union for the Conservation of Nature (IUCN)'s classification system for administrative protected areas.

The following publication presents a detailed description of the literature review and the proposed classification system. The review paper was published in the *Journal of Environmental Planning and Management*.

Full reference to the paper: Kamal S., Grodzińska-Jurczak M and Brown G. 2014. Conservation on Private Land: A Review of Global Strategies with a Proposed Classification System. *Journal of Environmental Planning and Management*. DOI: 10.1080/09640568.2013.875463

Lead author's contribution: Research idea, desk research, manuscript preparation

Number of references cited in the paper: 116

Conservation on private land: a review of global strategies with a proposed classification system

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Abstract: *With parks and protected areas insufficient to sustain global biodiversity, the role of private land in biodiversity conservation is becoming increasingly significant. This paper reviews global voluntary and involuntary strategies for private land conservation. Involuntary strategies can achieve effective conservation outcomes, but often lack social acceptability. In contrast, voluntary strategies enjoy greater social acceptance but may not achieve sufficient uptake to have meaningful conservation objectives. Based on the review, we propose a classification system for private land conservation as a complement to the International Union for Conservation of Nature's (IUCN's) classification of global protected areas. The classification system provides a framework for identifying and describing conservation strategies on private land on the dimension of tenure and security. It also identifies opportunities and vulnerabilities in achieving conservation on private land while emphasising the need for systematic data collection similar to IUCN's efforts for protected areas.*

Keywords: Private land, conservation strategies, protected areas, classification system

1. Introduction: The importance of conservation on private land

Globally, biodiversity conservation has relied heavily on protected areas to halt its loss and safeguard the existence of its components into the future. Protected areas, identified on the basis of the endangerment, distinctiveness, and utility of the natural components they contain, are the functional units of in-situ large scale conservation and have an important role in promoting nature conservation (Bishop et al. 2004; Gibbs et al. 2009; Naro-Maciel et al. 2008). Historically, they consisted of public land, or sometimes a combination of public and private land, but often the private land was converted to public land by purchase or acquisition. However, protected areas (whether public, or a combination of both public and private land) cannot be considered as sufficient measures for conservation as they contain a small fraction of the global biodiversity, occupy only 13.9% of the total global land area, are susceptible to human degradation, can be downgraded in their protection and lastly, their effectiveness in isolation is questionable (Chape et al. 2003; Emerton et al. 2006; Mascia and Pailler 2011; Mora and Sale 2011; Naughton-Treves et al. 2005; Stolton, Mansourian and Dudley 2010).

A more holistic approach to conservation requires looking beyond the “closed” box model of protected areas as the only solution to conservation, as it is not possible to convert every tract of land with conservation value into a formally recognized protected area (Figgis 2004). Instead, conservation strategies should aim for a bioregional model that conserves landscapes irrespective of ownership.

Within the scope of this paper, conservation on private land refers to land under private ownership of individuals, families or other non-public entities within an administrative protected area, or otherwise informally reserved or managed for nature conservation purposes. Although it is unlikely that private land can meet all conservation needs, it can substantially contribute to increasing protected habitat and species, and maintaining connectivity (Clough 2000; Smith et al. 2006). For example, 73.8% of total land within national parks in Great Britain is privately owned; 45% of Costa Rica’s Biological Reserves lie in private hands; and a minimum of 14 million hectares of private land in Southern Africa is involved in some form of wildlife management (Chacon 2005; Krug 2001; NPA UK 2011). More attention should therefore, be directed toward biodiversity-rich land that is under private ownership, in addition to the formally recognized protected areas (Knight 1999; Kirby 2003; Mayer and Tikka 2006; Paloniemi and Tikka 2008; Tikka and Kauppi 2003).

However, integrating private land into conservation planning and management is complicated by the nature of land ownership and the complex social and economic traits that are inter-related with its current use (Knight et al. 2006; Mascia 2003; Paloniemi and Tikka 2008; Raymond and Brown 2011; Tikka and Kauppi 2003). Since biodiversity exhibits public good characteristics, there is little incentive for conservation at an individual level which traditionally led to government involvement (Clough 2000; Doran 2003). However, top-down approaches to biodiversity conservation on private land have

had negative repercussions, with landowners expressing their unwillingness to participate in conservation strategies that provide no benefits for them (Grodzinska-Jurczak and Cent 2011; Grodzinska-Jurczak et al. 2012). Knight and Cowling (2007) and Knight et al. (2010) emphasize that while defining areas of conservation priority depends primarily on ecological knowledge and understanding, implementation of conservation actions is a function of conservation opportunity such as stakeholders' willingness and capacity to participate.

As a result, strategies related to nature conservation on private land are being explored globally from legal prescriptions to financial incentives and participatory site selection approaches (Doremus 2003; Frank and Muller 2003; Paloniemi and Tikka 2008). However, except for developed countries where formal efforts for conservation on private land began relatively early (e.g., USA, UK, and Australia), most countries lack an adequate system with legal and government support to promote private land conservation (Figgis 2004). Also, while protected areas have an international classification system developed by the IUCN in 1978 (modified in 1994) based on six categories ranging from strict nature protection to areas managed for sustainable resource use, private land conservation lacks a similar system of classification (Phillips 2004). With the broader goal of understanding the role of external strategies to promote private land conservation, this paper addresses two primary objectives:

- *describe the role and effectiveness of prominent external strategies used to promote conservation on private land;*
- *develop a novel typology and classification scheme which parallels the IUCN protected areas system that relates the important dimension of conservation security to strategies used for conservation on private land.*

2. External interventions to promote conservation on private land

The existing spectrum of nature conservation policy options on private lands is very broad, ranging from regulatory prohibitions and government acquisition to direct incentives for private action and public consultations in decision-making on conservation policy (Doremus 2003; Kauneckis and York 2009, Mayer and Tikka 2006; Mieners 2004; Ostermann 1998; Young 2005). While some of the conservation strategies have specific biodiversity protection goals, others work more on broader conservation objectives with biodiversity conservation being a secondary objective. To be inclusive, both types of strategies are considered in this paper. The focus of this paper is not to provide a detailed account of various strategies used in private land conservation as it already exists in literature such as Doremus (2003), George (2002) and Paloniemi and Tikka (2008); rather, the goal is to highlight the differing nature of these strategies in terms of their security, owner's participation and tenure. Most existing options are either involuntary (the decision to participate in conservation strategies doesn't reside with the landowner), voluntary (a

landowner pro-actively decides to participate in conservation strategies) or a combination of both. Conservation success will likely be determined as much by the context and scale of the external intervention and by coordination of conservation activities across properties as by the chosen strategy. Figure 1 summarizes the categories of conservation strategies discussed in this paper.

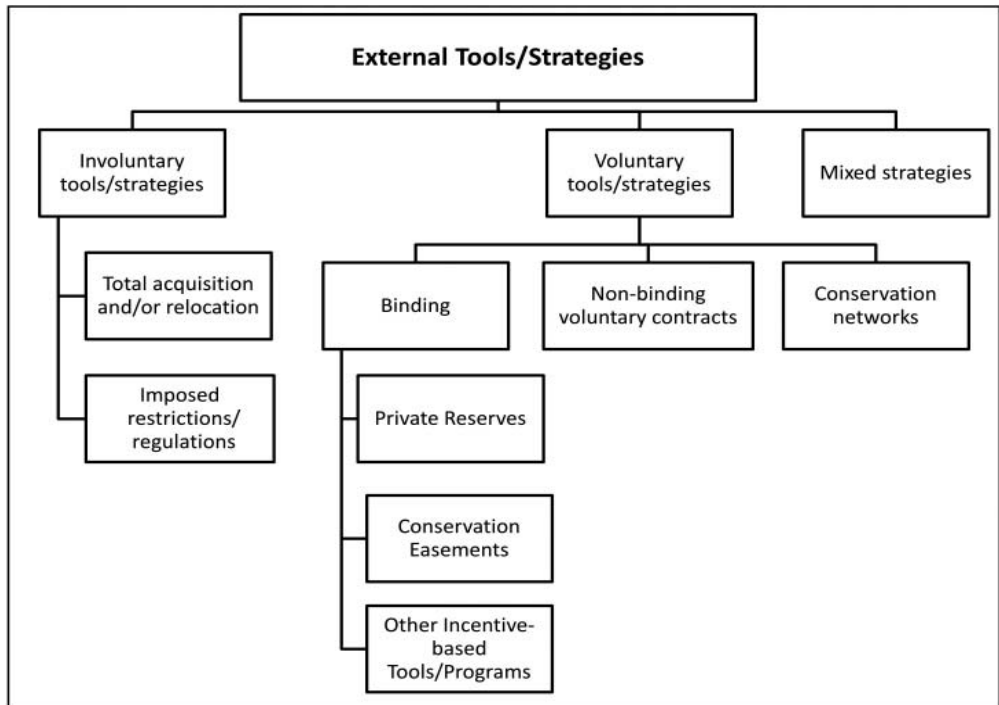


Fig 1. Types of external strategies used for conservation on private land

2.1. Involuntary strategies

Involuntary approaches to integrate private land into conservation include prescriptions or prohibitions by government agencies or authorities that provide for minimal participation from land owners in the decision-making process or in management of the private land being conserved.

2.1.1. Total acquisition and/or compulsory displacement

One of the earliest strategies used for converting private land into protected areas was compulsory acquisition of the land by the government, as witnessed during the establishment of the first few protected areas in the world (Polasky and Doremus 1998; Stroup 1997). While this practice has decreased in developed countries, in some developing countries such as those in South Asia and Eastern and Central Africa, this method is still prevalent (Adams and McShane 1996; Cernea 2005; Doremus 2003;

Karnath 2005; Neuman 1998; Rangarajan and Shahbuddin 2006; Schmidt-Soltau and Brockington 2007). This strategy is based on the assumption that the relationship between human use and biodiversity is linearly negative, and human use of biological resources can only harm biodiversity (Eriksen 1999; Rangarajan and Shahbuddin 2006).

Relocation of people for protection of nature and wildlife is a recurrent action in nature conservation, especially when there is perceived conflict between traditional inhabitants and the protection of nature (Brockington 2004). There is, however, increasing effort to meet the interests of the different stakeholder groups. Examples of such efforts include recognition of Indigenous Protected Areas in Australia, The Scheduled Tribe and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006 of India, and resettlement through incentive programs in countries of Eastern Africa (Bhullar 2008; Cernea 2005; Figgis 2004; MoEF 2006; Schmidt-Soltau and Brockington 2007; Springate-Baginski et al. 2009).

2.1.2. Imposed restrictions/regulations

Another form of involuntary conservation is when private land is legally prescribed as a protected area or part of protected area, often without substantive consultation with the land owner. Authorities can also impose restrictions on land-use and developmental activities that are believed to have a negative impact on the ecosystem/species or for conservation of a habitat. Although this strategy is less drastic and intrusive than resettlement, it confronts property rights and challenges autonomous use of the land. This is especially true of private land situated within strict protected areas such as national parks where regulations and restrictions imposed over the public land extend to the private land as well (ELI 2003; Grodzinska-Jurczak and Cent 2011; Grodzinska-Jurczak et al. 2012; Mayer and Tikka 2006). The government has the option of acquiring the land, but with limited budgets, authorities usually prefer to use this model where private land situated within protected areas is subjected to similar restrictions as those on public land (ELI 2003).

Imposed restrictions unaccompanied by compensation, easements, or contracts are rare in developed countries today, although they exist at a smaller scale in the form of local land-use regulations such as zoning, or specific regulations such as those of the Habitat Conservation Plan in USA. This practice is more prevalent in “countries in transition” as well as developing countries due to its cost effectiveness: some governments lack the financial capacity to purchase all the private land within protected areas, or to provide compensation schemes to landowners (ELI 2003; Schroter-Schlaak and Blumentarth 2011).

2.2. Voluntary tools/strategies

There is a diverse array of voluntary strategies to conserve biodiversity on private land that are context-specific but adaptable to different sites or regions. Voluntariness is when the decision to implement a conservation action on private land lies with the

landowner. Although the mechanisms and incentives for action may be supported by government or other agencies, the decision to get involved in such conservation action is made by the landowner.

Sometimes large, private conservation organizations purchase private land to either set aside and self-manage, or to donate to government agencies for conservation purposes, as has been witnessed in many countries of Latin America, North America, Australia and Africa (Armsworth et al. 2006; Cowell and Williams 2006; ELI 2003; ENS 2010; Figgis et al. 2005; Pasquini et al. 2011). Such activities are usually undertaken by organizations that have biodiversity conservation as one of its primary goals and they often secure significantly large tracts of lands. Hence, land under such non-government organizations (NGOs) can be considered to be well protected both spatially and temporally. While acknowledging the important role that NGOs play in promoting conservation on private land that merits a discussion on its own on their significant contribution, this paper will focus more on the strategies available for individual private landowners to engage in conservation while maintaining ownership.

2.2.1. Formal and informal private reserves

Within the context of this paper, private reserves are defined as land under private ownership that has been set aside for the protection of nature and its components through legal or other effective means for personal or public benefits (Chacon 2005; Figgis 2004). It includes private wildlife reserves for the protection of biodiversity as well as private game reserves or ranches, where game or trophy hunting within predefined, sustainable limits is permitted. The status of such protected areas can be either formal (legal status bestowed by government authorities based on ecological and technical criteria) or informal (no legal status and functions on the commitment of the landowner to conserve), depending on the provisions available in the country. Ownership of such reserves could also be under NGOs that purchased the land for biodiversity conservation but, as mentioned earlier in this paper, we refrain from a detailed discussion on this topic and instead concentrate on individual landowners. Private reserves vary in size, land tenure, land use, management regime, the type of habitat protected, and the objectives for formation (Krug 2001; Langholz and Krug 2005). This form of sanctioned conservation is especially advantageous when a country's land tenure laws do not recognize conservation as a land use (ELI 2003; Ramutsindela 2004).

Private reserves and game reserves, whether owned individually or in partnership with investors, are most popular in countries with rich mega-fauna which generates direct income through activities such as eco-tourism and safaris, wildlife viewing, and game hunting. They offer significant potential to promote conservation on private land when other conservation options are not viable because the economic benefits are directly linked to conservation and maintenance of wildlife habitats (Lindsey et al. 2006). The tradition of private reserves for game management has been quite common in the African continent in

countries such as Namibia, South Africa, Kenya, Zimbabwe and Tanzania and they continue to gain popularity (Krug 2001; Langholz and Lassoie 2001; Ramutsindela 2004; Sims-Castley et al. 2005). There are about 150 (or 2% of total land area) game reserves in Namibia and close to 1000 (or 5.6% of total land area) in South Africa Krug (2001). Similarly, Brazil has 429 registered private reserves, and in Central America, a total of 2900 landowners are now protecting 509,000 hectares of land in formal private reserves (Chacon 2005; ELI 2003). In Australia, private reserves have been formally established as Private Wildlife Sanctuaries and Private Protected Areas, primarily owned by larger private companies and supported by the National Reserve System program (Figgis 2004). However, other forms of government support in the country are also provided for smaller “off reserves” and “landscape reserves” (Binning and Feilman 2000; Figgis et al. 2005). A similar private initiative in the UK under the National Nature Reserves program allows for private land to be declared protected with the approval from statutory conservation bodies, although these reserves are more common to larger private organizations than individuals (Reid 2011).

2.2.2. Conservation easements/restrictions/covenants

Compared to the other strategies used to promote conservation on private land, use of conservation easements is relatively new but it has become one of the most popular strategies used now. With involuntary approaches increasingly considered intrusive, expensive, and generating conflict over property rights, easements offer a more effective and less expensive tool (Gattuso 2008; Main 1999). A conservation easement, in its most basic form, is a voluntary but legally binding agreement between a landowner (or a grantor) and an organization such as a land trust or a government agency (or a grantee) in which the landowner relinquishes some rights over the land to protect the natural landscape in exchange for economic benefits through sale of developmental rights and tax relief (Bernstein and Mitchell 2005; Gattuso 2008; TNC 2011; Yonavjak and Gartner 2011). Land trusts are non-profit organizations that undertake or assist in conservation easement acquisitions (LTA 2010). Restrictions on land use are usually in perpetuity and applicable even when the ownership of the land changes through sale or inheritance (Clough 2000; Figgis 2004). Easements have been developed for agricultural lands, private forests, and land with historical, cultural or scenic values (TNC 2011). The economic benefits to the landowner from placing land under a conservation easement derives from a reduction in property value which reduces the landowner’s tax burden and/or the sale of development rights on that property, which sometimes comes close to the value of the land itself. Restricting developmental activities on private land lowers the value of the land and this difference in value (before and after the easement was formulated) generates the tax relief (Bernstein and Mitchell 2005; Figgis et al. 2005; TNC 2011). Additionally, depending on the country, conservation easements may be eligible for an income tax deduction if they are considered a charitable donation. For example, farmers and ranchers in the U.S. were

eligible for a tax deduction for up to 100% of the value of the land (50% for non- farmers) under the Food and Energy Security Act of 2007 (USDA-ERS 2008).

The use of conservation easements or covenants began in the 1950s in the U.S., and they are now being used in countries across Latin America, Africa, the UK and Australia (Fishburn et al. 2009; Gattuso 2008; Leva 2002). Particularly in the U.S. where 85% of the federally listed endangered species occur on private land, this approach assumes an important role for biodiversity conservation (Rissman et al. 2007; Stein et al. 2010). Yonavjak and Gartner (2011) reported that conservation easements cover more than 30 million acres in the U.S. Strongly related to conservation easements is the exponential growth in the number of land trusts in the U.S., from 1,263 in 2000 to 1,699 in 2010 (Gattuso 2008). According to the 2010 census of USA's Land Trust Alliance, land trusts together control about 19.2 million hectares (or 3.5% of total private land in the U.S.) with 2.3% under national land trusts, and 1.2% conserved by state and local land trusts. The Nature Conservancy, the largest national land trust, accounts for 37% of the total land owned by land trusts in the country, with about 13% of this land in the form of conservation easements (LTA 2010; TNC 2011).

Although a detailed discussion on conservation easements is beyond the scope of this paper, it is important to acknowledge its significance in addressing economic and conservation needs together, and the degree to which easements could bridge the needs of nature conservation and the landowner.

2.2.3 Other incentive-based actions (conservation contracts/programmes)

Another closely related approach is to use incentives that make it attractive for landowners to apply conservation measures voluntarily. For incentive based programs to be effective, it is imperative to have well-defined conservation goals that are both ecologically sound and acceptable to landowners. Such programs or contracts typically provide economic incentives for activities that enhance or restore the quality of the land, or otherwise limit activities that have negative impacts on the state of biodiversity (Doremus 2003; George 2002; Mayer and Tikka 2006).

The type and number of voluntary programmes are large and diverse, with perhaps the largest number of examples coming from the U.S. Many states have different incentive programs that use cost sharing, technical assistance through conservation contracts (an agreement between landowner and government for conservation actions that the landholder will undertake in exchange for a payment from government), or rewards for conservation initiatives that target specific species or habitat such as agricultural lands, wetlands and private forests (Clough 2000; Doremus 2003; Mayer and Tikka 2006). Some examples of these programs include the Private Dedication Program in Kentucky, the Landowner of the Year Program in Colorado, the Indiana Classified Forests Act, the Wildlife Habitat Contracts in California, and The Pheasant Habitat Improvement Program in Colorado.

Doremus (2003) and George (2002) provide a detailed account of these state-level programmes in the U.S.

In addition to state-specific programs in the U.S., there are several national incentive and cost-share programmes such as the Department of Agriculture's Wildlife Habitat Incentives Program, The Wetlands Reserve Program (WRP), The Grassland Reserve Program (GRP), The Healthy Forests Reserve Program (HFRP), and The Conservation Reserve Program (CRP) (USDA 2011). The CRP is particularly innovative in that it provides for the retirement of marginal agricultural land by offering compensation to private landholders that divert land from agricultural production to biodiversity conservation (Clough 2000; USDA 2011). Similar examples exist in the European context, where several regional and national programmes are based on the incentive model. The Agri-Environment Scheme (AES) under the Common Agricultural Policy (CAP) of the EU is the most well-known and widely implemented program. AES pays about £400 million (or USD 628 million) a year to farmers and land managers and covers 66% of England's agricultural land (Natural England 2009). It supports programmes that offer compensatory payments for voluntary provision of environmental services on farmland by landowners such as maintenance of native species on farmland, and the management of hedgerows and water regimes (Said and Thoyer 2009). The amount and nature of compensation depends on the type of environment-friendly practices adopted or the foregone benefits because of the conservation measures. Other examples from Europe include Finland's Natural Values Trading Program, Germany and Portugal's fiscal transfer tools, Austria's Natural Forests Reserve Program, and Sweden's Nature Conservation Agreements (DGARD 2005; Frank and Muller 2003; Mayer and Tikka 2006; Paloniemi and Tikka 2008; Ring, 2008; Swedish EPA 2007).

Forest certification is also an incentive program in that it provides an opportunity for private foresters to undergo formal assessment according to predefined sustainable standards in return for better market prices for harvested forest products such as timber. While several forest certification programs are available in the U.S. such as the American Tree Farm System, the Forest Stewardship Council, and the Sustainable Forest Initiative, this mechanism of using market demand to promote sustainable use of resources is also being adopted in other countries such as Britain, Australia, several EU Member States, and several countries in Latin America such as Brazil (Imaflora, Société Generale de Surveillance's Qualifier Program) and Chile (AFS 2011; Crawford 2006; Cubbage et al. 2009; FSC 2011; May 2006; PEFC 2012).

2.2.4. Voluntary non-binding conservation activity

The external approaches discussed thus far create binding or formal obligations for the landowner, but there is growing interest among landowners (especially in developed countries) to conserve their land based on growing awareness of the benefits of nature conservation such as increasing the "attractiveness" of their land to support activities such as eco/agro-tourism. Participation in a programme is not binding, allowing participants to

disengage at any time. Because the programme does not offer financial incentives, minimal financial resources are required from the government (Stoneham et al. 2000). However, it also requires landowners' environmental awareness and willingness or capacity to participate. For example, in Australia, Land for Wildlife is a voluntary program that attracts landholders convinced of the value of conservation who then seek advice and expertise to maintain their property for conservation. Conservation development, practiced in USA as well as some countries in Latin America, is another example of voluntary initiative which combines land development with functional protection of natural resources (Milder 2007). It is a form of controlled land use, where development of an area is balanced by designing it sustainably in order to have open spaces, or protected farmlands and other wildlife habitats.

2.2.5. Conservation Networks

The increasing awareness and growing interest of landowners to integrate conservation with economic values has led to the formation of several associations/networks/organizations of landowners that share information and resources on conservation options. Although such associations are not directly responsible for implementation of conservation strategies, they play an important role through information dissemination that bridges the gap between private landowners and implementing agencies. The Private Landowner Network and the Cooperative Conservation America in the U.S. are examples of such networks; Australia has the Conservation Management Networks while the European Landowners Organization and National Ecological Network (now a part Pan European Network of Protected Nature Areas (PEEN)) serve a similar purpose in the European context at a regional and national level (CCA 2007; COE 2011; ELO 2010; Figgis et al. 2005; PLN 2006).

2.3. Mixed strategies

Sometimes the traditional approach of top-down prescription is combined with one or more voluntary bottom-up strategies to achieve conservation outcomes. This often occurs in public protected areas that contain patches of private land and so they may be the only viable option of land use due to other development restrictions already imposed by governments.

Examples of mixed strategies include Transfer of Development Rights (TDRs) and mitigation banking. TDRs are complex market-based instruments that are undertaken by local governments to promote transfer of development rights (thereby "selling" the particular right) from ecologically sensitive areas (sending areas) to areas with higher development potential (receiving areas) (Daniels 1998; Johnston and Madison 1999). Often, the incentive for landowners to convert their land into a "sending area" is because it is already recognized by the government for its conservation value and therefore it has limited economic viability for the owner based on the restrictions already in place.

Mitigation banking, primarily used to restore, enhance or preserve wetlands, is another example. It runs on a credit system that offsets adverse impacts of developmental projects on similar ecosystems (EPA 2012).

Covering different types of mixed strategies is beyond the scope of this paper due to the diversity of such strategies based on context and scale. However, it is important to recognize their potential in conservation because they seek to balance top-down and bottom-up approaches that target both collective and individual interests.

3. A Proposed System for Classifying Conservation on Private Land

Private land in conservation is increasingly significant with human demographic and development pressure limiting the amount of land available for designation as protected areas. The impetus for developing a classification system for protected areas by the IUCN was to monitor and record the growing global protected areas network for conservation in a systematic way by categorizing them based on their management objectives (Bishop et al. 2004; IUCN 2012; Phillips 2004). Thus far, private lands under different forms of conservation strategies (whether involuntary or voluntary) have no clear distinction in terms of the extent and duration of conservation security they provide. The proposed classification system is a pragmatic one that seeks to provide a platform on which to describe, understand and possibly evaluate private lands. It can also act as a tool for planning protected area systems and wider bioregional conservation planning; encourage governments and managers of private protected areas to develop coordinated systems that are tailored to national and local circumstances; and provide a framework for the collection, handling and dissemination of data about private protected areas.

The framework for assigning the attributes to each class addresses the following:

1. *Conservation security*: the extent of enforceable protection provided
2. *Permanence of protection*: time duration of the conservation security
3. *Property rights*: rights surrendered (and retained) by the landowner.
4. *Management purpose*: intent of management actions or interventions

These functional attributes will reflect the reasons behind protecting a site, the intended object/characteristic being protected, and how it affects the landowner in his use of the land. The system we propose classifies conservation strategies into categories that approximate the degree of regulatory protection as in case of the IUCN classification, but is more explicit about the level of conservation security. Further, it takes into account the distribution of property rights, and the purpose of management.

Property rights have been conceptualized as being a bundle of rights similar to a “bundle of sticks” where each “stick” represents one right associated with the property. It is possible to divest some rights while retaining others (Rissman 2013; Schlager and

Ostrom 1992). The broader groups of rights associated with a private property are: (1) right to use and possess (includes access, management and extraction rights), (2) right to exclude, and (3) right to transfer (or alienate). Schlager and Ostrom (1992) define the specific rights as follows:

- *Management*: the right to be able to regulate development or other changes on the land
- *Withdrawal*: the right to extract resources from the land
- *Access*: the right to physically access the land
- *Exclusion*: the right to physically exclude outsiders from accessing the land
- *Alienation*: the right to sell or lease the land, along with the other rights associated with it (management, exclusion, access, exclusion).

The management purpose and conservation security are co-dependent and together they determine the management actions. The management purposes have been developed by taking into consideration the Australian Land Use and Management Classification System (ALUM) that takes into account both public and private lands, and classifies based on generality, level of intervention, prime use and hierarchical structure (ALUM 2010). We classified the management regimes into the following broader categories based on the use of the land after a conservation strategy is implemented:

- *Nature conservation*: land is primarily for conservation purposes, essentially of natural ecosystems that are already present
- *Managed resource protection*: land is restricted to protect specific natural resources or ecosystem through active management or interventions
- *Management co-existing with production*: land is primarily used for production and sustainable consumption, while considering ecological dimension of such actions.
- *Production and resource use*: land is for production and consumption and natural environment (if protected) is an unintentional secondary benefit

A brief description of limitations is provided with each conservation strategy. The proposed six classes show rough progression from high and formal conservation security for a long duration (or perpetuity) to decreased security and informality in implementation. The classes are described in Table 1.

CATEGORY	CHARACTERISTIC	PERMANENCE OF PROTECTION	PROPERTY RIGHTS SURRENDERED	MANAGEMENT PURPOSE	KEY VARIABLES INFLUENCING BIODIVERSITY CONSERVATION	SPECIFIC EXAMPLE
Category I(a): Ownership by private conservation organizations	Land title held by organization (NGOs, land trusts), conservation effectiveness determined by management activities, self-monitoring of conservation activities	Land protected in perpetuity (unless sold to another party without core conservation motives)	None	Nature conservation	Primary motivations and principles of the organization, management activities undertaken	The Nature Conservancy in the US owns 6 million hectares of private land (TNC 2011)
Category I(b): Conservation easements on private land	Land title retained by the landowner, legally binding and incentive based contract, restricts development, voluntary, monitoring by easement holder or third party	Land protected in perpetuity (unless specifically stated in the easement clause)	Withdrawal Management (as dictated by the easement) Exclusion (if mentioned in the easement)	Nature conservation/ Management co-existing with production	Content and duration of the easement, capacity to monitor and enforce easement clauses	Conservation easements in the US (LTA 2010; USDA 2011)
Category II: Regulated private	Land titled retained by the landowner, legally binding, restrictive	Long term (as long as the legislation exists)	Withdrawal Management	Nature conservation/ Managed resource	Substantive content of statutory or regulatory	Natura 2000 in EU(Hiedenpää 2002; Ostermann

properties	and non-voluntary, monitoring by external party (often government agencies)	and sometimes in perpetuity		protection	restrictions, enforcement capacity of the implementing agency	1998), Forest (Conservation) Act, 1980 in India
Category III: Contracted conservation	Legally binding, incentive based, often contains specific management activities to promote conservation, monitoring by contracting party, penalty for breach of contract	Usually short term in duration (usually 1-10 years) but renewable	Withdrawal Management (partially)	Managed resource protection	Type of management activities undertaken, primary objective of the contract, monitoring of compliance	Conservation Reserve Program and Wetland Reserve Program in USA (USDA-ERS 2008), Agri-environment scheme in EU (Grodzinska-Jurczak et al. 2012)
Category IV: Sanctioned or certified conservation program	Non-binding, voluntary participation, monitoring by sanctioning party or certifying organization	Tenure dependent on individual cases, quick termination possible	Withdrawal (partially)	Management co-existing with production	Public willingness to pay conservation premium, public trust in certification standards	Game reserves in Africa (Krug 2001; Langholz and Lassoie 2001), Forest certification programs (FSC 2011)
Category V: Active voluntary conservation	Non-binding, exists primarily because of strong conservation ethic of landowner, flexible, no monitoring, may or may not involve external financial support	No obligation in tenure length, quick termination possible	None	Management co-existing with production	Landowners' attitudes, values and motivations, social norms, landowner efficacy	Conservation Buyers program of The Nature Conservancy in USA (TNC 2011); Land for Wildlife in Australia (Figgis 2004)

Category VI: Inactive conservation	Non-binding, conservation benefits derived from current capacity of the land	None	None	Production and resource use	Continuation versus changes in current use of the land, public education, environmental awareness and outreach	Private land under no specific conservation action
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Table 1: Proposed typology for classifying private land involved in biodiversity conservation

Categories I (a) and I (b) restrict development and provide conservation benefits for a long period of time, if not in perpetuity. Category I (a) includes private land that has been purchased (with title) from, or donated by individual landowners to conservation-oriented organizations for the protection of biodiversity. Assuming that management purpose behind purchase of the land was for conservation benefits, which is typical of large international NGOs working for biodiversity conservation, this form of protection is considered to be highly secure and the new owner bears all the property rights. Category I (b) includes private land protected through easements (without title) that exist in perpetuity. Based on the terms of the easement, the owner usually surrenders rights over withdrawal (although agricultural activity may be allowed in some easements), management that involves permanent development, and exclusion (if dictated in the easement), while maintaining access and alienation rights. Private land under this category targets biodiversity conservation (if stated in the conditions of the easement) by attaching development restrictions to the land and hence the management purpose is the same as Category I(a). Land under Category I(a) that are owned and managed by NGOs depend on the integrity and capacity of the organization to achieve conservation outcomes and are still theoretically vulnerable to poor land management practices or divestment by the NGO which may not be legally actionable by third parties. Category I(b) easements are, in theory, legally enforceable if the landowner fails to abide by the terms of the easement.

Although conservation easements have been one of the most popular instruments to engage landowners, their effectiveness in achieving actual conservation outcomes is subject to debate. Taking the U.S. as an example, less than 2% of private family forest owners have entered land into easements, which is significant because 82.6% of the forested land in the Eastern states and 31.1% of forested land in the Western states is under private ownership (Ma et al. 2012; USDA: FS-696, 2000). Similarly, agricultural land (grazing, forest-use land, cropland, farm roads) represents 51.8% of the total land area of the country, yet less than 1% has been placed in conservation easements (Lubowski et al. 2002; NIFA 2009). Moreover, the monitoring of land post easement becomes difficult, especially if a single trust holds a large number of easements. There is also a significant increase in the number of local and national land trusts and this has generated speculation over the role of land trusts as unbiased agencies or mediators for the government to convert private land into public. Gattusso (2008) provides an in-depth critique of the use of conservation easements as profit making ventures by land trusts. Additionally, as Byron et al. (2001) and the Joint Committee on Taxation U.S. (JCT 2005) highlight, the primary benefit from conservation easements are tax benefits that appear to drive the process, which means protection of land for its intrinsic conservation value may not be the main goal for landowners. Further, tax deductions require that the local or national governments are affluent enough to bear the loss of revenue from taxes, which makes this tool challenging to implement in developing countries that struggle to support basic social services through revenues.

Category II includes private land where developmental activity or other land use changes have been legally restricted through legislation and prescribed policies. This category includes two types of private land: private holdings inside protected areas (such as national parks, or in case of Europe - Natura 2000 sites on private land) where the regulations of the protected area extend to private land; and second, private land whose usage is restricted by government through legislation, or legally enforceable land use plans. In such cases, the landowner surrenders specific withdrawal and management rights, but involuntarily and hence acceptance may be lower. The management purpose could be broader nature conservation, or targeted resource management. For example, the Endangered Species Act in the U.S. legally protects endangered species and its associated habitat irrespective of whether these occur on public or private land.

Governmental policies that use involuntary controls over land use are becoming less preferable (Harrop 1999). The effectiveness of restrictive policies depend significantly on the general awareness among people about the importance of biodiversity conservation since direct benefits to the landowners are often not obvious (CBD 2009; Hesselink et al. 2007; Laycock et al. 2009).

Category III includes environmental contractual obligations often administered through government programmes designed to promote conservation outcomes through better land/water management. Because these programmes are generally of a fixed term (e.g., 10 years) and subject to continuing government appropriations, they are less secure than Categories I and II. Based on the terms dictated by the specific program, landowner relinquishes his right of withdrawal and/or management. The main purpose is to manage targeted natural resource and they often include safeguarding or promoting overall biodiversity as its primary or secondary objective. This category includes conservation contracts on private land administered through such programs as the Agri- Environmental Scheme of EU and the U.S. Department of Agriculture's Wetlands Reserve Program.

Category IV includes lands that implement voluntary conservation activities, but the activities are recognized, sanctioned, or certified by an external body. Most of the rights are retained by the landowner, including extraction, but the extraction of resources must remain within defined limits to achieve external recognition. Conservation outcomes appear less secure than the previous categories because the length of landowner engagement with the game reserve activity or certification program is not prescribed and can be withdrawn without significant landowner penalty.

Game reserves and private forest management certification programs are the leading examples. According to Figgis (2004), however, the long term sustainability of such non-binding conservation practices is uncertain because the land could be sold or inherited by those not interested in continuing the reserves. Further, in the case of game reserves and certified forests, the main incentive for conservation might itself get corrupted due to unsustainable harvesting (Deere 2011).

The impetus behind forest certification is to promote sustainable harvesting of forests in developing countries suffering from accelerated deforestation. However,

certification has been observed to be more popular in developed regions such as North America and Europe (Cashore et al. 2005; May 2006). In 2006, FAO estimated that 7% of the world's forests had been certified, almost all on private land. Challenges in certification include the cost of certification and generating consumer awareness about the added value of certified products (Anderson and Hansen 2004; Archer et al. 2005; Hartsfield and Ostermeier 2003).

Category V includes private land that is voluntarily managed to conserve a landscape or specific natural resource, without any specific economic or financial incentives, and hence, all rights related to the property are retained by the owner. The landowners undertake such measures because of their awareness and/or passion for nature, or when the conservation measures they have already been taking in the past entail no significant cost. Thus the purpose of managing such land is to protect the relatively natural environment that can co-exist with production or current land use. Intentional, voluntary wildlife conservation without incentives is rare but the advantage of this type of conservation is that because it attracts people predisposed to conservation, the implementation cost is minimal and is a powerful motivation, once established. However, because management for conservation outcomes rests purely on the motivation of the landowner, there is no security in the continuance of conservation activities in the absence of formal agreements (Stoneham et al. 2000). Also records on the proportion of land under this category would be difficult to maintain, unless there are special regulations or schemes from governing authorities (such as Land for Wildlife program of Australia) that require declaration or registration of such parcels of land.

Finally, Category VI includes “undeveloped” private land, that is, land that has conservation potential but does not have any active conservation strategy or management for conservation. The potential biodiversity benefits from these lands derive from the inherent or latent features of the land rather than any conscious activity on the part of the landowner. For biodiversity conservation on private land to be more effective in the future, a primary objective should be to identify land in this category with significant biodiversity potential, both in terms of ecological priority and landowner opportunity, and make conservation of this land more explicit and secure. Generating awareness among landowners through environmental education would play a significant role in addition to the other strategies discussed in this paper.

4. Challenges and Opportunities

Unlike the IUCN categories of protected areas, private protected areas have emerged mostly as a result of endeavors that are individualistic and targeted at micro-scale. Therefore, the purpose of the proposed classification system is also to provide insights into the gaps that need to be filled before private protected areas can be unified by a classification system. We summarize the main challenges and possible opportunities in implementing such a classification system.

Data collection: The primary challenge is that basic information on the acreage of private land involved in conservation at a national level is rare and more specific information on the amount of private land devoted to conservation at local and regional levels is lacking in most countries. However, some conservation strategies (Category Ia, Ib, III, and IV) require obligatory record keeping and/or monitoring and therefore access to such information will be relatively easier than for the other categories where there is no formal monitoring. It is imperative to create a basic database, starting from local level and scaling up, on the acreage of private land involved in conservation, which in turn, will involve addressing the issue of combining all data sources, as mentioned below.

Collation of data: Even for the categories where data is available, the main hindrance lies in the scale of such data, which is usually available only at a local level, and in collating the information from different sources (such as NGOs, environmental agencies, land trusts). Therefore, there needs to be a unifying body/agency that would manage and monitor the collation of data. This is possible only when national legislations recognize and reflects private protected areas, and this leads us to the next challenge mentioned below.

Adoption into national strategies: Management and monitoring of protected areas under the IUCN categories is possible because of the presence of an over-arching body (the IUCN) that defines the standards, and the coherence between national environmental policies that support this classification system thus making it possible to reflect the categories at a national or local level. National environmental databases on protected areas allow for combining local data into national data, while UNEP-WCMC (World Conservation Monitoring Committee) and IUCN's WCPA (World Commission on Protected Areas) in turn provide regional and global assessments such as the World Database on Protected Areas (WDPA). Assessment of private protected area will require similar initiative, and therefore categories of private protected areas need to be recognized and reflected in a country's environmental policy as an accepted form of protected area, much like the IUCN categories.

Monitoring conservation status: In order to receive recognition and policy support, the classification system for private land conservation will need to prove its value to biodiversity conservation over time. Related to this issue is the coordination of conservation activities across properties. Fragmented and isolated conservation actions on private land are less likely to produce strong conservation impacts. This means monitoring the conservation status of private lands involved in conservation. Thus far, there exists no systematic monitoring of the different categories at a national level, although there is monitoring of specific strategies (such as those in Category Ib, III and IV) at a local level. To have coherent data, the criteria for conservation status should be tracked at both national and site levels. Conservation targets (species, ecosystems, landscapes) can be prioritized based on the immediacy of threat to persistence. Site level criteria should represent conditions and indicators which can be measured or described in a standardized way within the individual locality. Although it is not possible to be very specific across

individual cases (e.g. two tracts of land that are being tied under conservation easements), but it is possible to have broader criteria and indicators that can be coherent across sites. For this, there needs to be collaboration among the different agencies responsible for implementing these strategies. The national level criteria should sum up those used on the site level within the overall criteria for conservation status.

Availability of such information and coordination of actions would help address the important research question about the relationship between conservation security, identified through various categories of conservation on private land, and the degree to which biodiversity is actually conserved on such land.

5. Conclusion

This paper reviews conservation strategies and proposes a typology based on an underlying dimension of conservation security. Each category has been defined in terms of its characteristics and the variables that ensure biodiversity conservation. These variables can also be adopted as key features of future conservation policies and actions that focus on successful implementation of conservation strategies on private land. The vast majority of private lands (Category VI) are insecure for conservation and unlikely to produce significant conservation outcomes except by chance. Therefore efforts to promote conservation on private land will need to focus on moving land under Category VI to any of the other categories with higher conservation security through educational efforts along with other strategies presented herein.

Private lands possess different levels of ecological value for biodiversity conservation as well as conservation opportunity based on landowners' capacity and acceptance. Private land with high ecological value as well as high landowner acceptance of conservation goals will require minimal intervention to move this land into Categories I-V; however, lands with high ecological value but low acceptance of conservation goals by landowners will require some incentives to make conservation more attractive and plausible (Byron et al. 2001; Knight et al. 2010; Raymond and Brown 2011).

Securing conservation outcomes on private land can be achieved through a variety of strategies described herein, but the most secure categories will bear the highest social cost. Identifying the socio-ecological context of private land conservation and explicitly including conservation opportunity as a guiding principle can reduce the cost of private land conservation and increase conservation security. Achieving greater conservation security for Category VI lands can be furthered by recognizing that private land with current high conservation value in this category is probably not due to chance, but rather is a result of environmentally friendly land management practices that reflect some landowner understanding of the importance of sustainable land use. Securing longer-term conservation commitments from these landowners should be a priority.

When public goods such as wildlife occur on private properties, it is almost impossible to manage such common resources without treading on some of the private property rights. Property rights surrendered and retained by the landowner highlights the social and economic costs of conservation on that land. Where the landowner has voluntarily agreed to surrender some of his rights, the particular strategy (and the benefits it provides) represents the conservation cost for protecting that land. Property rights also seem to have a relation with the conservation security provided by the categories. From our classification table, we observe that the extent of conservation security on private land is inversely proportional to the property rights retained by the landowner, that is, more rights from the “bundle of rights” retained by the landowner equates to less conservation security.

In the practice of biodiversity conservation, more attention has been devoted to conserving the patches of protected areas and corridors linking them than the matrix of private lands that surround these lands. This is understandable given the challenges of private land conservation. But ecologists and biologists recognize the importance of private land in biodiversity conservation and have expressed this by identifying specific private lands as areas of conservation importance. The Natura 2000 site delineation in Europe is a good example.

David Brower, a well-known environmental leader, once said, “All of our environmental victories are temporary, and all of our defeats are permanent”. And so it is with conservation on private land. The proposed classification of private land conservation serves to highlight the limited, insecure, and tenuous nature of conservation gains made to date. To advance conservation on private land, we consider it vitally important to account not only for the extent of conservation on private land, but the security of the land that is conserved. Identifying private land conservation opportunities that intersect ecological priority areas is a pragmatic pathway to increasing the benefit of conservation on private land.

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CHAPTER 3: Investigating Institutional Perspectives toward Private Land Conservation: In-depth Interviews from Poland and USA

The literature review, while focused on the international context, also revealed a significant gap in the information availability in Poland on biodiversity conservation on private land. Data sources were very scant, with no concrete data on the acreage of private land within protected areas boundaries except in the case of national parks. Additionally, private land is yet to be recognized as a biodiversity conservation strategy in the national and local environmental policies. Thus, private land conservation in Poland can be considered at its nascent phase at best. Following the literature review, the second phase of research focused on exploring perceptions toward conserving biodiversity on private land and the challenges and opportunities involved in the process.

Most of the private lands involved in biodiversity conservation in Poland are those that lie within the boundaries of protected areas, and their management regime mirrored that of the protected area they were a part of. Regulatory conservation on private land, as is the case in Poland, leaves the decision making power in the hands of conservation agencies and institutions. This led the research design to initially concentrate on institutions that are involved in the management of the selected protected area sites and investigate the challenges and opportunities they face as primary decision makers. Their standpoint will inevitably impact conservation on private land in Poland and how landowners perceive a strategy such as private land conservation, either creating a platform for collaboration or resulting in conflict and chaos.

While Poland remains new to the concept of conserving biodiversity on private land, several countries are exploring its potential and trying to reduce the gap between conservation priority (defined by ecological criteria such as protected habitat and species) and conservation opportunity (defined by the willingness and capability of a community to undertake conservation measures). Countries such as the US have had relatively longer history of conservation and specifically, with private land conservation. US also rely heavily on voluntary conservation on private land through incentives and support programs, unlike the regulatory model of Poland. Therefore, to examine the institutional perspective of factors that affect the success of private land conservation, the research also conducted in-depth interviews in three selected sites in the US. The following publication presents the background, research methodology, analysis and the discussion that resulted from the interviews conducted in the two countries.

The research paper was published in the journal *Biodiversity and Conservation*.
Full reference to the paper: Kamal S., Grodzińska-Jurczak M and Pietrzyk-Kaszyńska A. 2015. Challenges and Opportunities in Biodiversity Conservation on Private Land: an

Institutional Perspective from Central Europe and North America. Biodiversity and Conservation. DOI:10.1007/s10531-014-0857-5

Lead author's contribution: Research design, data collection, data analysis, manuscript preparation

Number of references in the paper: 49

Challenges and Opportunities in Biodiversity Conservation on Private Land: an Institutional Perspective from Central Europe and North America

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Abstract

Private land is slowly emerging as a global biodiversity conservation strategy for its potential to complement the existing protected area model in its attempt to halt the global biodiversity loss. However, involving private land in conserving a public good faces continuous challenges. While examining landowners' motivations for conserving their land is imperative to its success, it is equally important to assess how other stakeholder groups perceive private land conservation. In order to capture the diversity and contrasts in implementing private land conservation, this research focuses on investigating the managerial perspectives on the status of private land conservation in two countries: USA and Poland. The paper presents the results of twenty five in-depth interviews that were conducted in the two countries. The US context, with a longer history and experience, captured complex interactions and factors that influence private land conservation, including role of conservation policies, civic sector organizations, stakeholder collaboration, technical and financial support, and non-monetary motivations of landowners. The Polish context however, was limited to the regulatory model and as such did not differentiate private land conservation from traditional protected areas. In Poland, the lack of voluntary initiatives along with adequate policies and lack of awareness on private land conservation at a national and local level contributed to limited scope and understanding on the subject. The two case studies highlight the context dependency of such a strategy and bring to focus some of the factors that should be addressed while adopting conservation on private land as a biodiversity conservation strategy.

Keywords: private land conservation, biodiversity, managerial perspective, in-depth interviews, USA, Poland

1. Introduction

1.1. Conservation on Private Land

The role of private land in biodiversity conservation has only recently been recognized, more so as protected areas are proving insufficient to reduce and halt the global biodiversity loss (Knight and Cowling 2007; Langholz and Krug 2001). Protected areas can certainly be considered as a necessary condition for sustenance of biodiversity but they are often limited due to their isolated and limited geographical coverage, their lack of connectivity, their possible downsizing and their limited coverage of actual global biodiversity (Kamal et al. 2014; Mascia and Pailler 2011; Mora and Sale 2011; Naro-Maciel et al. 2008). In this regard private land can play a significant role. Although private lands are not a sufficient condition for biodiversity conservation, nevertheless, they can contribute to larger and contiguous landscape protection, better connectivity between protected areas and higher coverage of global biodiversity (Kamal et al. 2014; Smith et al. 2006). For instance, 85% of the federally listed species in the United States (US) occur also on private lands (Stein et al. 2010). Hence, involving private land in conservation is becoming crucial, especially with the increasing demographic and developmental pressures (Joppa et al. 2008).

However, involving private land in conservation strategies is complicated by the nature of the land itself — that it is privately owned (Mascia 2003; Tikka and Kauppi 2003). The challenge is to convince landowners and institutions that a public good such as biodiversity needs private land for its conservation. At the same time it is important to resolve the gap between conservation priority (determined based on biological and ecological knowledge) and conservation opportunity (the capability and willingness of people or a community to participate in conservation actions), as defined by Knight et al. (2010) and Knight and Cowling (2007). The conventional top-down model of governance used in protected areas is unlikely to work on private land conservation due to the nature of ownership and the lack of implementation or monitoring (Kamal et al. 2014; Knight et al. 2010). Instead, it is crucial for managers of private land under conservation to strive for a delicate balance between conservation and regulation, as site selection and management actions will influence landowners' perception of this strategy and in turn affect its acceptance and efficiency. Also, translating theory into practice will depend largely on how agencies responsible for implementing private land conservation perceive and approach this strategy. The research goal, therefore, is to analyze the institutional perspectives on the status of private land conservation, the factors influencing its effectiveness and the challenges it continues to face.

1.2. Research Context

In order to capture the diversity in the interpretation of private land conservation, this research focuses on two countries as case studies that are at very different phases and have very different approaches to private land conservation: Poland and USA. Poland poses a unique challenge for private land conservation with its interesting mix of troubled political history contrasted with its progressive future as a Member State of the European Union (EU). Biodiversity conservation in Poland has been very traditional so far, with protected areas being the only functional units of conservation. Private land conservation exists only within the borders of protected areas and are mostly regulated or passive (Grodzinska-Jurczak and Cent 2011; Kamal et al. 2013). Using Kamal et al.'s (2014) classification system of private land conservation, most private land involved in biodiversity conservation in Poland can be classified as category II (regulated private properties) and category VI (inactive conservation).

With the accession into the EU in 2004, Poland had to adopt several EU policies into its national strategy, Natura 2000 being one of them. Simply put, Natura 2000 is a framework of two directives (the Birds Directive and the Habitats Directive) which together form the backbone of EU's biodiversity conservation strategy (European Commission 2013; Hiedanpaa 2002). In order to become a Member State, Poland designated nearly 20% (approx 68,04,300 ha) of its terrestrial area as Natura 2000 sites and a significant proportion of it lies on private land (GUS 2013). There is also significant overlap between Natura 2000 sites and other forms of protected areas (Kamal et al. 2013). This has generated considerable amount of conflict among different stakeholder groups, especially landowners who feel their authority over their land being threatened, and the only solution to the "problem" of having private land within protected areas have been acquisitions (Cent et al. 2007; Grodzinska-Jurczak et al 2012; Kamal et al. 2013). However, acquisition is not feasible in the long term for two primary reasons: first, it is often economically unfeasible for a government to buy every parcel of private land in protected areas. Second, it changes the proportion of public-private ownership of land within the country, which is an important fact considering Poland was one of the few countries that managed to retain a considerable portion of its territory under private ownership even under the communist rule, indicating the importance of private ownership to its people (Giovarelli and Bledsoe 2001). Hence, in this current mix of traditional, regulated private lands and new adoption of EU policies, it becomes important to understand how managers responsible for implementing or promoting private land conservation at local and provincial level perceive such a strategy, its role in biodiversity conservation and the challenges and opportunities it brings to Poland.

The institutional perspectives toward private land conservation in Poland will undoubtedly be influenced by the country's private land conservation policies and tools which are, at present, in its nascent state at best. So how does it differ from institutional

perspectives in countries with promising policy support and incentive tools? How do managers in such cases perceive private land conservation and identify factors that influence its success? Several countries are exploring the potential of private land in biodiversity conservation but this research investigates deeper into the US context for several reasons. Private land is gradually emerging at the forefront of biodiversity conservation in the US and has been a subject of discussion in the literature for a while with mixed models of protected areas as well as voluntary conservation on private land. Doremus (1998); Gattuso (2008); James (2002); Kittredge (2005); Rissman et al. (2006) and Scott et al. (2001) are a handful of such examples where the focus is on private land conservation in the US, the role of civil society organizations and landowners' motivations. A country with a high percentage of private land within its territory (72%), US has also been a country with significant acreage of private land under conservation (Gorte et al. 2012). For instance, an estimated 40 million acres (or 16,187,400 ha) of private land is under conservation easement alone (NCED 2014). Using Kamal et al.'s (2014) classification, most of US's private lands under conservation fall into category I(a) (conservation through purchase by a private conservation organization) I(b) (land under conservation easements), III (land under conservation contracts) and category V (active voluntary conservation). Therefore, its current state of private land conservation is already far advanced than that of Poland's. As a non-European country, it also presents a different context and a different perspective from the post-communistic European one.

Voluntary private land conservation at this scale in the US would not have been possible without adequate policy support both at the federal as well as state level. Open space programs, federal and state tax laws as well as the strong presence of civil society organizations such as land trusts and other non-governmental organizations (NGOs) offer a large number of incentives and opportunities to private landowners to engage voluntarily (George 2002; Ma et al. 2012). Conservation easements, conservation contracts, provisions under the Farm Bill such as the Conservation Reserve Program, Grassland Reserve Program are a few examples of the many tools that support voluntary private land conservation in the US (Rissman et al. 2006; USDA-ERS 2014). Along with the policy support, there has also been a surge in the number of organizations that work directly or indirectly to facilitate conservation on private land. Land trusts are the most conspicuous of all and their number is on a constant rise (Ernst and Wallace 2008; Gattuso 2008). It has been over three decades since the Land Trust Alliance (LTA), an organization that facilitates resource exchanges among the increasing number of land trusts along with promoting land conservation, was formed and there are over 1500 local and national land trusts in the US right now (LTA 2013). These facts along with the ever increasing literature on private land conservation are an indication of the growing recognition of private land conservation in the US by both the public and the private sector institutions. The US, therefore, presents an interesting context where private land has had some time to evolve and to be explored, and in this process it brings forward useful insights as a way of laying foundational principles for others on what has worked, what has not and why.

The goal of this research is to analyze the difference in institutional perspectives that is generated based on the experience of voluntary (in the US) and involuntary private land conservation (in Poland). Specifically, it examines how the context of regulated private land versus the presence of voluntary tools has an influence on managerial perception of the role of private land in conservation, its challenges and potential opportunities.

2. Research Methodology

2.1. Study sites

To investigate the institutional perspectives on private land conservation, the research first identified study sites within each of the selected countries. Since private land conservation in Poland is limited only to protected areas and there is no voluntary form of private land conservation, the research focused had to limit itself to specific sites, which were the three most prominent forms of protected areas in Poland. The criteria for site selection included size of the protected area (minimum 15,000 ha), percentage of private land or arable land within its border (minimum of 25%) and minimal overlap with other forms of protected areas. Based on these criteria, three forms of protected areas were selected which lies in three voivodeships (equivalent to states): Natura 2000 site Dolina Gornej Wisly (Slaskie voivodeship in the south-west); Skierbieszowski Landscape Park (Lubelskie voivodeship in the south-east), and Biebrzanski National Park (Podlaskie voivodeship in the north-east of Poland).

For the US case study three states were identified based on several criteria. The research did not limit to specific sites since US has several voluntary conservation tools for private land outside of protected area and the goal was to capture the perspective of institutions involved in such voluntary actions. Primary focus was on states with high percentage of private land ownership, high percentage of voluntary private land conservation (using National Conservation Easement Database as an indicator), different forms of land uses (such as farming and forestry) and different forms of private land conservation (voluntary, and private land within protected areas). Most of the states narrowed down in this process were located on the east coast of the country. Accordingly, the states of Connecticut (private land ownership: 94.3%), Pennsylvania (private land ownership: 83.26%) and the state of New York (private ownership: 62.9% and contains Adirondacks Park) were selected for the study (NRCM 2002).

2.2. Selection of Respondents, Data Collection and Analysis

Qualitative social sciences method, namely in-depth interview, was used to collect data for this exploratory research. Within each site in Poland, the primary institutions

involved in management and decision making processes of the protected area were first identified. For the national park, respondents included the national park office, Regional Directorate of Environmental Protection (RDOŚ), a local NGO chosen randomly from a list of NGOs in the locality, and the office of local municipality that is part of the protected area. Similarly, for the landscape park it was the landscape park office, RDOŚ, an NGO and the local municipality office; while for the Natura 2000 site it was the RDOŚ office, a local NGO, municipality office and finally the water management authority responsible for the management of the water body that led to the designation of Natura 2000. A total of twelve face-to-face interviews were conducted and each interview lasted an average of forty five minutes.

In the US, the main institutions involved in the management of private land under conservation (both voluntary and within protected areas) were considered. For New York, it was the landowners' association in Adirondacks Park, the Wildlife Conservation Society (WCS) at Adirondacks, the US National Forest Service (NFS) and the National Park Service (NPS). In case of Pennsylvania, respondents included the USFWS, US Natural Resources Conservation Service (NRCS), The Nature Conservancy (TNC) and a local land trust and respondents from Connecticut included a local land trust, the USFWS and TNC. Additionally, the research also included a respondent from the NPS's Human Dimensions in Biological Resource Program, as it was specifically designed to work with private landowners inside of national parks. A total of thirteen interviews were conducted across the three states, of which two were face-to-face interviews and the remaining were telephonic interviews. Each interview lasted an average of one hour and ten minutes.

The interviews were conducted following a broader interview guideline that was drafted during the research design. It contained eight open ended questions (with guiding sub-questions to each question); however, the objective behind these questions was to merely guide the conversation in a way that would document responses to the following issues:

- Respondents' understanding of the role of private land in biodiversity conservation and the need to include it in conservation strategies
- The primary challenges for private land conservation, as identified by the respondents, to become an effective conservation strategy (specifically within social, economic and governance domains)
- Respondents' opinion of potential solutions to overcome these challenges (economic, social and policy level)
- Respondents' opinion on the role of NGOs in enhancing private land conservation
- Respondents' experience of landowner characteristics that predisposes them to conservation and undertaking activities on their land
- Any additional insight from the respondents on private land conservation based on their field experience

Additionally, the role of voluntary tools and their benefits and challenges were further discussed in the US context.

The interviews were recorded after due permission from the respondents and were subsequently transcribed. The transcriptions were then coded using Gibbs (2007) and Saldana (2009) as guides and QDA Miner as the software for the analysis. The coded statements from all transcriptions were then analyzed to gather the respondents' opinions and select specific statements to represent these opinions.

3. Results

The following results summarize the respondents' perceptions on the status of private land conservation from their institutional perspective and in their context. The two tables present the main issues raised in the discussion, the key findings and contain examples of respondent statements that are evidence of these findings. The statements are also referred to by their numbers in the description of the results. The two case studies highlighted the differing views that exist on private land conservation and how it varies based on context and experience. Specifically, the lack of any concrete initiative targeting private land conservation in Poland limited respondents' input to the discussion due to the lack of experience as well as focus on the subject. The US context on the other hand captured a diverse range of factors contributing to efficient private land conservation, although challenges still remain abound.

3.1. Conservation on Private Land in the Polish context

The respondent statements referred in the text in this section are from Table 1.

Issues Raised	Key Findings	Statements	Respondents
Role of private land in biodiversity conservation	<p>Mixed opinions:</p> <ol style="list-style-type: none"> 1. Sometimes identified as crucial. Important for connectivity within protected areas 2. Questioned the need for conserving private land when public lands are well conserved 3. questioned over the need for active conservation on well managed private land 	<ol style="list-style-type: none"> 1. <i>I think it is of crucial importance but at the same time it [conserve nature] is very difficult as it is difficult to convince farmers..</i> 2. <i>It [private land] has a crucial role, especially taking into consideration the overall landownership structure in Poland...particularly important for biodiversity and connectivity. When thinking about land that serve as ecological corridors, it is impossible to not include private land...</i> 3. <i>Sometimes it's better not to interfere with somebody's land because this species has already been there for some time and nothing bad has happened, which means it is well managed..</i> 	<p>NGO</p> <p>NGO</p> <p>RDOŚ</p>
Voluntary private land conservation	<p>Non-existent right now</p> <p>Limited understanding of what it entails and is imagined to be conversion of private land into protected areas.</p> <p>Perceived unfeasible and impractical.</p>	<ol style="list-style-type: none"> 4. <i>I haven't heard that a new protected area would be created at a request of somebody. Frankly, I don't even know how this would work and if it would even stand a chance..</i> 5. <i>...landowners would decide they want their land to be included into conservation plan – this would be absurd! No one would probably agree, why would they want to lose the land if it's not necessary?</i> 6. <i>...the landowner cannot always decide if something should be protected or not...in that case on the vast majority of private lands nothing [no conservation] will be undertaken</i> 	<p>Landscape park administration</p> <p>National park administration</p> <p>RDOŚ</p>

Collaboration between stakeholder groups	Limited and formal, if at all	<p>7. ...mostly national park employees and NGOs [taking care of this area]. There is RDOS but they don't care... they can act on their own...or they can involve us to help them, instead of complaining about how we put a signature in the wrong place...</p> <p>8. A lot of agencies are responsible for nature conservation nowadays. The responsibilities overlap...it is a mess but we are trying to adjust...</p>	<p>NGO</p> <p>Landscape park administration</p>
Tools for private land conservation	<p>Regulatory mechanisms (of protected areas)</p> <p>Acquisitions by NGO and park agencies</p>	<p>9. Nobody asks people if they wanted to be included or the form of nature protection... it is just designated and that's it. This is where the opposition originates – why can't I manage my land the way I want it because it inside of a protected area?</p> <p>10. Since the very beginning when somebody has an idea to designate private lands as protected, it should be done in cooperation with landowners. It should be explained to them why and how it will be done, step by step, so that they have a clear image of the situation.</p> <p>11. ..in some cases [specific example cited] only land acquisition work. You cannot force farmers to stop going for wood into their forest in wintertime</p> <p>12. ...the financial aspect is the most important here [tools for private land conservation] and it has the greatest role. For now we are relying only on acquisitions...</p>	<p>Municipality office</p> <p>Municipality office</p> <p>NGO</p> <p>Landscape park administration</p>
Challenges to private land conservation	Two primary challenges identified	<p>13. For now – mostly money, and in a longer time perspective also other factors. This is the reality: if somebody wants to earn, he will go for EU subsidies and he will do things “for” nature even if he personally doesn't care... If they get</p>	National park administration

	<p>1. In the short term, lack of financial tools : compensation or incentives</p> <p>2. In the long term, lack of environmental awareness and motivation for civic engagement among landowners</p>	<p><i>money the tone of a conversation changes and their attitude changes as well. It's not very ideal but this is what our reality looks like..</i></p> <p><i>14. In comparison to Western Europe, we are a rather poor society and for the majority of people the priority is unfortunately earning as much money as possible and not managing in an environmentally friendly way..</i></p> <p><i>15. ..it's a real loss when somebody wants to manage his own land in his own way and he cannot. Usually it not just the fact that something is not allowed, but also a financial loss</i></p> <p><i>16. ..people loose. Financially. Not the general society but single people in terms of their earnings</i></p> <p><i>17. .. people mostly treat land in a utilitarian way. Nature protection pops up only when they apply for EU subsidies and then they are told that they should take nature into consideration in their actions, include it but not treat it as an obstacle...</i></p> <p><i>18. ..in a longer timeframe only education can help.</i></p> <p><i>19. If we want to increase the role of conservation on private land we need to first raise the environmental awareness. It needs to be explained somehow that it is not a whim of bureaucrats but a reasonable action conducted with a specific, important goal. The best would be to show that it is profitable as well..</i></p>	<p>NGO</p> <p>National park administration</p> <p>Municipality office</p> <p>RDOŚ</p> <p>NGO</p> <p>RDOŚ</p>
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Table 1: Summary of key findings and important statements from the interviews in Poland

The only form of private land conservation in Poland currently in existence is the regulatory form within protected areas and it became increasingly evident during the discussions that private land conservation is a very new school of thought for the managers and as such, they did not recognize it as a strategy that is separate from the traditional protected area model. Nevertheless, within this limited view, the respondents had a mixed opinion on the importance of private land for biodiversity conservation. While some acknowledged and mentioned it as “crucial”, others related its importance to their local context — if public lands were sufficiently protected in conservation priority area then conserving private land was not so important. Additionally, if a private parcel of land outside of a protected area was identified with high conservation value (such as having a protected species), then the land management by the landowner must have been adequate so far and therefore, there should be no need to put restrictions on such parcels of land. This reflected their lack of focus on the influence of factors such as change of ownership or land-use and future division of the land. Most respondents were also challenged in articulating the reasons for which private land could be important to biodiversity conservation, besides the fact that it was already a part of some protected area. Nevertheless, a few respondents did identify connectivity within the protected area as a key function that private land can perform for biodiversity. Examples of remarks from the respondents on this issue include statements 1-3.

Since private land conservation had no presence in Poland besides the regulatory form, the respondents had limited understanding of what voluntary conservation entailed. They often interpreted it as another form of regulatory conservation, only difference being that the landowner would voluntarily allow for his private land to become a protected area. Hence, it was difficult for them to comprehend why a landowner would be interested in making his/her land a part of protected area voluntarily, if it had not already been identified so by the government agencies. Within this limited definition of “voluntary” conservation, most respondents concluded that it was unlikely that any landowner would want his/her land included in any conservation mechanism, thereby making voluntary conservation unfeasible and impractical in Poland. Remarks such as statements 4-6 validate this point of view.

Focusing the discussion on policy support, the respondents could not identify any environmental or conservation policy at a national or local level that focused on private lands. The only indirect policy was regulations for protected areas, and these subsequently extended to private land inside of protected areas. There were also some instances of acquisitions of private land within protected areas, mostly by NGOs and the responsible protected area agency itself, in order to have less acreage of private land and more control over the management of the entire protected area. However, the NGOs are relatively limited in their number and resources, and cases of acquisitions are not very common and it is often economically unfeasible for the protected area agency to buy all parcels of private lands within the protected area. Also, the fact that each sector/agency tried to perform its tasks with limited or no collaboration with other sectors/agencies made it

challenging to have any significant impact. Still, acquisitions and regulations continue to be the dominant themes in private land conservation but often pose a financial challenge and is a source of conflicts. Statements 7-12 evidence some of these findings.

The importance of financial incentives or compensation for landowners, and the current lack of such tools in Poland was perhaps the most discussed and emphasized issue during the interviews, as apparent in example statements such as 13-17. Indeed, this topic contributed to major part of the discussion and most respondents iterated and reiterated this issue, citing it as the most effective and immediate solution to deal with conflicts related to property rights and landowners' authority over their land. At present, Poland has no financial tools for private land conservation, except for the EU agri-environmental schemes, which are targeted at farmers only and does not cover other forms of land uses on private properties. For most respondents, presence of financial tools was the crucial condition required to even initiate conservation measures on private land and so far, it has been an unfulfilled condition. According to them, the lack of any adequate financial mechanisms made the situation often confrontational between conservation agencies and landowners over different aspects of property rights. To reiterate the fact, some examples of human nature conflicts related to private land were also cited. However, the respondents had limited knowledge on financial tools that are already being explored in different countries. Also, little was said on who should be responsible for designing or implementing such tools, and with limited interaction among the different stakeholder groups, fulfilling these tasks was a challenge in itself. Besides the immediate and short term solution of financial tools to mitigate conflicts, they also identified a need to address the lack of motivation and awareness among landowners to conserve biodiversity on private land, coupled with their low level of civic engagement and willingness to participate. The general agreement was that better information dissemination and raising environmental awareness, together with financial support, would make such a strategy more acceptable and might even motivate landowners to engage in voluntary conservation. The respondents assessed a serious challenge in the current lack of basic mutual communication and cooperation between the stakeholder groups, especially the landowners. Examples of responses to this topic include statements 18, 19.

Thus, according to the respondents, private land conservation has had limited application in Poland so far, and with no political and financial support, together with lack of strong collaboration between stakeholder groups, the feasibility of the strategy (both voluntary and regulatory) was questionable.

3.2. Conservation on Private Land in the US context

The respondent statements referred in the text in this section are from Table 2.

Issues Raised	Key Findings	Citations	Respondents
Role of private land conservation	<p>Important both inside and outside of protected areas.</p> <p>Main reasons for including private land in conservation:</p> <ol style="list-style-type: none"> 1. Protecting wildlife/species 2. Increase connectivity <p>Holistic conservation of landscapes/ecosystems</p>	<ol style="list-style-type: none"> 1. <i>...if you want conservation to happen, it's got to happen on private land, or at least a mix of public and private land</i> 2. <i>...there is not enough public land anywhere in the world to provide the protection needed for wildlife.. so it is really important to look beyond the borders of protected areas and focus on private land...over 75% of US's wildlife occur on private land so you have to work with private landowner</i> 3. <i>...we have a mosaic of small chunk of public land surrounded by private lands.. so we really have to figure out the connectivity of our landscape..</i> 4. <i>...you have got to blend it together because you have got to think in terms of ecosystems and overall landscapes...you can't take little blocks [of public lands]. You have to look at the bigger picture.</i> 	<p>land trust</p> <p>NRCS</p> <p>NFS</p> <p>WCS</p>
Regulatory and voluntary actions	<p>Both are required based on the context:</p> <ol style="list-style-type: none"> 1. <i>Regulations</i>: when conservation priority becomes higher than conservation opportunity 2. <i>Voluntary</i>: less confrontational, more acceptable and respectful of landowners' property rights 	<ol style="list-style-type: none"> 5. <i>...if they [landowners] would have wanted to do it voluntarily, they would have done it already...you cannot rely fully on people to always do the "right thing"</i> 6. <i>...conservation is most effective, quick and conflict free when it is voluntary</i> 7. <i>...if it is strictly a regulation and we as an agency are going onto private lands, then by and large, that quickly becomes confrontational. I used to believe strongly in regulatory science but after 12-15 years in voluntary programs, I have become very anti-regulatory.</i> 	<p>NRCS</p> <p>LTA</p> <p>USFWS</p>

Types of assistance for private land conservation	<ol style="list-style-type: none"> 1. Technical: trainings, workshops, expert advice on projects and practice 2. Financial: incentives and compensation 3. Advocacy 4. Promotion of stewardship 	<ol style="list-style-type: none"> 8. <i>..we could be providing direct technical assistance and trainings, how to facilitate a conservation dialogue, on conservation practice and standards, workshops etc..</i> 9. <i>..we work mostly with private landowners to restore habitats that are on private land by lending our expertise and advice, or executing the project on their land..</i> 10. <i>..primary mechanism that we do are through our (grant) programs. So we provide grants to other organizations to work with private landowners...do conservation work, through easements and other programs.</i> 11. <i>..the advocacy function, we provide mainly by lobbying ..so during the year we are working on different policy agenda that will benefit the land conservation community.</i> 12. <i>..working with landowners to help improve stewardship for wildlife.</i> 	<p>LTA</p> <p>USFWS</p> <p>NRCS</p> <p>land trust</p> <p>land trust</p>
Adequacy of policies	Theoretically adequate and supportive; however, implementation remains a challenge	<ol style="list-style-type: none"> 13. <i>..we [the US] have a pretty decent policy and policy is not the stumbling block..</i> 14. <i>..in terms of policies we have a ton of stuff and if all of them were implemented it would make a remarkable change...</i> 15. <i>..there's nothing cohesive overall and overarching that would connect each unit together. You have the Farm Bill and then you have the Conservation Easement Act but it is up to the state to tie them together</i> 16. <i>...the Farm Bill is one of the biggest policy tools and it only reaches out to a small fraction of private landowners.</i> 	<p>NFS</p> <p>NPS</p> <p>TNC</p> <p>NRCS</p>

Popular tools in private land conservation	<ol style="list-style-type: none"> 1. Direct acquisition 2. Conservation easements 3. Other provisions under the Farm Bill 	<p>17. ...[NFS] would prefer to purchase where possible to have contiguous land because then it's much easier...of course funding always comes into play.</p> <p>18. If you need to develop park properties, then there is only way to go about it and that's direct acquisition. If it's just to preserve the landscape and continue the residential use...then we can shoot for easements.</p> <p>19. ...much of that land we are trying to conserve is because there were farmers there in the first place...the land and the owner are connected..</p>	<p>NFS</p> <p>NPS</p> <p>TNC</p>
Conservation easements	<p>Strong role of easements in private land conservation</p> <p>Challenges included:</p> <ol style="list-style-type: none"> 1.financial constraints 2.monitoring 3.enforcement 	<p>20. ..it has reached a level where we are now having a small explosion of interest, which is really heartening...it's given them [landowners] the ability to hold on to their land.</p> <p>21. .. is a major financial burden for land trusts, especially smaller ones, as they might have to go through some legal actions...</p> <p>22. One of the challenges is in monitoring the purchases...making sure that your easements are constructed in such a way that its monitoring is possible and it is enforceable by the land trust is in itself a challenge..</p> <p>23. ..the devil is in the details of all easements: whether there is a good stewardship component, who has access to the landscape etcetera.</p>	<p>LTA</p> <p>land trust</p> <p>TNC</p> <p>land trust</p>

Role of NGOs	<p>Very crucial to private land conservation for their outreach, fundraising abilities, flexibility and the general trust among people.</p> <p>Collaboration among agencies</p>	<p>24. <i>..the total land protected by land trusts is 47 million acres...so that's just private land being protected in addition to public lands</i></p> <p>25. <i>I think they [NGOs] have played a big role...they do hundreds and thousands of acres of conservation easements regularly ...and different ways of stewarding their parcels of land</i></p> <p>26. <i>...their [NGOs] role is ever increasing to tell you the truth. With these budget shortages...you can look for some non-profit to come and help you. You can't underestimate the role of these NGOs in conserving private lands...they come to our rescue over and over again</i></p> <p>27. <i>.. NGOs are so much more flexible, and so, quicker to respond. Also from a landowner's perspective, it is much easier to approach a NGO than government.</i></p> <p>28. <i>..we have invested a lot of time and resources [into private land conservation] and so if these lands are to be well maintained and without conflict, we need to partner with state agencies..</i></p> <p>29. <i>..generally we are understaffed and so we do not do all the work by ourselves but we partner with several other organizations.</i></p>	<p>land trust</p> <p>USFWS</p> <p>NPS</p> <p>NRCS</p> <p>LTA</p> <p>land trust</p>
Landowners' disposition to conservation	<p>Landowners' characteristics can influence their attitude toward private land conservation. Besides socio-economic factors, the key influencing characteristic is non-monetary: conservation ethic</p>	<p>30. <i>..wouldn't generalize over the socio-economic status but the main common denominator is their true love for their land...people who are conserving are pretty much thinking beyond themselves</i></p> <p>31. <i>..money is always a factor, yes; but it is the conservation ethic. If they have it then money becomes somewhat secondary</i></p> <p>32. <i>..the underlying issue with them [landowners] is that they have a conservation ethic just like we do. We are not an easy group to work with — we are very bureaucratic and very slow...and</i></p>	<p>WCS</p> <p>USFWS</p> <p>NPS</p>

		<i>they are patient with us, thank God!</i>	
Challenges to private land conservation	<ol style="list-style-type: none"> 1. dynamic and contextual: dependency on landowners' willingness 2. financial constraints 3. awareness and outreach 	<ol style="list-style-type: none"> 33. <i>they are people [laughs], and so people can be challenging to work with...they can be not all that honest, and can have an agenda of their own...how much they can give up and what their priorities are against our priorities.</i> 34. <i>if someone had a property in the middle of a [national] park and wanted to construct a big hotel and have the right zoning for it, then there's nothing we can do</i> 35. <i>you have the public lands to manage and some private landowner wants to develop his land and you simply don't have enough money to buy it... at each level they[federal and state government] do not have enough financial resources</i> 36. <i>the hardest thing is making communication [with landowners] an effective one in order to build relationships and trust, and that takes a lot of time. Often there's not enough money or staff to do it</i> 37. <i>..most landowners often ask 'does that mean we have to open our lands to the public?' They are also worried about too much oversight...they don't want to be told what to do with their land..</i> 	<p>USFWS</p> <p>NPS</p> <p>NFS</p> <p>land trust</p> <p>land trust</p>

Table 2: Summary of key findings and important statements from the interviews in the US

The importance of conservation on private land was well recognized and sometimes mentioned as “dramatically important” in the American context by managers of the interviewed agencies, including public institutions such as the NPS that mentioned changes in their strategy to be more inclusive of private lands around protected areas. Respondents from both public and private sector institutions cited biodiversity on private lands as the main reason for its inclusion in conservation strategies and several contributions of private land to biodiversity conservation were identified. They acknowledged the role of private land in increasing habitats for threatened species and strengthening ecological connectivity among protected areas for better movement of wildlife. Some respondents focused more looking at the bigger picture and emphasized on the role of private land in holistic conservation of contiguous landscape, instead of small isolated pockets of land. Statements 1-4 include respondents’ opinions that support these findings.

Private land conservation in the US has relied mostly on voluntary strategies and therefore intrusion on property rights did not seem to be an issue of contention. Comparing voluntary strategies with regulations resulted in mixed opinions. While the need for regulations in certain cases was acknowledged, some of the respondents had reservations against using regulations all the time. The argument in favor of regulatory action was that voluntary initiatives will never be sufficient and depends largely on the landowners. On the other hand, restrictions on private property were not going to be very effective anyway due to property rights of the landowner and in turn, generate more animosity between landowners and the implementing agencies, and as such was not a preferred mode of operation for the institution as well as the landowner. Statements 5-7 echoed these sentiments.

Voluntary conservation was encouraged by all interviewed agencies using different forms of assistance —depending on the agency, they provide technical assistance for land management or project planning and implementation, advocacy, promotion of stewardship, financial assistance, or a combination of a few of them, as captured in statements 8-12. Most of the financial assistance to landowners lies in easement programs, along with specific programs under the Farm Bill, the primary agriculture and food policy tool of the US federal government. In addition to these, respondents also mentioned other programs that pay for actual practices consistent with those mentioned by Kamal et al. (2014) as conservation contracts, such as incentive payments for practices that support wildlife. Irrespective of the type of assistance, most respondents noted that the choice of assistance was decided not only on available funds but also on organizational objectives and meeting the interests of both exchanging groups.

The presence of conservation agencies and the financial assistance depend largely on the existing policies and the opportunities that they present. In general, most respondents felt that the policies were theoretically adequate and more policies to regulate how people use their land might not be possible. The main challenges now are to connect these policies to one another and also to reduce the gap between theory and practice —how

these policies translate into action and increase their outreach. Examples of responses to current status of policies include statements 13-16. The existing policies, however, do open a path for various tools that can be used for conserving private land. Outright acquisition and conservation easements emerged as the two most popular tools being used on private land as evident in statements 17, 18. However, financial constraint is always a limiting factor for most agencies when it comes to direct acquisition of private lands that are important for biodiversity. Also, some agencies held reservations against acquisition as it can affect both the land use dynamics and the cultural connections that landowners hold with their land, an example of which is statement 19.

Acquisition being simply ownership transfer, this research enquired more on the role of easements in private land conservation. Conservation easement, in its basic form, is a tool where a landowner voluntarily surrenders some rights (such as developmental rights) over his land to an organization who is the easement holder (such as a land trust), in exchange for monetary or tax benefits. There was almost a unanimous opinion that the role of conservation easements has been very crucial which is why it is growing rapidly throughout the country. The tax benefits from easements have been a strong motivation for landowners, especially for owners of large land parcels which can sometimes become a financial burden for the new generation of owners. However, there are always challenges including assessing their real conservation contributions, along with enforcement and monitoring which requires substantial time, money and human resources. Additionally, the change in ownership through sale or inheritance can also make easements difficult to continue or implement as new buyers may not agree to the terms of the easement or choose to disregard it. Statements 20-23 present some examples of respondents' opinion on conservation easements.

The conservation easement "movement" and indeed private land conservation in the US has been spearheaded by the NGO sector. One of their main roles, especially of land trusts, have been to provide financial support, sometimes even to public agencies such as the NPS. Their mode of operation also makes them more approachable and effective in outreach. The response to the role of NGOs is well captured in statements 24-29. Public sector institutions were quick to acknowledge the role of NGOs which could be an outcome of the collaborations between the private and the public sector institutions. For example, the USFWS in Pennsylvania works with NRCS as well as with NGOs such as Ducks Unlimited, Pheasant Conservation groups and "dozens of such associations" for their projects on private lands. Also, most local land trusts are small in size and in such cases collaborations are mutually beneficial. Inter-agency as well as hierarchical frictions were mentioned but most respondents acknowledged the need to set aside differences if they were to proceed with their work.

Besides the support from NGOs and public institutions in the form of technical and financial assistance, the extent and effectiveness of private land conservation relies heavily on the landowner himself/herself and a landowner's characteristics can definitely influence the outcomes. While acknowledging that socio-economic factors are difficult to generalize,

nevertheless, some characteristics were considered influential such as economic standing, social status in the community, education, land-use type, acreage of land owned, other income sources and generation of ownership. However, there was a consensus on one trait: the presence of conservation ethic in landowners. Almost all respondents emphasized that the “love for the land” and the desire to see it last forever in its present state is the main driving force for a landowner to conserve that triumphs over all other factors including financial incentives. Examples that support this finding include statements 30-32. However, this line of thinking comes with the caveat that conservation ethic needs to be encouraged or supported by some form of assistance and often financial or technical assistance helps develop a feeling into action.

Thus private land conservation in the US has been a complex amalgamation of policy and institutional mechanisms, and landowners’ motivations. It therefore cuts across social, economic, ecological and political sectors and such a mix cannot be without its challenges. For most government institutions and also some NGOs, as reflected in statements 33, 34 the toughest hurdle for voluntary conservation was the very fact that they have to rely heavily on a landowner’s willingness to participate, and to work with people and on their private properties where their authority is unquestionable. Unsurprisingly, the second biggest challenge was identified as financial constraints. Especially acquisition of private land and its subsequent conversion to public lands lacks political will and as a result, government institutions and their programs are limited in their budget for acquisitions. For NGOs and especially the land trusts, the financial constraints were also very pronounced and they had to devote significant time and human resources to fundraising. Large organizations like the LTA also help smaller land trusts to raise operational funds. Lastly, landowners’ willingness to conserve, especially when they fear it will conflict with their land use is one of the hurdles that most institutions faced. This was mostly attributed to their fear generated from less awareness and more information dissemination was definitely desired. Statements 35-37 mention some of the above constraints.

The respondents, therefore, felt that conservation on private land is making a difference in the US landscape; however, it is still a relatively new conservation strategy and a complex of various factors, some of which are yet to fall into place.

4. Discussion

This research would like to acknowledge the role of a country’s political history in its present and future policy decisions on biodiversity conservation. Poland is gradually emerging from its communistic past and although it has overcome a lot of its challenges and has made significant progress, there are still several areas of improvement. In terms of biodiversity conservation, Poland still restricts itself to regulations and centralized control, as reflected in its national environmental legislations as well as its traditional model of

protected areas. Poland's communistic past therefore makes it a challenge to evolve from a top-down approach of governance to a more participatory approach, which is a prerequisite for private land conservation. The US on the other hand represents the other end of the spectrum; nature conservation has had a long history and so does public participation. Its relatively longer history of democracy has been supportive of individual's rights as well as acknowledging the role of civic sector organizations. The choice of conservation tools for private land is therefore dependent, among other factors, on a country's political history and its will to engage with all stakeholders. However, discussing the rich political history of the two countries is beyond the scope of this research and hence the discussion will limit itself to the findings of this research alone. The aim of this research is to present the differing perspectives of institutions based on their experience with voluntary or involuntary private land conservation and US and Poland serve as examples of such conditions.

4.1. Role of private land in biodiversity conservation

The findings of this qualitative research presents the institutional perspectives of organizations involved in private land conservation and thus it differentiates itself from similar studies on private land conservation that focuses on landowners' perspectives and motivations or on specific private land conservation tool such as easements (Daley et al. (2004); Ernst and Wallace (2008); Farmer et al. (2011); Joshi and Arano (2009); Raymond and Brown (2011)). The institutional perspectives from the two countries highlighted the differing views that exists on what private land conservation entails and its trajectory into the future in the two countries. In the US case study of mostly voluntary private land conservation, which was restricted only to the north-eastern part of the country, private land is being conserved both inside and outside of protected areas and their perception of private land conservation extended to all types of private properties. In contrast, the perception of private land conservation in the case study of involuntary conservation (Poland) was restricted to only those lands that were inside of protected areas. Even voluntary conservation was perceived as "tools" that can be used to engage landowners to willingly become part of protected areas, and voluntary conservation without any legal obligation of being part of a larger protected area was rather inconceivable for managers in the Polish case study. This suggests a common assumption among managers that top-down, regulatory approach works the best. It also validates Kamal et al.'s (2014) observation that from a global perspective, conservation on private land and what it encompasses still lacks a clear and concise understanding for managers of such regulated private lands and associated institutions.

Another closely linked issue is the role of private land in biodiversity conservation and here again there is difference in perspective based largely on experience. The importance of private land conservation and the role it plays in biodiversity conservation at a species, ecosystem and landscape level is well recognized in both the public and civic sector in the case of voluntary conservation (such as the US), and there is also some data

available to support these facts. Ecological connectivity and increasing the total land area under conservation is also one of the reasons why voluntary conservation on private land that are outside of formal protected areas are being supported by US conservation agencies. In contrast, although ecological connectivity was identified in involuntary conservation as well, it was limited to the outlook of private land as unfinished pieces in a mosaic of public protected areas and increasing the connectivity within protected areas and not between landscapes. Subsequently, even if financial mechanisms were to be made available in such areas, the institutions will tend to focus only on these private lands, instead of including at private lands outside of protected areas. Changing this institutional perspective is, therefore, very crucial if biodiversity conservation is to be extended outside the limits of formal protected areas.

4.2. The importance of institutional structures and support mechanisms

For sustaining and disseminating a strategy such as private land conservation, the presence of dynamic and adaptable policies is imperative and this was highlighted in the two contrasting case studies. Although there is still a lot of scope for improvement in implementation, nevertheless, the policy support in the US has made a promising start. Unfortunately, the same cannot be stated for Poland. If the role of private land in biodiversity conservation goes unacknowledged in national and state environmental policies as is the case right now, then there are limited opportunities for practitioners to mitigate conflicts or to encourage voluntary private land conservation. Other EU countries which are subjected to similar EU environmental legislations such as Natura 2000 are exploring policy tools to make private land conservation more feasible within their national framework such as fiscal transfers in Portugal and France, and there is no reason why Poland, cannot explore potential tools that fit well into the country's context (Santos et al. 2010; Schroter-Schlaack et al. 2014). Inclusion of private land in conservation policies is no longer optional for Poland, more so as the designated sites of Natura 2000 are being officially implemented on private lands and management plans are being drawn. Policies that support top-down approach to governing biodiversity needs to adapt in order to make the governance process more inclusive and participatory.

Since private land conservation is founded essentially on grassroots initiatives, the presence of a strong civic sector can have significant influence on its outreach and implementation. In the case studies, the two countries have a very different political history and hence the role and the ability of the civic sector to establish and engage and perform activities are also very different. Whereas the strong presence of NGOs has hastened the pace of private land conservation movement in the US and often supported the public sector, the role of NGOs has been rather limited in the Polish context. It is important to acknowledge that this is partially an outcome of Poland's troubled political past where "voluntary" actions were often forced on people, "civic organizations" were controlled by the government, and the modern civic movement has been around for only 20-25 years (Bell et al. 2011; Cent et al. 2007). Thus, there is still a lot of mistrust among people which

is reflected in their weariness in forming or working in civic sector organizations (Cent et al. 2013 and Niedzialkowski et al. 2013). For effective outreach and implementation of a strategy such as private land conservation the presence of the civic sector organizations need to as conspicuous as the public sector and Poland has a long way to cover in this aspect.

The importance of financial mechanisms in promoting private land conservation cannot be undermined; however, to what extent it is influential is questionable and largely context based (Polasky and Doremus 2003). In addition to stronger financial support than most countries, private land conservation in the US has relied significantly on altruism and philanthropy. It is therefore crucial to focus on non-monetary factors that influence private land conservation such as landowners' conservation ethic, their environmental education and awareness, and other socio-demographic factors (De Snoo et al. 2013; Koontz 2001; Ryan et al. 2003). Also, it would be perhaps more effective if financial incentives were framed with emphasis on the differences in landowner characteristics instead of being homogenous, such as differences in small acreage versus large acreage landowners, in new owners versus several generation owners, in inheritance and in land use, to name a few. Finally, progressive policies do not necessarily ensure a shift in people's perception. Acquisition is still the preferred choice in the US, especially for private land within protected areas. The paradigm shift in policies for land conservation needs to be complemented with a shift in practitioners' attitude that would promote and maximize the opportunities in land stewardship.

Examining the Polish case study on the same subject, it is evident that the lack of financial support specific for private land conservation has concentrated the attention of managers to think of financial tools as the ultimate solution to their challenges. While this is necessary and important, it often becomes a shortsighted solution and other complex interactions that were identified in the US context such as public-private sector collaborations, role of civil society organizations, promotion of stewardship, and building on the existing social and cultural traits such as conservation ethic are often overlooked. Also, no data exists on how much of private land is being conserved even inside of the different types of protected areas in Poland. Since regulatory mechanisms have dictated private land's involvement in conservation so far, there has been a lack of motivation to gather information on landowners' attitudes toward private land conservation. Without the availability of such information, managers of regulated private land inside of protected areas have to deal with human nature conflict based on their best subjective judgments.

5. Conclusion

A crucial aspect of private land conservation was left untouched in both discussions and that is the current lack of focus on the conservation outcomes in private land conservation. The primary interest is on 'how much' of land is being conserved

instead of assessing ‘what’ these private lands are conserving (Murdoch et al. 2010). This information is probably available at a local scale but there is a need for more cohesive and overarching measurement and evaluation, if private land conservation is going to be a strategy for biodiversity conservation like public protected areas.

Private land conservation at a global scale is at a nascent phase and it needs to be better organized and more efficient in order to be recognized for its contribution to biodiversity conservation, much like the protected areas. Strategies to reduce the current trends of biodiversity loss need to be dynamic and adaptive and private land conservation is no exception. Such a bottom-up initiative relies heavily on all stakeholder groups to play their part and significant progress can be expected only when the desired changes in landowners’ attitudes is complemented with a change in managerial perspective of institutions that are involved in the governance of such conserved private lands.

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CHAPTER 4: Characterizing and Developing a Typology of Attitudes among Stakeholders: Q Methodology

Biodiversity conservation on private land in Poland will be influenced not only by the institutions managing it currently but also by other stakeholder groups who will be impacted by such an action, mostly private landowners. The decision making process on planning and management will undoubtedly have an impact on landowners' attitude toward biodiversity conservation on private land. Being regulatory, private land conservation in Poland has not focused on exploring the potential of landowners' willingness or capacity to participate in conservation actions. However, with the increase in acreage of private land under conservation with Natura 2000 and also with the pressures of urbanization on natural resources such as biodiversity, it becomes crucial to examine stakeholders' attitude toward private land conservation in order to build on their motivations and make the strategy more effective and less conflict ridden.

Attitudes of stakeholders toward conservation on private land had not been studied prior to this research in Poland, it was imperative to analyze the type of attitudes that existed in the population before investigating the factors that can affect them. Therefore, the first phase of analyzing attitudes was exploratory, and this was conducted through a specific methodology used in psychology and other social sciences called Q methodology. This method is unique in its approach as it helps to quantify human subjectivity by interpreting qualitative data in a quantitative way, while leaving scope for qualitative interpretation. Q methodology focuses on what the types of attitudes in the population are and not on how many in the population are expressing it. The use of Q methodology has expanded to research fields beyond sociology such as medicine, education and health science; however, its use in environmental studies has been limited. This research was the first to use Q methodology to measure environmental attitudes in Poland.

The following research article was published in the journal *Biodiversity and Conservation*.

Full reference to the paper: Kamal S. and Grodzińska-Jurczak M. 2014. Should Conservation of Biodiversity Involve Private Land? A Q Methodological Study in Poland to Assess Stakeholders' Attitude. *Biodiversity and Conservation* 23(11): 2689-2704. DOI: 10.1007/s10531-014-0744-0

Lead author's contribution: research idea and design, data collection and analysis, manuscript preparation

Number of references in the paper: 41

Should conservation of biodiversity involve private land? A Q methodological study in Poland to assess stakeholders' attitude

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Abstract

Biodiversity conservation is gradually shifting its dependency on public protected areas to take a more holistic ecosystem and landscape approach that includes private lands in addition to public lands. However, effective practice of biodiversity conservation on private land also depends on landowners' attitude and their willingness to participate and cooperate. This study focuses on Poland where conservation on private land is a relatively new concept but it is slowly gaining recognition, especially after its accession into the European Union. It investigates and classifies the diverse attitudes among stakeholder groups in Poland toward biodiversity conservation on private land that are part of protected areas. Four primary stakeholder groups were considered: conservation and park authorities, local administrative officials, local conservation based NGOs and private landowners. The study was conducted across three sites that represented three different forms of protected areas in Poland: a national park, a landscape park and a Natura 2000 site. Q methodology, a research method from psychology and other social sciences, was used to classify human subjectivity in stakeholders' attitude in a more systematic manner. The analysis yielded three predominant factors which highlighted the diversity in attitudes among the stakeholder groups based on their knowledge, concerns and experience in the subject. Additionally, it underlined the common recognition among all stakeholder groups for better policy support, stronger collaboration among stakeholder and more financial or compensatory support for landowners to make private land conservation more feasible. Understanding the differences in attitudes will help bridge the gap between conservation priority and conservation opportunity—a current challenge in the field of biodiversity conservation.

Keywords: Private protected areas, conservation, human subjectivity, Q methodology

1. Introduction

1.1. Role of private land in biodiversity conservation

In-situ biodiversity conservation has traditionally relied on protected areas for its sustenance and recovery, and historically such areas often consisted of public lands or community/private lands that were converted to public lands. However growing demographic pressures, including encroachment and land degradation, along with rapid urban development has limited the amount of public lands that can be set aside for biodiversity conservation (Alers et al. 2007; Joppa et al. 2008). Additionally, there is a growing recognition for a more holistic approach to conservation that looks beyond the conventional model of public protected areas (Figgis 2004). The new approach aims for a bioregional model that conserves landscapes irrespective of ownership (Kamal et al. 2014a). This has led conservationists to explore other potential options, private land conservation being one of them.

Kamal et al. (2014a) defines conservation on private land as land under private ownership of individuals, families or other non-public entities within an administrative protected area, or otherwise informally reserved or managed for nature conservation purposes. Within the limitations of its regional and historical context, private land can make significant contribution to increasing habitat for protected species, and to maintain connectivity (Smith et al. 2006; Tryjanowski et al. 2011). Mixed models of protected areas (a combination of both private and public lands) have always existed throughout history, as it is near impossible to have large track of contiguous landscapes or ecosystem without including some portion of private land in it. Additionally, conserving private land that are outside of formal protected areas are also being explored, examples of which include land under conservation easements, private reserves, conservation contracts and other similar tools (Doremus 2003; Fishburn et al. 2009; George 2002; Krug 2001; Langholz and Lassoie 2001; The Nature Conservancy 2013). In the long history of biodiversity conservation, private land conservation has been a fairly recent strategy but it is gaining momentum through the use of some innovative tools, especially in countries such as the USA, UK, Australia and some countries in Latin America and Africa (Environmental Law Institute 2003; Figgis et al. 2005; Leva 2002; Land Trust Alliance 2013).

1.2. Conservation on private land in Poland

Despite the growing recognition for the importance of private land in biodiversity conservation, conflict over conservation on private land still continues (Knight et al. 2006; Tikka and Kauppi 2003). Earlier challenges of displacement and relocation of people from protected areas has combined, and in some cases yielded to, concerns over property rights and the opportunity cost of conservation (Mascia 2003; Paloniemi and Tikka 2008). Since private land conservation lacks a cohesive approach at a global scale, it is difficult to assess the conservation impact as well as management challenges at a broader scale (Kamal et al. 2014a, b). In its current state of organization and information availability,

understanding the importance and impact of private land on biodiversity conservation is dependent on individual study sites/regions (Tryjanowski et al. 2014).

This research focuses on Poland as its study site. Conservation on private land poses a unique challenge as well as opportunity in Poland, especially when we take into account its political history as well as its current status as a member of the European Union (EU) (Grodzinska-Jurczak et al. 2012). On one hand, private property is of special significance here because of its troubled past under communism when owning private property was not encouraged. On the other hand, Poland's progressive future requires adaptation to regional policies which will impact how people use their land now. Although private lands have traditionally been part of protected areas such as national parks, their cumulative proportion (about 10–12%) has been significantly lower than that of public lands (Central Statistical Office Poland 2012). However, this proportion changed as Poland strived to become a part of the EU. In order to become a Member State of the EU, Poland had to adopt several EU policies into its national strategy, Natura 2000 being one of them. Simply put, Natura 2000 is a combination of two EU directives known as the Birds Directive (1979) and the Habitats Directive (1992) and together they form the cornerstone of EU's nature conservation strategy (European Commission 2013). They identify and protect important bird species and habitats of conservation value mentioned in their annexes. To meet the EU requirements, Poland adopted Natura 2000 and designated sites all across the country, covering nearly 20% of Poland's territory. Natura 2000 overlaps with almost all previously designated protected areas, in addition to incorporating new sites (Central Statistical Office of Poland 2012). Considerable proportion of Natura 2000 also lies on private land and in some cases it covers entire municipalities (Grodzinska-Jurczak et al. 2012; Grodzinska-Jurczak and Cent 2010). This brings private land to the forefront of protected areas and biodiversity conservation in Poland.

However, conservation on private land in Poland has faced its fair share of protests right from its inception. For instance, the site designation process of Natura 2000, which was hastened to meet the EU requirements, was based on pure ecological criteria to determine the conservation priority of the land (Cent et al. 2007; Grodzinska-Jurczak and Cent 2011). This resulted in considerable amount of conflict among conservation authorities, municipalities and landowners (Grodzinska-Jurczak et al. 2012). National parks and other protected areas which contained private land within their boundaries are now part of Natura 2000 as well. The next phase, the development of management plan for each site, is currently underway and this phase has also been conflict-ridden. Thus, it becomes imperative to understand stakeholders' attitude toward private land conservation in order to mitigate such conflicts and make conservation more effective. Better understanding of stakeholders' attitudes would help overlay conservation priority as identified by the conservation policies such as Natura 2000 on conservation opportunity, indicated by stakeholders' willingness and capacity to participate.

Therefore, our research goal is to investigate and characterize the attitudes among different stakeholder groups toward the feasibility of biodiversity conservation on private

land in Poland. To do this, the study used a methodology that helps quantify human subjectivity known as Q methodology. This study will help combine the knowledge on conservation priority with that of conservation opportunity as described by Knight and Cowling (2007) and Knight et al. (2010). It will also equip conservation authorities with information that could help to address the concerns of landowners and local authorities.

2. Q methodology

Q methodology was first developed by psychologist/physicist William Stephenson in the 1930s, with the goal of revealing human subjectivity in attitudes in a more objective manner (Brown 1980; Cross 2005; Kamal et al. 2014b). It collects and analyses data in a way that allows for statistically sound results while leaving scope for qualitative, in-depth interpretation of the results (Brown 1996). It is important to note that unlike other quantitative methodologies, Q methodology requires relatively small sample of respondents. This is because the goal of conducting a Q study is to focus on what the different views are, and not how many people are expressing it (Brown 1996; Watts and Stenner 2005). Therefore, it describes a population of viewpoints and not a population of people expressing those views (Van Exel and De Graaf 2005; Risdon et al. 2003). Although it was initially developed as a tool for psychological research, Q methodology has found its application in various fields of social sciences, education, health care and medicine (Brown 1996; Deignan 2009; Spurgeon et al. 2012; Webler et al. 2009).

A detailed description of Q methodology and its principles have already been covered by Brown (1980), Watts and Stenner (2012), Kamal et al. (2014b) and (Van Exel and De Graaf 2005) to name a few, and so we consider it to be outside the goal and scope of this paper. Nevertheless, we present a short summary as its use in socio-ecological research so far has been fairly limited. Q methodology allows for a sample of statements known as the Q set (that respond to only one particular question) to be arranged in a pre-described quasi normal distribution based on their importance to the respondent. The number of statements in a Q set depends on the aim of the research, the number of dimensions (of the research subject) to be explored and the target respondents, but it usually ranges between 30 and 60 (Logo 2013; Watts and Stenner 2005). The statements are sorted using a pre-defined scale. There are fixed number of slots assigned to each level on the scale—it has the least number of slots at the extremes and the highest in the center creating an inverted pyramid. Hence, it somehow directs the respondents to put the statements in a quasi-normal distribution, whose size is defined by the researcher. As an example, the structure of the inverted pyramid used in this study has been presented in Figure 1.

Q methodology uses a negative-positive continuum scale instead of a positive continuum only. This is done for several reasons. It impresses upon the respondents that some of the statements are meant to be negative for them, while others are positive or

neutral. It also makes the limitation at each level of the scale apparent to the respondent and the analysis more convenient for the researcher. Each respondent ranks all the statements based on his/her preference and a completed response from a respondent is referred to as a Q sort. After a Q sort is collected, a short interview is conducted with each respondent to get his/her feedback as well as get an additional insight into the respondent’s perspective which could help in the final interpretation of the results.

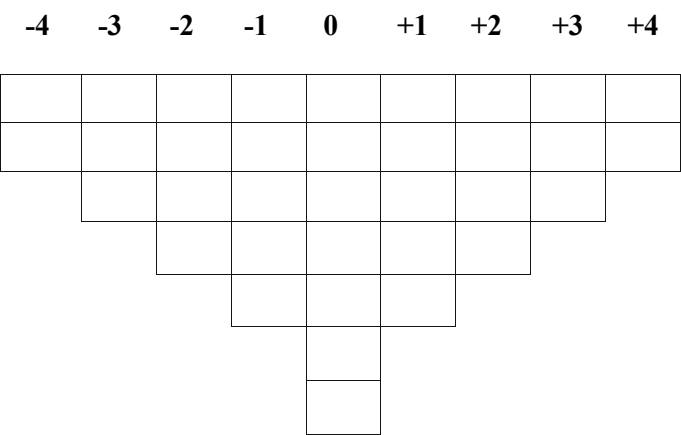


Fig 1. Q sort template with fixed number of slots (for statement numbers) at each level of the positive–negative continuum scale

The Q sorts collected from all respondents undergo an inverted factor analysis (usually in PQ Method, PCQ or similar software specific for Q methodology). It is an inversion of the conventional factor analysis (or R analysis) in that Q methodology correlates the Q sorts (or the people) rather than the statements— the Q sorts are the dependent variables and the statements are the independent variables (Brown 1980; Watts and Stenner 2005). The output from a Q methodology reduces the individual opinions into factors based on their similarities and differences. Thus, each factor is a group of similar opinions and people loading high on this factor are assumed to think in a similar way, with respect to the subject in question.

Each factor in a Q methodology output is then open for interpretation, which is done by the researcher. This is a multi-step process that considers all the output data generated from the analysis. Watts and Stenner (2012) presents a detailed step-by-step guide to interpret results from a Q methodology analysis.

3. Research methodology

3.1. Sample sites and sample respondents

The sites in Poland were chosen based on the data available from the Central Statistical Office of Poland's annual report (2012). The criteria for choosing sample sites were:

- Cover three most prominent forms of protected areas in Poland: a national park, a landscape park and a Natura 2000 site.
- Total size of the protected area: the minimum size of a protected area that was considered as a sample site was 15,000 hectares. This was done to ensure a reasonable size of protected area with a considerable overlap with human habitation.
- Percentage of private land inside of the protected area: For national parks, which are generally more exclusive and with limited human habitation, the minimum level was set at 15%. Also, percentage of arable land (min. 10%) was taken into account. For landscape parks and Natura 2000 sites, data on the percentage of private land within a park boundary was not available. Instead, the percentage of arable land was taken as an indicator of agricultural and private land. The minimum percentage of arable land for both forms of protected areas was set at 50%.
- Minimum overlap with other forms of protected areas: Almost all protected areas in Poland, especially national parks, are also Natura 2000 sites. Hence, those landscape parks and national parks with minimum overlap of Natura 2000 were prioritized. For the Natura 2000 site, those that were only under Natura 2000 and no other forms of protection were considered.

Based on these four criteria, Biebrzanski National Park in north-east Poland (Podlaskie voivodship/state), Skierbieszowski Landscape Park in south-east Poland (Lubelskie voivodship/state) and Dolina Gornej Wisly Natura 2000 site in southern Poland (Slaskie voivodship/state) were selected as the three study sites.

From each site ten respondents were selected (30 respondents in total). To shortlist the respondents, the stakeholder groups of interest were first identified and this process was guided by the goal to capture as much diversity in perspectives as possible. The main stakeholder groups included in this study were the protected area managers or conservation authorities, the local level administrative authorities within the park boundary, conservation based NGOs, and landowners/farmers. Each protected area was managed by two conservation agencies (for instance, Biebrzanski National Park had the national park agency as well as the Natura 2000 implementation agency; the Natura 2000 site had its own agency and an additional site management authority), so representative from both the conservation agencies were included in the study. Selection of respondents from the conservation agencies, protected area managers and the local administrative authorities was through judgment sampling and the chief administrator/director from each office was contacted (Marshall 1996). To select NGOs, a list of conservation oriented NGOs working around each protected area were prepared and an NGO was chosen at random. Within each

organization, the coordinator of community based conservation programs was selected. In the case of landowners, a list of local village heads and community contacts for implementation of agricultural programs were provided by each of the county/municipal office. From each list six respondents were chosen at random, a total of 18 respondents.

3.2. Data collection and analysis

The statements for conducting the Q methodology study were prepared after an exhaustive literature review on the topic of private land conservation. This included research and review articles published in peer reviewed journals, articles and opinions published in newspapers (national and international) and other popular media such as internet and television. The statements were themed to cover three dimensions of private land conservation: its importance (or the lack of it), the main challenges (economic, social, cultural, political) and the possible solutions. Initially, 45 statements were prepared and they were subjected to a pilot test with ten respondents. Based on the feedback and the results, the statements were restructured and reduced in number to 35 (to avoid overlap and confusion).

Once the statements and the list of respondents were finalized, data was collected through a face-to-face interaction where the purpose of the research and the rules of the exercise were explained in detail. Each statement was presented as a single piece of paper and the respondent was asked to arrange them on a predefined scale ranging from -4 to +4. The interviewer also had a detailed discussion with the respondent to gather his/her final thoughts, feedback on the exercise, as well as to note any additional information that the respondent wished to provide.

Of the data from 30 respondents, 28 were used for the analysis as two of the Q sorts had errors in them (such as double entry of a statement number) and had to be rejected. 57% of the final respondents were male ($n = 16$) and 43% were female ($n = 12$).

4. Results

4.1. Factor extraction

The Q sorts were subjected to factor analysis using the PQ method software that is available for free download from the internet. Brown (1980), Watts and Stenner (2005) and Watts and Stenner (2012) were consulted during the analysis. The factors were extracted using centroid analysis (Horst's centroid). The data generated eight factors of which the first three were selected for the analysis due to the following reasons: first, it is a standard procedure to consider factors with Eigen values greater than 1 and having at least two respondents (that is, have at least two defining Q sorts) load on the factor (Brown 1980; Watts and Stenner 2012). Second, together the three factors explained 51% of the total variance and had minimal correlation within them, whereas the latter factors had stronger

correlation with the first three factors as well as with one another. Finally, the difference in error in residual variance did not change significantly when considering four factors versus three factors. Each factor had a few Q sorts that especially contributed to defining that particular factor. The respondents corresponding to these defining Q sorts for each factor have been mentioned in the following section on factor interpretation.

The three chosen factors were then subjected to varimax rotation before the software conducted the final analysis. The three factors together had 26 defining Q sorts (two Q sorts loaded individually on two other factors that did not meet the criteria of selecting a factor). The software also presented the factor array table (or a model Q sort). A factor array table contains the statement scores for each factor based on the weighted average of its defining Q sorts (Table 1). Simply put, a factor array represents the statement scores on a factor that a Q sort would assign if it were to load a hundred percent on that factor. The statement scores in this table were used in the final interpretation. Taking a conservative approach, distinguishing statements (that is, statements which were highlighted in the analysis as being significant to the interpretation of a particular factor) at $p < 0.01$ were also used in the interpretation, even though they might have had lower statement scores. Following the same logic, consensus statements (that is, statements that did not help in distinguishing among the three factors) at $p < 0.01$ were excluded from the interpretation of individual factors, even though some of them had higher statement score. However, the consensus statements were interpreted together to highlight the issues on which each group of attitude (that is, all stakeholders) seem to agree/disagree on.

Consensus statements: These are statements that generated a common agreement (or disagreement) and therefore didn't contribute to distinguishing among the factors. However, it is important to highlight them because they represent the common attitude that was identified among all stakeholders. People loading on each group of attitude (or each factor) seem to have a common consensus on the fact that private land as part of protected areas should consider landowners' willingness to participate (statement 2), which has not been the case in Poland. So far, it has been a EU/national prescription that did not take landowner's consent into account and, as such, is not working well in Poland due to lack of appropriate policy, and lack of support for landowners from the responsible authorities (statements 24, 28 and 20). Instead of being a broad prescription that one is forced to implement, conservation on private land would be more effective if it can demonstrate through peer experience that there are real, tangible benefits from private land conservation (statement 33).

No.	Biodiversity conservation on private land...	Factor 1	Factor 2	Factor 3
1	...is acceptable, especially if it holds important biological resources	0	3	2
2	...should consider landowners willingness to participate before declaring it as a part of a protected area	3	2	2
3	...at present, is supported by adequate compensation schemes for landowners to offset the cost of conservation	-3	-3	0
4	...is a big obligation as it will transfer the same restrictions on the land to the next generation of owners	0	-1	1
5	...indicates that landowners are good managers of their land, which is why that particular parcel of land holds important biodiversity	1	0	-2
6	...at present, has no possible decision that satisfies every stakeholder/groups involved	1	0	3
7	...results in some restrictions on the use of the land, but it doesn't question the owners' right over his land	0	0	0
8	...is practically impossible to implement in the given state of management and decision making process of nature protection in Poland.	-1	0	3
9	...requires that all stakeholders have the opportunity to fully participate in the process of planning and management in nature protection.	1	3	-2
10	...will be more acceptable if the larger community is obliged to implement it instead of just a few individuals	0	2	-1
11	... is more effective if decisions on managing such private protected areas are made by the responsible conservation authorities and ecological experts	-4	-1	-2
12	...should be treated as one of the priorities of biodiversity conservation as it requires contiguous	-2	4	-1

	tracts of landscapes/ecosystems			
13	...still allows the owner to continue the main use of the land (e.g. agriculture, forestry etc.)	-4	-1	-4
14	...doesn't change anything significantly about the functioning of the private land.	-3	-2	-4
15	...infringes on the rights of the owners over their own property.	-2	-4	4
16	...takes away the final authority of the landowner in deciding what to do with his own land	0	2	1
17	...should be a voluntary action only, where the decision to participate is of the landowner	2	-4	-1
18	...requires awareness generation among landowners about the new opportunities (including income) it can bring	-2	2	1
19	...can work more efficiently as a mixed model with being a part of public protected areas.	-1	0	-3
20	...has appropriate policy and legislative support to work efficiently in this country.	-2	-3	-3
21	...requires stronger collaboration between the local stakeholders and the agencies responsible for conservation of the area.	4	4	1
22	...should require a landowner's consent during the planning process (e.g. preparing management plans etc.) and not just in the final consultation phase	3	1	0
23	...is an involuntary procedure imposed on landowners and hence is unacceptable.	1	-2	0
24	...is an EU/nationally prescribed form of biodiversity conservation with no requirement for consent of landowners to participate	2	1	2
25	...can be helpful and complementary to existing land use (such as agriculture being protected from pests)	-1	-1	-3
26	...will impose the same restrictions as that of the protected area that it is part of. This is not acceptable.	2	0	-1

27	...is a proof that biodiversity conservation being prioritized over meeting human needs	1	-3	-1
28	...have no or very minimal support from the responsible agencies for the landowners	3	3	4
29	...can be beneficial for the landowners as it can bring new income opportunities by being part of a protected area.	-3	1	1
30	...negatively impacts the income generation from the private land.	4	-1	0
31	...requires market based instruments and financial incentives to mitigate conflicts related to private protected areas	0	-2	-2
32	...cannot be implemented in the long term through financial incentives alone	-1	1	0
33	...can be more effective if it can be demonstrated through peer experience that there are real, tangible benefits from conserving biodiversity on private land	0	1	2
34	...might stop traditional practices of land use which will be gradually lost in subsequent generations.	-1	-2	0
35	...is a top-down approach of designation and inclusion of private land in protected areas, much similar to public protected areas	2	0	3

Table 1. Factor arrays containing the individual statements scores of Factors 1, 2 and 3

4.2. Factor interpretation

A factor summary with its defining Q sorts (that is, respondents who loaded significantly on that factor) has been presented in Table 2. The interpretations of the three factors have been presented after the table. In each factor interpretation, the first number in the parenthesis is the statement number and its adjacent number is the score allotted to that statement for the particular factor.

Factor 1

Factor summary: Factor 1 explains 30% of the total variance and has an Eigen value of 8.35. Twelve respondents loaded significantly on this factor, of which seven were male and five were female. Eight respondents were from the national park site, two from the Natura 2000 site and two from the landscape park. Except for the administrator from

the municipality office that is part of the national park, the eleven remaining respondents were landowners (including all landowners from the national park site). Of the eleven landowners, nine were also farmers.

Interpretation of Factor 1: The Skeptic – biodiversity conservation on private land is at a cost that landowners have to bear

Factor	Total Variance Explained (%)	No. of Factor Defining Respondents (Q sorts)	Protected Area Site of Factor Defining Respondents*			Characteristic of Factor Defining Respondents
			NP	LP	N2000	
Factor 1 (The Skeptic)	30	12	8	2	2	11 landowners; 1 municipality officer
Factor 2 (The Supporter)	14	9	2	3	4	3 NGOs; 2 municipality officers; 4 protected area officials
Factor 3 (The Uncertain)	7	5	0	2	3	4 landowners; 1 municipality officer

*NP = national park, LP = landscape park, N2000 = Natura 2000 site

Table 2. Factor summary with information on the respondents loading significantly on a factor

Including private land in biodiversity conservation strategy is a proof that conserving nature is being prioritized over human needs and therefore has no outcome that can satisfy all stakeholder groups (27:+1; 6:+1). So far, it has been a top-down approach where the inclusion of private land in protected areas and the subsequent restrictions have been imposed in a manner similar to public protected areas (35:+2; 26:+2). Once a part of a protected area, a landowner is unable to use his land the way he has always used it (13:-4). Such an involuntary and imposed form of biodiversity conservation is unacceptable (23: +1). Although it might not infringe on the property rights of a landowner directly, conservation on private land will significantly change how the land functions for the landowner (15:-2; 14:-3). It negatively impacts the income generated from the land without bringing in new economic opportunities (30:+4; 29:-3). There is also a lack of adequate

compensatory support such as compensation schemes to offset the cost of becoming a private protected area and bearing the restrictions (3:-3). Additionally, conservation strategies do not complement or benefit the existing land use in any way that is useful for the landowner (25:-1). If a parcel of land has been identified as having conservation value, it only implies that the landowner has been a good manager of his land (5:+1). Hence, even though private lands may sometimes hold important biological resources, it should not be treated as a priority in large scale nature conservation strategies as landowners are inherently good caretakers (1:0; 12:-2).

Private land as a conservation strategy will work only when it is voluntary (17:+2). Also, the management and the decision making process needs to be more inclusive: managing authorities or ecological experts should not be the only group with the decision making power over a private or mixed model of protected area (11:-4). There needs to be a stronger collaboration between the local stakeholder groups and the authorities in both the planning and implementation phase, and not as a final consultation with local communities on pre-decided plans (21:+4, 22:+3). Lastly, support structures such as financial compensation and market based incentive programs are important and should be in place to complement such conservation strategies right from the start (32:-1; 31:0).

Factor 2

Factor summary: Factor 2 explains 14% of the total variance and has an Eigen value of 3.82. Nine respondents loaded significantly on this factor, of which five were male and four were female. Four respondents were from the Natura 2000 site, three from the landscape park and two from the national park site. This factor was loaded entirely by all protected area management authorities, NGOs representatives and municipality administrators (except one from the national park) from all three sites. No landowner/farmer loaded on this factor.

Interpretation of factor 2: The Supporter – Private land is important to biodiversity conservation

Private land should be treated as a priority in nature conservation strategies as they are crucial in conserving larger ecosystems and landscapes as a whole (12:+4). It is not the objective of private land conservation to undermine human needs and nor is it about restricting people's right over their land in perpetuity (27:-3; 4:-1); rather, it is based on the simple fact that private land often holds important biological resources and therefore, needs to be conserved (1:+3). People are generally good managers of their own land (which has sustained the important biodiversity on private land so far), but that should not be used as a pretext to make it a pure voluntary strategy and rely solely on a landowner's willingness to participate or not (5:0; 17:-4; 23:-2). Private land conservation does not harm a landowner as it doesn't infringe on his property rights nor does it impact the income generation from the land (15:-4; 30:-1). Although it might not directly benefit the current land use and might even modify it, private land conservation has the potential to

bring in new economic opportunities (13:-1; 25:-1; 29:+1). The primary challenges in promoting conservation on private land has been to negate the sense among landowners that their decision making power and authority over their land is being taken away, and to make them aware of the potential economic opportunities (16:+2; 18:+2). These two factors, along with the lack of adequate compensation schemes for landowners to offset the opportunity costs of conservation, have made private land conservation a challenge in Poland (3:-3).

If private land is to be conserved on its own or in a mixed model of protected areas then the decision making process will need to be more inclusive and not limited to managing authorities alone (19:0; 11:-1). The top-down mechanism of decision making needs to make way for a more open process where all stakeholders groups have an equal opportunity to participate in the planning and management of such areas (35:0; 9:+3). Finally, peer pressure can be more effective than prescription, and it will be easier to convince landowners of conserving their land when they witness others in their communities do so (10:+2).

Factor 3

Factor summary: Factor 3 explains 7% of the total variance and has an Eigen value of 1.98. Five respondents loaded on the factor, of which three were male and two were female. Three respondents were from the Natura 2000 site and two from the landscape park. No respondent from the national park loaded on this factor. All five respondents were landowners and farmers.

Interpretation of factor 3: The Uncertain – Private land can conserve biodiversity but can threaten landowners' rights in the process

Private land conservation, in its current state, doesn't have any solution that will satisfy the interest of all stakeholders (6:+3). On the one hand, it is important to conserve private land, especially if it holds important biological resources (1:+2). In such cases, it is not a choice between nature and human needs, and conservation shouldn't have to depend only on voluntary actions and a landowner's managing capabilities (27:-1; 17:-1; 5:-2). On the other hand, conservation on private land threatens to infringe on a landowner's property rights and change the primary functioning of his land significantly (15:+4; 14:-4). It does not allow for the landowner to continue the use of his land as he used to and even if it did, conservation measures do not benefit or complement his land use in any way (13:-4; 25:3). Moreover, the restrictions of being part of a protected area will often be in perpetuity and therefore a burden inherited by next generation of landowners (4:+1). Along with lack of compensatory schemes, the top-down approach of site selection and designating private land as part of protected areas, has also made it conflict ridden (3:0; 35:+3). Even as a mixed model of public and private protected areas, it will not work efficiently as it will impose the same restrictions on the private property as that of the

public protected area it is a part of (19:-3; 26:-1). Thus, private land conservation comes across as a tool that takes away a landowner's authority over his own land (16:+1).

Considering the current state of management structure and process in Poland, it is almost impossible to have effective private land conservation (8:+3). Decision making power should not lie in the hands of the managing authorities only and there is a need for stronger collaboration among local stakeholder groups and the managing authorities (11:2; 21:+1). There might be new income opportunities from private protected areas that can mitigate some of the challenges, but landowners need to be made aware of those potential opportunities (18:+1; 29:+1).

5. Discussion and Conclusion

This study uses a very specific social sciences methodology (Q methodology) to address an important research question for biodiversity conservation in Poland. Socio-ecological researches, especially related to investigating human attitudes, have been at a disadvantage because of its often subjective nature but tools such as Q methodology provide a unique opportunity that allows for quantifying human subjectivity. Therefore, use of such methodologies should not be dictated by a discipline and instead, should be determined by the research question to be addressed. However, it is important to remember that while Q methodology is very useful to explore and classify the attitudes based on their similarities and differences, but its findings cannot be extrapolated to the whole population.

Three primary attitudes emerged, two of which were loaded almost completely by landowners and this reflects the diversity in attitudes on the subject even within the same stakeholder group. Therefore, it would be short-sighted to assume that all landowners have the same attitude toward biodiversity conservation on private land. Even though both the "Skeptic" and the "Uncertain" were loaded by landowners, the latter is relatively more inclined toward biodiversity conservation. If conservation priority was to overlap with conservation opportunity, then for two parcels of land with equal conservation priority, the one with the "Uncertain" holds a higher conservation opportunity than the one owned by the "Skeptic".

"Skeptics" are predominantly against private land conservation, mostly due to the fear of economic losses that they might have to bear. This fear stems from two reasons: first, the lack of actual financial incentives for private land conservation in Poland and second, the lack of communication and information dissemination on what conservation on private land entails. Financial incentives for conservation on private land in Poland is mostly limited to agricultural land only, the most popular program being the EU Agri-Environment scheme which neither targets all land uses and nor does it focus on private land within protected areas. Without proper financial support mechanisms and tangible benefits, it would be difficult to convert a "Skeptic" into even an "Uncertain". Also, the

interviews conducted after each Q sort highlighted the need for a more accessible form of information dissemination at the community level to generate awareness on what conservation strategies such as Natura 2000 on private land actually entail. Most landowners were unaware or misinformed about regulations on private land within the boundaries of different types of protected areas.

Scanning across all the stakeholder groups included in this study, we find a distinct dichotomy in the perception of the importance of private land conservation, with NGOs, government institutions and park officials at one end of the spectrum and the landowners at the other. This result may not be surprising, but it is yet another evidence of lack of good governance in protected area management. The dichotomy can be related to characteristics that define the standpoint of each stakeholder group. Analyzing the standpoint of one end of the spectrum, we find that the views stated by NGO employees, park and municipal employees on the importance on private land conservation are in harmony with the working principles of their organizations and their attitudes are also a reflection of their beliefs and their loyalty to the visions of the organizations they work for (the “Supporter”). However, as the managers of such protected areas, they have not been able to transfer their vision and understanding of the importance of private land conservation to their communities, which is why the “Supporter” also wishes for more collaboration and a participatory approach to decision making.

Focusing on the other end of the spectrum, most landowners are in direct contact with their land and the resources it supports. They bear strong ties to their land and both the “Skeptic” and the “Uncertain” stated themselves to be good stewards of the land they manage. When management of private protected areas is done in a top-down manner as has been the case in Poland, then it is often viewed as questioning a landowner’s capability to manage his land. Another key factor defining the “Uncertain’s” standpoint on this subject is the issue of property rights, and any interference in what a landowner believes to be his right can be viewed as a threat. This, together with the hierarchical relationships among the stakeholder groups has created a sense of distrust toward any authoritative figure/institution (for both the “Skeptic” and the “Uncertain”). Economic incentives are influential in private land conservation but they should not be considered as the only driving force that manoeuvres landowners’ attitude and this fact must be weighed while developing strategies that will affect their authority over their land. Despite the obvious differences in the three attitudes groups, they agree on a few issues. The common thinking thus far has been that private land conservation is a top down national or regional policy directly prescribed without taking local context into account and everyone, including local authorities feels wronged in the process. All stakeholder groups, including local conservation authorities and government administration, acknowledge the importance of landowners’ willingness to participate, and yet the management authorities of protected areas have not been able to realize landowners’ participation as something more than just a formal requirement. Each group of attitude emphasized on the need for stronger collaboration, which is an encouraging sign in that every stakeholder group recognizes its

importance and express their willingness to strive for it. However, there needs to be more room in the national and regional policies to adapt to local context and create a platform for stronger collaboration among stakeholder groups.

Private land conservation has a long way to go in Poland before its potential in biodiversity conservation is fully realized. Unless the challenges highlighted through the findings of this study are addressed and the opportunities capitalized, private land in biodiversity conservation will remain controversial and conflict ridden. The results from this study not only help understand the different attitudes that exist among stakeholders, but it also gives rise to more research questions such as the possible relationship between the expressed attitude of landowners and their socio-demographic characteristics. Such information is also crucial to designing policies as well as to mitigate conflict that revolves around biodiversity conservation on private land in Poland.

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CHAPTER 5: Identifying Landowners' Attitude and Assessing Factors that Influence the Expressed Attitude: Quantitative Survey

The final stage of the research involved conducting surveys with landowners across the three selected sites. This was done to test some of the findings from the exploratory phase of conducting interviews in Poland as well as in the US. As was revealed during the interviews, most managers in the US context identified certain intrinsic characteristics about the landowners that predispose them to undertake conservation actions. This included factors such as income, education, land use, land parcel size and conservation ethic, to name a few. However, most managers in the US context expressed their opinions based on their experience with voluntary private land conservation. The survey conducted in Poland examined if there is any consistency in the factors with respect to regulatory private land conservation. Simply put, the survey deduced if similar factors had an influence of landowners' attitude when it came to regulatory private land conservation. Additionally, the interviews conducted in Poland emphasized on the lack of financial incentives as the main challenge and also the primary source of conflict. The survey tested this assumption by assessing the importance of financial incentives to landowners. Finally, the attitudes expressed toward regulatory private land conservation in the survey helped determine the attitude category (developed during the Q methodology study) to which most landowners belonged to: the skeptic, the supporter or the uncertain.

The survey was designed based on testing the above assumptions and also to assess landowners' attitude toward nature conservation and protected areas. It also gathered the socio-demographic and economic characteristics of the respondents for further analysis of any possible trends. Since this study is the first of its nature in Poland, it also provided a socio-demographic and economic description of a typical landowner in Poland whose land is part of a protected area.

This is an unpublished research article that has been submitted to the journal *Environmental Science and Policy* and is undergoing the review process.

Lead Author's Contribution: Research design including sample selection and preparation of questionnaire, data collection and analysis, manuscript preparation

Number of references in the paper: 40

Conservation opportunity in biodiversity conservation on regulated private lands: factors influencing landowners' attitude

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Abstract

Contemporary approaches to involve private land in biodiversity conservation focus primarily on voluntary strategies. However, regulatory private land conservation continues to be dominant in several developing and transitional countries, especially in case of private land within protected areas. Poland, the study site of this research, represents such an example where private land conservation is restricted to only those within protected areas. Use of regulatory approach can have an influence on landowners' attitude toward private land conservation that is in contrast to attitudes toward voluntary approaches. The paper presents the results of a quantitative survey conducted with private landowners in three forms of protected areas in Poland (a national park, a landscape park and a Natura 2000 site) to assess their attitude toward private land conservation and analyze factors (socio-demographic, economic and external) that influence this expressed attitude. This being the first research on private land conservation in Poland, the results characterized a typical private landowner in Poland whose land is part of a protected area. It also revealed that except for education and landowners' conservation ethic, none of the socio-demographic and economic variables had a strong influence on building conservation opportunity. However, external factors such as the type of protected area and imposed regulations did have an influence. Finally, the research highlighted the lack of sufficient institutional structures and existing gap in communication between the stakeholder groups which need to be addressed in building conservation opportunity for effective management of such mixed models of protected areas.

Keywords: private land, biodiversity conservation, landowners' attitude, conservation opportunity, Poland

1. Introduction

1.1. Private Land in Biodiversity Conservation

Attempts to reduce and halt global biodiversity loss have not been very successful so far and the debate to find effective ways to reverse this trend continues in the conservation field (McShane et al. 2011; Wilkie et al. 2006). The increasing development pressures along with other challenges such as resource extraction, poverty and climate change makes the search for solutions more challenging (CBD 2010). Protected areas have been the functional units of biodiversity conservation and globally their numbers are on a constant rise, more so in the last two decades (Kamal et al. 2014; Robbins et al. 2006). However, the geographical juxtaposition of protected areas and human habitation often becomes a source of human-nature conflict. The challenge lies in protecting biodiversity while meeting the needs and expectations of local people (Knight et al. 2010). This becomes very obvious in the case of regulatory conservation on private land, especially private lands that are inside the boundaries of protected areas. In such cases, it becomes imperative to balance conservation opportunity, which is a community's capacity or willingness to participate in conservation with conservation priority, which is the ecologically identified need to conserve an area (Knight and Cowling 2007; Knight et al. 2010).

Involving private land in biodiversity conservation has been a growing global conversation (Doremus 2003; Figgis 2004; Knight 1999; Langholz and Krug 2005; Paloniemi and Tikka 2008). Protected areas are limited in their geographical extent, connectivity, their susceptibility to human activities including downgrading, and their financial constraints in protecting every endangered ecosystem and landscape (Mascia and Pailler 2011; Mora and Sale 2011). In contrast, private lands can provide larger, contiguous landscape and connect the mosaic of isolated protected areas (Kamal and Grodzinska-Jurczak 2014). This fact is being gradually recognized in several countries as they explore the use of various tools and incentives to engage private lands, which Kamal et al. 2014 classifies as either voluntary or involuntary tools. Regulatory form of conservation on private land, which is involuntary, is perhaps one of the oldest tools that involve private land in biodiversity conservation. Although current approaches in private land conservation tries to engage more voluntarily than involuntarily through use of tools such as conservation easements and conservation contracts, nevertheless regulatory private land conservation still continues to be one of the predominant forms of conservation in several countries (ELI 2003; Mayer and Tikka 2006; Schroter-Schlaak and Blumentarth 2011). Regulatory conservation might have its benefits such as effective monitoring and more accountability in the degree of protection offered to biodiversity which are often challenging for voluntary conservation; however, its biggest challenge is its command-and-control approach that conflicts with the inherent nature of private lands such as property rights and land use (Brockington 2004; Cernea 2005; Kamal et al. 2014; Merenlender et al. 2004). It can also be assumed that involuntary form of private land conservation will

inevitably influence the attitudes of landowners toward private land conservation. Research on landowners' attitude toward private land conservation is well documented in literature (Bourke and Luloff 2008, Ernst and Wallace 2008, Joshi and Arano 2009, Koontz 2010; Langholm and Krug 2005); however, it is mostly restricted to voluntary conservation. This research focuses on examining attitudes toward private land conservation among landowners who have experienced regulatory conservation and analyze factors that could influence this expressed attitude. It undertakes Poland as a case study, a country where the only form of private land conservation is the regulatory form inside of protected areas.

1.2. Conservation on Private Land in Poland

Poland presents an interesting case study as it emerges from its troubled political past of communism and imbibes its progressive future as a Member State of the European Union (EU). Nature conservation and protected areas have been an intricate part of Poland's recent history, with Bialowieza designated as the first Forest Reserve in 1921 and later transformed into the first national park of Poland in 1932 (Bialowieza National Park 2007). Thereafter, Poland has witnessed a surge in the number and types of protected areas such as nature reserves and landscape parks. After its accession to the EU in 2004, Poland had to adopt EU's umbrella legislation on biodiversity conservation called Natura 2000, which has led the establishment of another type of protected area: the Natura 2000 sites (Boltromiuk 2010; Pietrzyk-Kaszynska et al. 2012). Natura 2000 is a compound legislation of the Birds Directive and the Habitats Directive where sites are designated as Special Areas of Conservation (SACs) or Special Protection Areas (SPAs) (Klodzinski 2012). The site designation process in Poland was based entirely on the ecological priority for biodiversity protection and together the sites cover almost 20% of Poland's territory, often overlapping with other forms of protected areas (Cent et al. 2007; Grodzinska-Jurczak et al. 2013). In the past, the protected areas in Poland did engulf private lands but the percentage was not very significant. For instance, except for Biebrzanski National Park where 52% of the park area is under private ownership, all other national parks have less than 25% of private lands within their borders (GUS 2013). In case of landscape parks, the proportion of private land is expected to be higher than national parks, although data of such nature is not available currently. However, with the recent designation of Natura 2000 sites, the percentage of private lands within protected areas is speculated to significantly increase (Kamal and Grodzinska-Jurczak 2014).

Currently, private land in biodiversity conservation in Poland is restricted to the regulatory model, where private lands that lie within the boundaries of protected areas follow similar management regime to that of the protected area. This may also be the reason why private lands and landowners' attitude and expectations have received limited attention in biodiversity conservation research, as regulatory conservation often does not have to rely on landowners' willingness to participate. Additionally, the regulatory model is not supported by any policy or financial tool that focuses on private lands, which makes the situation challenging for managers of such protected areas (Kamal et al. 2014).

Acquisition has been the only tool available for managers but often government agencies are constrained by limited budget. The civic sector functions at a relatively small scale and are often restricted in their actions to advocacy and activism (Cent et al. 2013). Even in the case of Natura 2000, which is relatively non-restrictive in its site management, insufficient information dissemination has resulted in numerous instances of human-nature conflict (Grodzinska-Jurczak and Cent 2011). In order to mitigate such conflicts, it is imperative to understand local residents' attitude toward biodiversity conservation and protected areas and focus on the factors that can influence this attitude. Literature and research on private land conservation in Poland is scant in international as well as national domains, and little data is available on private land inside of protected areas or on stakeholders' attitude. This research is therefore first of its nature in Poland as it investigates private landowners' attitude toward inclusion of private land in protected areas and analyzes some of the intrinsic and extrinsic factors that could influence this attitude.

2. Methodology

2.1. Site Selection

The study sites in Poland were chosen based on the data available from the Central Statistical Office of Poland's annual report (2012) using the following criteria:

- *Cover three of the most prominent forms of protected areas in Poland:* a national park, a landscape park and a Natura 2000 site
- *Total size of the protected area:* set at a minimum of 15,000 hectares in order to ensure reasonably sized protected area with a considerable overlap with human habitation.
- *Percentage of private land inside of the protected area:* For national parks, data on private ownership within the protected area boundaries was available and since national parks tend to be more exclusive a minimum of 15% of human habitation was set as a limit. In case of landscape parks and Natura 2000 sites, data on the percentage of private land within a park boundary was not available. Instead, the percentage of arable land was taken as an indicator of agricultural and private land. The minimum percentage of arable land for both forms of protected areas was set at 50%.
- *Minimum overlap with other forms of protected areas:* Almost all protected areas in Poland overlap partially with Natura 2000 sites. Hence, landscape parks and national parks with less than 15% of overlap with a Natura 2000 site were prioritized. For the Natura 2000 site, those that were only under Natura 2000 and no other forms of protection were considered.

Accordingly, Biebrzanski National Park in the north-east of Poland (Podlaskie voivodeship; established 1993), Skierbieszowski Landscape Park in the south-east of Poland (Lubelskie voivodeship; established 1995) and Dolina Gornej Wisly Natura 2000 site in the south-west of Poland (Slaskie voivodeship; established 2007) were chosen as the study sites. Figure 1 exhibits the map of Poland, highlighting the three sites.

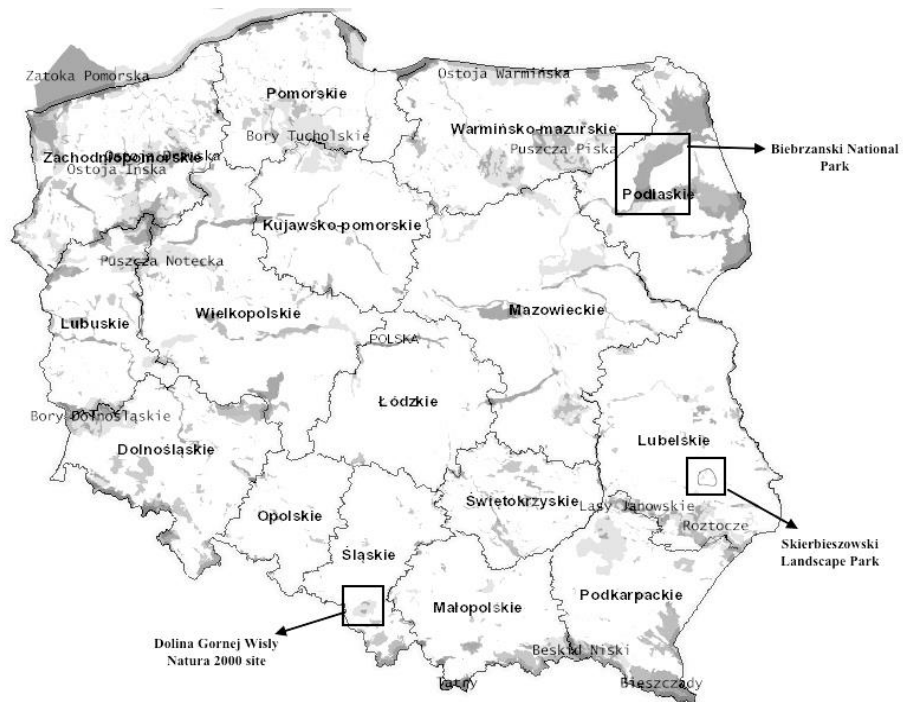


Fig 1: Map of Poland indicating the three study sites of this research

2.2. Questionnaire Design and Sampling Method

A questionnaire was designed based on the available information on regulatory private land conservation in Poland as well as at a global scale. Bradburn et al. 2004 and Converse and Presser 1986 were used as guides during the questionnaire design. The questionnaire was then tested in a pilot study with 10 respondents and based on the experience and the feedback, further modifications were made. The final questionnaire contained 38 questions, of which 17 were focused on gathering socio-demographic and economic information on the respondents and the remaining 21 investigated their awareness of the protected area and its functions, and their attitude toward biodiversity and its conservation on private land. The questions varied from closed, choice questions to open ended questions and scaled statements.

Table 1 summarizes the main questions used in the questionnaire.

Landowners' socio-demographic and economic characteristics

1. Socio-demographic

- i. Age of respondents
- ii. Gender of respondent
- iii. Education of respondent
- iv. Household size
- v. Do you own the house/apartment that you live in?
- vi. Do you own any land in this gmina?
- vii. How many plots of land do you own?
- viii. How long have you been the owner of your first plot of land?
- ix. How did you acquire your first plot of land?
 - x. If you inherited the land, do you know who the first owner of the land in your family was?
- xi. What is the total area of land you own?
- xii. What is the primary use of your land?
- xiii. Do you receive any subsidies for agriculture?
- xiv. Do you own land anywhere else in Poland?

2. Economic

- i. What is the total/range of monthly household income including all sources of income?
- ii. What is the primary income source for your household?
- iii. What are the secondary sources of income, if any?

Landowners' Conservation Ethic and Awareness of the Protected Area

- i. Rank following statements on a 5 point scale of strongly agree to strongly disagree
 - a. Natural environment in Poland should be protected in a better way
 - b. I am proud of the natural areas and landscapes in my locality
 - c. Nowadays people have stopped caring about the nature in their locality
 - d. Biodiversity conservation and economic growth are contradictory to each other
 - e. Given a chance, I would like to volunteer my time and skills to take care of the natural environment around me
 - f. I would enjoy having more wildlife in and around my locality
 - g. Protecting biodiversity is the authorities' job, not mine.
- ii. Do you know that your village is part of a protected area?
- iii. Do you know for how long your village has been part of a protected area?
- iv. What was your source of information when you come to know for the first time that your village is part of a protected area?
- v. Do you why your village has been made part of a protected area?

Landowners' Attitude toward Biodiversity Conservation and Its Inclusion of Private Land

- i. Do you think that loss of biodiversity is a problem in Poland?
 - ii. Do you know of any protected species (plants and animals) that are found in your locality?
 - iii. In your opinion has the protected area been effective in protecting nature in your locality?
 - iv. In your opinion should private land be included in biodiversity conservation?
 - v. If private land should not be included in biodiversity conservation, why not?
 - vi. Has been part of a protected area influenced your land and its use in any way?
 - vii. At present, has being part of a protected area put any restriction (of any nature) on your land or land use?
 - viii. Would you prefer to sell your land to the protected area agency than continue its current use?
-

-
- ix. In your opinion, are the responsible authorities doing enough to convince landowners of protecting biodiversity on their land?
 - x. In your opinion, what should the responsible authorities do more to convince landowners of proactive biodiversity conservation on their land?
-

Landowners' Awareness of Tools and Institutional Structures Related to Biodiversity Conservation

-
- i. At present, do you have access to any financial program that supports you to undertake conservation measures on your land?
 - ii. Are you aware of any specific programs or projects (e.g. workshops/trainings on good practices etc.) from the protected area agency to encourage landowners to participate in conservation actions?
 - iii. Has the protected area agency contacted you directly or indirectly? If so, for what reason?
 - iv. Do you know of NGOs in your locality that work on biodiversity conservation?
 - v. Do you have any interaction with any of these NGOs?
 - vi. In your opinion, who is easier to cooperate with: government agency, NGO, or there is no difference between the two?
-

Table 1: Table presenting the key questions present in the survey questionnaire

Poland's national law that protects private information of citizens (The Protection of Personal Data Act of 1997) allows only for the availability of addresses in the public domain and these addresses are available at a gmina (equivalent to a municipality) level. Therefore, at each site the first stage of sampling involved identifying gminas with more than 80% of its administrative boundaries within the protected area. Accordingly gmina Goniadz at the national park site, gmina Skierbieszow at the landscape park site and gmina Chybie at the Natura 2000 site were selected. Once the address list of the entire gmina was obtained from the main gmina office, villages and towns which were outside the protected area boundary were eliminated from that list. The remaining villages were divided into groups using stratified sampling based on the population size of each village such that each stratum had similar population size. This was done to ensure that the subsequent random sampling of household addresses did not increase the probability of any one village disproportionally.

Within the stratified samples, household numbers were chosen through random sampling. A total of 150 addresses were sampled for each site, assuming 50% response rates at each site. The existence of the selected addresses was cross verified using Poland's government operated portal called Geoportal 2 (www.geoportal.gov.pl) which provides geodetic and cartographic data at a national, regional and local scale.

2.3. Data Collection and Analysis

At each site, the interviewers collected data by visiting each of the selected address and conducting a face-to-face interview using the questionnaire. Each interviewer tried a household twice before marking the absence of residents. In total, 318 surveys were

conducted across the three sites: 109 responses from the national park, 103 responses from the landscape park and 106 responses from the Natura 2000 sites.

The data was entered using EpiData software (<http://www.epidata.dk/>) and further analyzed using IBM SPSS Statistics. Missing data constituted less than 5% of the total data collection and they were recorded into the data set as no response data and excluded from the analysis.

3. Results

3.1. Socio-demographic and economic characteristics of respondents

Of the total 318 respondents who participated in the survey, 42.1% were male and 57.9% were female, and the mean age of the respondents was 53 years. 64.5% of the respondents had completed secondary education while 22.6% had only primary education and 12.9% had tertiary or higher education. The average household size was 4.18 persons and each household had an average of 7.29 hectares of land (at 5% trimmed mean) in 6.25 plots. However, most landowners at the Natura 2000 site and the landscape park had relatively small tracts of land. Salaried employment (34.8%) and retirement benefits (27.5%) emerged as the primary sources of income followed by agriculture including animal husbandry (24.3%) and social benefits (10.2%). This finding was consistent with the fact that most respondents were of the older age category and owned relatively smaller tracts of land and therefore, were more dependent on other sources of income than from the land. The average monthly income of a household 2896.77 zloty (equivalent 877 USD) with the highest number of respondents (25.4%) in the 1001 to 2000 zloty income range (303 to 605 USD). The subsistence minimum/absolute poverty threshold in Poland for 2013 for a four person household with two income earners was calculated as 1850.50 zloty (equivalent 560 USD) per month and 36.6% of the respondents were below this threshold.

Most respondents were landowners, with only 18.2% of respondents stating that they had their land under some form of land lease. 73.2% of the landowners had inherited their land of which 67.2% were second generation and 19.4% were third generation landowners. In general, 44.1% of the landowners have had their land for more than 30 years. As evident in Table 2, the Natura 2000 site had the smallest parcel of land owned per household and this is consistent with the general trend in Poland, where the southern part of the country has witnessed more land fragmentation and developmental pressures as compared to the northern and the eastern part. Size of land parcels also had a direct relation with the land use. On an average, agriculture including animal husbandry (59.4%) was the most common land use followed by housing and home garden only (30.3%). However, when each site was evaluated separately, agriculture was found to be the predominant land use in the landscape park (81.3%) and the national park (52.6%), but housing was primary

use of land at the Natura 2000 site (60.9%). Table 2 presents the socio-demographic and economic characteristics of the respondents from the three survey sites.

Variable		Natura 2000	Landscape Park	National Park	General
Gender	% of women	60.4	54.8	58.3	58.0
Age (years)	mean	49.8	52.1	57.0	53.0
Education (% respondents)	primary	14.2	19.2	34.3	22.6
	secondary	70.8	73.1	50.0	64.5
	higher	15.1	7.7	15.7	12.9
Income per household (% respondents)	below 1000 zł	4.0	19.2	25.0	16.1
	1001-2000 zł	18.2	34.3	24.0	25.5
	2001-3000 zł	26.3	24.2	20.0	23.5
	3001-4000 zł	17.2	8.1	9.0	11.4
	4001-5000 zł	20.2	6.1	9.0	11.7
	> 5000 zł	14.1	8.1	13.0	11.7
Primary sources of income (% respondents)	salary	64.4	22.3	17.9	34.8
	retirement	27.9	17.5	36.8	27.5
	agriculture	1.0	38.8	33.0	24.3
	social benefits	4.8	16.5	9.4	10.2
	others (business, agriculture subsidies)	1.9	4.9	2.7	3.1
Type of land ownership (% respondents)	inherited	69.0	76.4	74.1	73.2
	purchased	31.0	23.6	25.9	26.8
Acreage of landownership (% respondents)	< 1 ha	84.8	26.9	32.9	49.5
	1-10 ha	14.3	43.3	20.7	26.5
	10-20 ha	1.0	19.2	11.0	10.3
	20 ha and more	0.0	10.6	35.4	13.7
	trimmed mean (5%)	0.49 ha	7.88 ha	20.97 ha	7.29 ha
Time span of land ownership (% respondents)	<5 years	4.6	5.7	3.7	4.7
	5-10 years	8.0	21.6	11.1	13.7
	11-20 years	23.0	14.8	14.8	17.6
	21-30 years	17.2	18.2	24.7	19.9
	>30 years	47.1	39.8	45.7	44.1
Primary land	agriculture	33.3	81.3	63.1	59.4

use (% respondents)	housing	60.9	14.3	14.5	30.3
	other use (forestry, meadows, etc.)	5.7	4.4	22.3	10.2
Indicator of conservation ethic (% respondents)	negative	7.5	13.9	27.8	16.5
	neutral	30.2	30.7	36.1	32.4
	positive	62.3	55.4	36.1	51.1

Table 2: Socio-demographic and economic characteristics of respondents per site

In-depth analysis of the relationships between socio-demographic and economic characteristics revealed that it was mostly respondents in the age group of 35-49 years (45.1%) who derived their income from agriculture. Respondents in the age group of 34 years and less were dependent on salaried employment (54.5%), while the older age group of 50 years and above relied mostly on retirement benefits (41.2%). Comparing income source to level of education, it was not surprising that almost half (48.8%) of the respondents with higher education relied on salary and 36.5% on retirement benefits as their primary income source. Agriculture was more prevalent among respondents with primary and secondary education, as compared to those with higher education. Additionally, with the increase in area of land they owned, land use tended more toward agriculture: 24% of respondents with less than 1 hectare of land were practicing agriculture in contrast to 79.2% of respondents with 10-20 hectares of land. Thus, ownership of large tracts of land mostly implied agricultural use in the three sites.

3.2. Respondents' attitude toward biodiversity conservation and its inclusion of private land

To assess their awareness and attitude toward nature conservation, the respondents were asked five questions on biodiversity and protected areas around them followed by eight scaled statements that indicated their attitude. Most respondents were aware of the biodiversity around them (74.8%) and in general agreed to the principle of having protected areas for effective biodiversity conservation. Two thirds of the respondents (67.7%) acknowledged that their respective protected areas contributed to enhancing and conserving natural resources around them. When asked to enumerate any known reasons for the establishment of the protected area in their locality, 45% mentioned the presence of rare plants and animals as one of the reasons, 34% stated the presence important habitats, 16% mentioned that their village was part of the buffer zone for the protected area and 8.5% believed it was because their surrounding was scenically attractive. To investigate respondents' conservation ethic, their responses to the eight scaled statements (five point scale) was summarized by converting them to a single scale (keeping the same order of answers on every statement) and then dividing them into three attitudes toward nature conservation: negative (lower values), neutral (mid values) and positive (higher values). A

majority of respondents exhibited a high conservation ethic and were enthusiastic about conserving the natural environment that surrounded them (51.1%).

The research further examined landowners' attitude toward private land conservation based on their experience of inclusion of private land in protected areas. An average of 54.8% of the respondents across the three sites stated that they did not support this strategy. Additionally, most of the remaining 45.2% who agreed to the strategy added that they did not have much choice as they were already part of a protected area and have learnt to accept it. The difference was especially conspicuous at the national park site where 63.9% respondents did not support the use of private land for biodiversity conservation. This may be attributed to the fact that national parks have the strictest regulations among the three types of protected areas. Most landowners who disagreed with the strategy of private land conservation did so because of their standpoint that a landowner should have the sole decision making power over his/her land and not external authority should be controlling him/her (72.5%). Other reasons cited include invasion of property rights (16.3%) and loss of income (11.2 %).

3.3. Relationship between respondents' expressed attitude and their socio-demographic, economic and external factors

When the expressed attitude was further analyzed for any relationship with the socio-demographic factors of the landowners, it was observed that except for education, none of the socio-demographic factors influenced this attitude in a way that was statistically significant, although there were slight variations among the three sites. Table 3 presents a summary of the relation between respondents' expressed attitude toward inclusion of private land in biodiversity conservation and various socio-demographic and economic factors. In case of education, irrespective of the type of protected are, the results showed a significant difference (χ^2 , df=2; p=0.04) in the attitudes as respondents with higher education expressed more support toward conservation on private land as compared to respondents with primary or secondary education, with the latter expressing the least support. This indicated a stronger inclination to support regulatory private land conservation among people with higher education as compared to people with basic education. Since people with higher education were dependent on salaried employment or retirement as their source of income, the expressed attitude was also evaluated against income sources. The findings were consistent with the expectation that people with agriculture as an income source emerged as the group that were the most against private land conservation (63.2% as compared to 44% in salaried employment and 57% in retirement); however, the difference was not statistically significant (χ^2 , df=6; p=0.05). Finally, conservation ethic played an influential role in framing landowners' attitude toward private land conservation. Even in the regulatory form of private land conservation, stronger conservation ethic led to higher agreement or acceptance of private land conservation (χ^2 , df=2, p = 0.03).

Factor	Factor levels	Do not support private land conservation	Support private land conservation	p-value
Intrinsic Factors				
Gender (N = 318)	female	58.2	41.8	0.07
	male	47.8	52.2	
Age (N = 318)	less than 34	56.8	43.2	0.41
	35-49	59.0	41.0	
	more than 50	50.8	49.2	
Education (N = 318)	primary	48.6	51.4	0.04*
	secondary	58.5	41.5	
	higher	39	61	
Primary land use (N = 254)	housing	44.2	55.8	0.10
	agriculture	57.9	42.1	
	forestry	40.0	60.0	
	animal husbandry	36.4	63.6	
	agro-tourism	100	0	
	other use	71.4	28.6	
Primary sources of income (N = 303)	agriculture	63.2	36.8	0.05
	retirement	57.0	43.0	
	salary	44.0	56.0	
	social benefits	46.9	53.1	
Income per household (N = 298)	below 1000 zł	54.2	45.8	0.37
	1001-2000 zł	56.6	43.4	
	2001-3000 zł	51.4	48.6	
	3001-4000 zł	52.9	47.1	
	4001-5000 zł	37.1	62.9	
	more than 5000 zł	62.9	37.1	
Time period of land ownership (N = 256)	less than 5 years	75.0	25.0	0.45
	5-10 years	51.4	48.6	
	11-20 years	46.7	53.3	
	21-30 years	58.8	41.2	
	more than 30 years	53.1	46.9	
Acreage of land ownership (N = 291)	less than 1 ha	50.7	49.3	0.22
	1-10 ha	49.4	50.6	
	10-20 ha	66.7	33.3	
	more than 20 ha	62.5	37.5	
	trimmed mean (5%)	8.81 ha	5.61 ha	0.54

Type of land ownership (N = 254)	inherited	54.3	45.7	0.99
	purchased	54.4	45.6	
Indicator of conservation ethic (N = 315)	negative	63.5	36.5	0.03*
	neutral	59.8	40.2	
	positive	46.6	53.4	
Extrinsic Factors				
Respondents subjected to regulations (N = 277)	no	50.6	49.4	0.01*
	yes	62.2	37.8	
Type of protected area (N = 318)	Natura 2000	48.1	51.9	0.03*
	landscape park	49.0	51.0	
	national park	63.9	36.1	
Awareness of being of part of protected area (N = 318)	no	50.0	50.0	0.60
	yes	54.3	45.7	
Access to financial programs	no	52.7	47.3	0.58
	yes	55.9	44.1	
Awareness of local NGOs	no	54	46	0.91
	yes	53.3	46.7	
Interaction with protected area agencies	no	53.7	46.3	0.91
	yes	55.0	45.0	

*significant at 0.05 significance level

Table 3: Summary statistic (in %) of relationship between respondents' intrinsic and extrinsic factors and their expressed attitude toward inclusion of private land conservation.

In addition to analyzing the influence of socio-demographic and economic factors, the research also investigated the influence of external factors such as imposed regulations, type of protected area, access to financial mechanisms, awareness of conservation NGOs working in the locality and interactions with the protected area agency. There was a statistically significant relation (χ^2 , $df=2$, $p=0.01$) between respondents subjected to regulations on their land and their expressed attitude as they were inclined to disagree more with the inclusion of private land in biodiversity conservation. Different types of protected areas implied different management regimes as well as regulations and this was perhaps the reason behind the type of protected area being statistically influential on landowners' attitude (χ^2 , $df=2$, $p=0.03$). This was most visible in the case of the national

park as compared to the other two forms of protected area. Other factors such as access to financial mechanisms, awareness of NGOs and interactions with the protected area agency had no significant influence on the expressed attitude. Table 3 presents the summary statistics for the above mentioned factors.

Since private land conservation was more rejected than accepted among the respondents, the option to sell their property was raised. 81.9% of the total respondents did not want to sell their land (to the protected area agency) and wanted to continue with its current land use, and the response did not vary across the three sites. Even when the responses of people who rejected regulatory private land conservation were specifically examined, 81.1% of these respondents were keen on retaining their lands. Thus, landowners were unwilling to sell their land even though they did not approve of inclusion of private land in protected areas. Instead, 73.4% of the respondents mentioned that the responsible protected area agency could definitely be more proactive in supporting and engaging them in nature conservation. Of the non-exclusive, multiple options presented to the respondents, 86.7% mentioned compensation to offset conservation costs, 91.6% wanted financial incentive programs to be made available to them and 88.9% stated the need for a participatory approach and allowing local residents to have a voice in the decision making process of managing the protected area. When asked to choose the one that they hold most important, 50.5% respondents opted for participation in the decision making process as being the most important factor lacking right now, followed by availability of financial incentive programs (28.6%). Although there is a severe dearth of incentive programs for private landowners to engage in conservation actions in Poland, nevertheless, few EU programs such as the Agri-Environmental Scheme exists for farmers. However, 65.1% of the surveyed respondents stated that they did not have access to any financial incentive or compensation program.

3.4. Respondents' awareness of tools and institutional structures for nature conservation

In addition to the factors mentioned by the stakeholders, the research also revealed existing gaps in communication, collaboration and information dissemination, which isolated one stakeholder group from another. For instance, most respondents were not aware of the presence of NGOs in their locality and their actions. On an average across the three sites, only 28.9% of the respondents were aware of conservation based NGOs, and only 17.6% have had some direct or indirect interaction with them. The relatively higher exposure to NGOs was at the Natura 2000 site and the least was at the landscape park site. Most landowners saw no difference between cooperating and collaborating with the public sector or the civic sector in the way they function (46%); however, when cross tabulated with their awareness of NGOs in their locality, the results showed that people who were aware of NGOs did show significantly higher preference (χ^2 , $df=3$; $p=0.01$) for NGOs over government agencies (39% compared to 20.2% who did not know of NGOs). Similarly, people who had interactions with NGOs showed higher preference for NGOs over

government agencies (48.7% compared to 28.9%) but the relation was not statistically significant. The general indifference or lack of confidence in the public sector also stems from limited interaction between the two stakeholder groups. The research examined the residents knowledge and participation in trainings/workshops/meetings organized by the protected area agency to encourage private landowners to undertake conservation actions and 82.1% of the respondents did not know of any workshops/trainings/ meetings of such nature while 93.7% of the respondents had never had any direct contact with the protected area agency. This limited communication had other consequences such as lack of awareness of the very existence of the protected area that the respondents were a part of (average 13.2% across the three sites), and this fact was most evident in the Natura 2000 site where 33% of the respondents did not actually know that their village was part of a protected area.

Finally, respondents who were aware of the existence of the protected area were asked to mention their first source of information about their village being a part of the protected area and the highest percentage of respondents (31.5%) were informed through media including information boards on the roadside and in and around the protected area; 29.7% stated that they participated in consultation meetings during the site designation process; 17.4% were informed in public meetings in their villages and 13.8% came to know from other residents of the village. Although public consultation did emerge as one of the main information source as mentioned above, it was not consistent across the three sites. It was one of main sources of information in case of the national park (45.7%) but much less for the landscape park (25.8%) and accounted for very little in case of the Natura 2000 site (8.5%). Thus, it can be assumed that the site designation process and the level of communication between the protected area agency and the local residents varied depending on the type of protected area. Table 4 presents a summary of the mentioned issues and the difference in responses across the three sites.

		Natura 2000	Landscape Park	National Park	General
Awareness of local NGOs	no	52.8	96.2	64.8	71.1
	yes	47.2	3.8	35.2	28.9
Interaction with those NGOs (of respondents aware of NGOs, N = 92)	no	60.0	50.0	52.6	56.5
	yes	40.0	50.0	47.4	43.5
Access to financial programs	no	79.2	70.2	46.3	65.1
	yes	20.8	29.8	53.7	34.9
Awareness of workshops/	no	83.0	81.7	81.5	82.1

trainings on nature conservation	yes	17.0	18.3	18.5	17.9
Awareness of residing inside protected area	no	33.0	3.8	2.8	13.2
	yes	67.0	96.2	97.2	86.8
First source of information about inclusion in protected area (N = 276)	while inheriting	2.8	3.0	8.6	5.1
	while purchasing public information meeting with PA agency	1.4	1.0	4.8	2.5
	local media	22.5	21.0	10.5	17.4
	consultation during site designation process from other residents	47.9	39.0	13.3	31.5
		8.5	28.0	45.7	29.7
		16.9	8.0	17.1	13.8

Table 4: Respondents' experiences (in %) with tools and structures that support nature conservation

4. Discussion and Conclusion

This research is the first of its nature in Poland with respect to the research subject and therefore, the data contributes to building a foundational platform for future research on the subject. It sheds light into the socio-demographic and economic characteristics of landowners involved in private land conservation in Poland. As the results show, a typical landowner who is part of regulatory private land conservation in Poland belongs to the older age group, without higher education and belongs to a very low income household. Large scale commercial agriculture is not very common in Poland and the results were consistent with this fact (through acreage of land owned, land use and primary income sources) in depicting that most landowners are small scale farmers and their primary land use is not necessarily their primary source of income. However, most of them have been landowners for more than a decade and express close ties to their land.

The research highlighted the fundamental differences between voluntary and involuntary private land conservation with respect to the influence of socio-demographic and economic characteristics of landowners on their expressed attitude toward either form of conservation. It also differentiated between the two forms of conservation on their

influence on landowners' motivations. Bourke and Luloff (2008), Ernst and Wallace (2008), Joshi and Arano (2009), Koontz (2010), and Raymond and Brown (2011) are a few examples of studies that report socio-economic factors as well as monetary and non-monetary motivations of landowners engaged in voluntary conservation. However, in the context of regulatory conservation, socio-demographic and economic factors did not appear to have as strong an influence (except for their level of education and conservation ethic) on landowners' attitude as compared to external factors such as imposed regulations and the type of protected area. Landowners who had experienced some form of regulation on their lands had a stronger inclination to disfavor private land conservation as compared to respondents who did not. Thus, regulatory form did have an impact on landowners' attitude toward private land conservation. Since the three types of protected area in this case study represent different levels and forms of regulations, consequently, the attitude of landowners toward regulatory conservation also varied across the three sites. As a national park, Biebrzanski has the strictest regulations and therefore the least support for inclusion of private land in the protected area, even though the park contributed to higher income from tourism as compared to the other two sites.

Inclusion of private land in protected areas appeared to make landowners protective of their property rights, and weary of any agency that might question their authority over their property, as was evident in the reasoning of landowners who disagreed with regulatory private land conservation in this research. While private land conservation aims to balance conservation goals with property rights, the latter often becomes a point of contention. Voluntary conservation tackles this challenge with its inherent voluntary nature and with the support of financial incentives and other policy mechanisms. However, regulatory form of private land conservation, especially one that operates in isolation without any policy support or incentive tools, can appear to disregard landowners' authority over the land. As the results indicated, even though most landowners were sympathetic to nature and its conservation, they could not agree to regulate private land for biodiversity conservation. It becomes imperative to support regulatory conservation with appropriate policy and financial tools, without which, it becomes a tough challenge to convince landowners to engage in such form of private land conservation. The lack of financial incentives or other similar tools in Poland seemed to be apparent to landowners as they expressed the need for such tools. Currently, EU's Agri-Environment Schemes is the only large scale tool available to farmers in Poland.

Although financial incentives are important, this research is an example that loss of income or lack of income opportunities is not the only source of conflict in private land conservation. Increase in the number of financial incentives was one of the options provided to the respondents when they were asked to identify the most important issue that needs to be bridged by the protected area agency, yet most respondents opted for the opportunity to participate in the decision making process of managing the protected area. This is indicative of a disjointed communication and lack of cooperation between the protected area agency and local residents, where local residents feel that they have no

scope to participate because of limited opportunity from the park agency. If landowners do not have a platform to voice their opinion on management decisions that will affect their lands, and their opinions are being ignored to meet conservation goals then it is highly probable that there will be repercussions on their attitude toward biodiversity conservation on private land. Lack of communication was also evident in the fact that some of the respondents were unaware that they were residing inside of a protected area and the primary source of information for those who did know about the protected area was media, which mainly included signboards by the road and local newspapers/newsletters. This was mostly in the case of the Natura 2000 site, which is a relatively new site (established in 2007); however, designating a Natura 2000 site requires public consultation and informing all residents of the site yet one-third of the respondents from the site were unaware of its existence (European Commission 2013).

The lack of communication and a common platform between the two stakeholder groups brings forward the role of the third group: civic sector organizations. Poland's political history has not been very supportive of community based actions and organizations that evolve at a grassroots level (Cent et al. 2007; Cent et al. 2013; Regulska 1999). Hence, the popularity of civic sector organizations is still relatively low as was reflected in the respondents' limited knowledge of NGOs and their interactions with them (Bell et al. 2011; Glinski 2006). This has a significant impact on private land conservation and its ability to evolve as a voluntary action. Countries where voluntary private land conservation has been relatively effective, such as the USA, Australia and several countries in South America, are testimonials of the important role that civic sector organizations can play, especially in fundraising and generating awareness. Unfortunately, the influence of the civic sector is mostly restricted to activism and advocacy at the local level, with some contribution to generating awareness. Private land conservation requires a balance of conservation priority with conservation opportunity as defined by Knight and Cowling (2007), and building on conservation opportunity which will depend on a strong civic sector that can increase the accountability and transparency of public sector institutions. Additionally, civic sector organizations can raise awareness among residents and create alternate channels of communications and actions for them. Their flexible approach and minimal bureaucracy can be encouraging for landowners to engage voluntarily and as this research revealed, respondents who were aware of NGOs and their actions preferred cooperating with them than with government agencies.

Biodiversity governance in regulatory private land conservation has not appreciated the need to maximize on the conservation opportunity, but with the growing development pressures on such lands and the human-nature conflicts associated with it, it is gradually becoming imperative. It is unlikely that the extent of private land involved in biodiversity conservation will increase if regulatory conservation continues without the support of adequate policy and financial tools. For private land to emerge as a biodiversity conservation strategy in countries such as Poland, there is a need for a common platform of interactions and dialogue among the different stakeholder groups, which in turn requires

modification of the rigid institutional structures. Additionally, voluntary options should be explored through the use of environmental policies aimed specifically at private land conservation, and financial mechanisms that target the expectations of disengaged landowners. Conservation of biodiversity and adhering to CBD's National Biodiversity Strategy will ultimately require countries like Poland to look beyond the traditional protected area model and explore the potential of private lands, and regulatory conservation should not be the only available option.

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CHAPTER 6: Conclusive Summary

Biodiversity conservation on private land is gradually emerging as a global conservation strategy and there is a variety of tools that are being explored in several countries which can be classified as either voluntary or involuntary. However, the diversity in tools in different countries and the scale at which they operate make it difficult to document and appreciate the role of private land in biodiversity conservation. A classification system that could categorize the existing tools based on their conservation security and tenure of security can help in improved documentation and monitoring of such private lands, much like the IUCN protected areas. Hence, the proposed classification system can make private land conservation more accountable and tangible. The classification system proposed in this research played a key role in the discussion of forming an international network of organizations working on private land conservation called the International Land Conservation Network, and the author of this thesis was invited by the Lincoln Institute of Land Policy, Boston (USA) for consultation to establish this network.

Specifically in Poland's context, this research brought to light some of the persistent challenges as well as possible opportunities for private land conservation to evolve as a biodiversity conservation strategy. Being first of its nature, it is also a foundation from where the research topic can be further explored. Private land conservation in Poland is still a novel concept and restricted to regulated private land inside of protected areas. There is insufficient data on the acreage of private land within the boundaries of the different types of protected areas and even lesser data on landowners' understanding of this strategy and their attitude toward it. The exploratory research on the attitudes of the different stakeholder groups using Q methodology revealed three different attitude toward biodiversity conservation on private land: one that disfavored it completely because of the fear of financial loss and loss of authority; the second that believed private land conservation was necessary and did not have any negative consequence for landowners; and the third attitude that acknowledged the need for such a strategy but was hesitant over its impact on property rights and land use. The results also highlighted how disjointed the three attitude were from one another. Contrary to the common presumption that all landowners are against private land conservation, the Q methodology study demonstrated the presence of at least group of thought that was not against inclusion of private in biodiversity conservation and instead was concerned about its consequences with respect to property rights. Landowners from this school of thought represent conservation opportunity that can be harnessed through effective information dissemination and raising awareness.

Initiating and implementing a strategy such as biodiversity conservation on private land requires a shift in the current institutional perspectives as well as institutional structures. As the in-depth interviews showed, private land conservation has limited understanding among the primary institutions involved in nature conservation in Poland.

Exposure to only the regulatory form along with very limited knowledge on the current global trends in voluntary private land conservation has restricted their opinion on the functions of private land in biodiversity conservation and most institutions in Poland equated all voluntary private land conservation to privately protected areas. Managers of regulated private lands perceive it as a contiguous entity with the protected areas that they are part of, and therefore do not consider it as a separate strategy from the protected area model. Protecting private lands outside of protected areas is currently unperceivable to managers. This gap in knowledge is a reminder for increased information dissemination of global initiatives and attempts, at an institutional level.

Change in institutional perspectives cannot be brought about without changes in institutional structures such as the presence of appropriate policy tools. Even if institutional perspectives are changed through better knowledge exchange, there is very little scope for such managers to take actions without the support of policy tools. The most urgent and apparent gap in private land conservation in Poland is the lack of appropriate conservation policies that would promote private landowners to engage in conservation. Current lack of financial tools to support private land conservation was resonated throughout the research by all stakeholder groups. It would perhaps be more cost effective to direct conservation budgets from acquisitions of private land within protected areas to developing context specific financial mechanisms that would allow landowners to retain their land while meeting the conservation goals.

Another change in the institutional structure that leaves much to be desired is the participation of stakeholder groups in the decision making process of such mix models of protected areas. Although the role of participation is being gradually recognized and incorporated into the theory of biodiversity conservation, its practice has been far less effective. Protected areas still follow a traditional approach to its planning and management, the responsibility of which is restricted mostly to the protected area agency. The results of the questionnaire survey supported this fact when most landowners prioritized the need for a participatory approach in the protected area's decision making process over other needs such as financial instruments. Even for a relatively new form of protected area which is the Natura 2000 sites, the site designation process relied mostly on the conservation priority based on ecological criteria and there was very little focus on the conservation opportunity, which is why a significant number respondents at the Natura 2000 site were still unaware that they were residing within a Natura 2000 site. Development of Natura 2000 sites' management plans have attempted to make the process more participatory but the lack of information among people in the first stage of site designation impairs their capacity to participate in the later stages. Therefore, the understanding of participation needs to evolve from its current equivalence to information dissemination and consultation.

As mentioned earlier, harnessing conservation opportunity will require the support of appropriate policies that can connect with disengaged landowners. This will in turn benefit from a better understanding of the target recipient's (landowners) characteristics

and expectations. The interviews conducted in the US identified several socio-economic as well as external factors that influence a landowners' attitude and motivation toward private land conservation. However, these factors were identified based on their experience in mostly voluntary conservation. When the socio-demographic, economic and external factors were assessed against landowners with experience in regulatory conservation, the results showed significant difference from the assumptions of voluntary conservation. It revealed that even with the experience of regulatory conservation, almost half of the sampled landowners were in support of private land conservation, and thus a potential conservation opportunity. The other half who disfavored private land conservation mostly did so from the fear of threat to their authority and/or imposition of restrictions. Thus, issues raised by the disfavoring group largely belong to the "Uncertain" category from the Q study and as deduced earlier, with efficient information dissemination and awareness generation, this group does have the potential to participate in conservation. Also, contrary to managerial belief in the in-depth interviews in Poland that financial mechanisms are the strongest motivations for landowners, the quantitative research revealed a strong desire for a participatory decision making among landowners to engage in conservation actions. Hence, limited scope of participation and interaction with the protected area management coupled with restricted information dissemination among landowners about protected area functions are the primary obstacles to enhancing the conservation opportunity in landowners for private land conservation in Poland.

Both the exploratory research as well as the quantitative surveys highlighted the weak presence of civic sector organizations in Poland. The presence of a strong civic sector is imperative for a grassroots initiative such as private land conservation as they can play a crucial role in raising awareness, providing financial support through fund raising and engaging the public sector for formulating and implementing appropriate policies (Cent et al. 2007). Although the number of conservation based NGOs are growing in Poland, most of them are limited to activism and advocacy. In addition to other factors, lack of policy structure that support civic sector organizations coupled with Poland's troubled communism past that discouraged associations of any nature, slows the growth of a robust civic sector that could potentially extend private land conservation to the voluntary domain (Cent et al. 2013; Regulaska 1999).

Finally, this research would like to clarify its standpoint that it does not undermine the role of regulation for biodiversity conservation and acknowledges that regulatory private land conservation is sometimes essential as it is not possible to remove all regulations and rely only on voluntary actions. However, regulations on private land do imply the sacrifice of some rights by the landowners and unless there is a balance between what they give up and what they gain in return, conflicts are bound to arise. Poland's nature conservation policies have so far ignored the private lands within its protected areas and perceived it only as a "challenge" that can be addressed by acquisition. However, as this research revealed, most landowners in Poland have been long time landowners and express close ties to their land and acquisition might not be as effective a solution as it is

currently perceived to be. Additionally, limiting private land conservation to only the regulatory form restricts the use of the full potential of private land in biodiversity conservation and restricts Poland's capacity of meeting the EU 2020 target. Private land can contribute to biodiversity conservation even outside of protected areas; however, such strategies will require engaging and encouraging landowners to undertake voluntary conservation. Since the findings of this research also have an applied character, the results may be presented to decision making authorities, especially of such mixed models of protected area. As a country in transition, Poland is evolving fast in all sectors, including biodiversity conservation and this research is an attempt to draw attention to the potential of private land in biodiversity conservation in Poland and the challenges that need to be addressed in order to extend it beyond its current regulatory form.

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Abstrakt

Strategia ochrony różnorodności biologicznej przez długi czas opierała się na tworzeniu obszarów chronionych. Wciąż postępujący spadek bioróżnorodności wymusił zmianę tego podejścia na takie, które uwzględnia w działaniach ochroniarskich również grunty prywatne. Choć włączenie gruntów prywatnych prawdopodobnie nie rozwiąże w pełni problemu spadku bioróżnorodności, z pewnością uzupełni dotychczas istniejący model jej ochrony, głównie ze względu na fakt, iż grunty prywatne stanowią znaczną część obszarów lądowych na świecie. Proces włączania gruntów prywatnych w strategię ochrony bioróżnorodności nie jest łatwy ze względu na charakter prywatnej własności gruntów i związanych z tym charakterystyk ekonomiczno-społecznych. Skuteczność działań ochroniarskich warunkowana jest wieloma zmiennymi o charakterze socjo-ekologicznym, w tym m.in. chęcią, możliwościami i zakresem partycypacji w nich przez różne grupy interesariuszy (*stakeholders*, ang.). Celem niniejszych badań było określenie nastawienia i postaw różnych grup interesariuszy względem ochrony różnorodności biologicznej na gruntach prywatnych, a także ustalenie czy konkretne czynniki o charakterze zewnętrznym (*extrinsic*, ang.) i wewnętrznym (*intrinsic*, ang.) warunkują, a jeśli tak, to w jakim stopniu te postawy. Głównym terenem badań była Polska, gdzie jedyną formą ochrony gruntów prywatnych jak dotychczas, jest ta prowadzona w ramach obszarów chronionych. Strategię ochrony na gruntach prywatnych w Polsce porównano z tymi obowiązującymi w Stanach Zjednoczonych, kraju, gdzie ochrona na gruntach prywatnych jest znacznie bardziej rozwinięta aniżeli w Polsce. Badania miały charakter ilościowy (kwestionariusze ankiet) i jakościowy (przegląd literatury, wywiady pogłębione, metodologia Q).

Ochrona na gruntach prywatnych w znacznym stopniu polega zarówno na wsparciu instytucjonalnym, jak i na chęci uczestniczenia w niej prywatnych właścicieli gruntów. Dlatego, *pierwszy etap* badań poświęcono analizie instytucjonalnych uwarunkowań ochrony różnorodności biologicznej na gruntach prywatnych. Analiza ta objęła 25 wywiadów pogłębionych z osobami kierującymi organizacjami i instytucjami zaangażowanymi w ochronę bioróżnorodności na gruntach prywatnych, tak w Polsce, jak i USA. Wyniki pokazały jak ocena uwarunkowań instytucjonalnych zależy od doświadczeń respondentów i obecności odpowiednich narzędzi polityki konserwatorskiej. W przypadku Stanów Zjednoczonych dobrowolne uczestnictwo w działaniach na rzecz ochrony na gruntach prywatnych jest wspomagane przez instrumenty finansowe i inne instrumenty polityki ochrony, zarówno ze strony instytucji sektora prywatnego, jak i publicznego, co zdecydowanie wskazuje na uznanie roli gruntów prywatnych w ochronie różnorodności biologicznej. Co więcej, kadra menadżerska instytucji sektora ochroniarskiego jest bardziej świadoma znaczenia czynników pozafinansowych, które skłaniają właścicieli gruntów do podejmowania działań ochronnych. W Polsce przeciwnie, uznanie wagi ochrony na gruntach prywatnych jest praktycznie minimalne, a kierownictwo instytucji ochroniarskich uznaje takie grunty jedynie za przylegające do pobliskiego obszaru chronionego, zaś

dobrowolne podejmowanie działań ochronnych utożsamiane jest jedynie z ochroną obszaru chronionego utworzonego na gruncie prywatnym. Skuteczność takiej strategii odbierana jest jako bardzo niska. Respondenci skupiali się przede wszystkim na instrumentach finansowych traktowanych jako ewentualne rozwiązanie prawnej regulacji ochrony na gruntach prywatnych. W Polsce brakuje także silnych organizacji w sektorze obywatelskim, które mogłyby wesprzeć taką strategię.

Sugerowane przez realizujących ochronę bioróżnorodności w Polsce i wynikające z pierwszej fazy badań założenie uznające zachęty finansowe za główną motywację właścicieli gruntów prywatnych do angażowania się w ochronę, zdecydowało o nakierowaniu *drugiej części* badań na zbadanie postaw przeważających wśród głównych grup interesariuszy w Polsce. Wykorzystano do tego specjalistyczne narzędzie tzw. „metodologię Q”, z jednej strony pozwalającą na przedstawianie informacji jakościowej w formie ilościowej, z drugiej zaś - wciąż umożliwiającej interpretację jakościową. Badania te objęły 28 respondentów – przedstawicieli różnych grup interesariuszy: pracowników instytucji ochroniarskich, urzędów gmin, organizacji pozarządowych i właścicieli gruntów. Wśród wszystkich badanych zidentyfikowano trzy podstawowe grupy postaw: (1) nie popierających obowiązkowej ochrony bioróżnorodności na gruntach prywatnych, uważając ją za obciążenie finansowe oraz utratę praw do własnej ziemi, (2) popierających ochronę bioróżnorodności na gruntach prywatnych ze względów ekologicznych, co jednak nie dotyczyło przekonania, że w celu ochrony ważnych zasobów przyrodniczych wystarczy opieranie się na dobrowolnych działaniach właścicieli gruntów. Interesariusze o takich poglądach nie przewidywali też żadnych znaczących strat, jakie mieliby ponieść właściciele w zakresie prawa własności do gruntów w toku tego procesu. Wreszcie (3) uznających znaczenie gruntów prywatnych w ochronie bioróżnorodności, lecz wyrażających wątpliwości co do możliwości osiągnięcia kompromisu pomiędzy ochroną bioróżnorodności a prawem własności właścicieli gruntów. Zwolennicy tego poglądu uważali, że polityka i struktura organizacyjna obowiązująca w Polsce nie wspiera tego typu strategii ochrony.

Wyróżnione trzy grupy postaw wskazują na istniejący w Polsce potencjał możliwości ochrony gruntów prywatnych, jednak wykorzystanie tychże możliwości wymaga odpowiednich uregulowań prawnych i instytucjonalnych, co z kolei nie jest możliwe bez lepszego zrozumienia czynników kształtujących postawy właścicieli gruntów prywatnych wobec ochrony bioróżnorodności. We wstępnych badaniach (pierwszy etap) prowadzonych w Polsce i Stanach Zjednoczonych określono niektóre właściwe dla tych krajów charakterystyki właścicieli gruntów, jak również pewne czynniki zewnętrzne wpływające na podejście właścicieli ziemi do problemu ochrony na gruntach prywatnych. Kolejną (*trzecią*) część badań poświęcono więc określeniu opinii właścicieli gruntów prywatnych na temat włączania tychże gruntów do ochrony bioróżnorodności, a także ustaleniu czy różne czynniki np. socjo-demograficzne, ekonomiczne, typ obszaru chronionego czy różnego rodzaju ograniczenia właścicieli wpływają na te postawy. Badania te miały charakter badań ankietowych i obejmowały 318 losowo wybranych

właścicieli gruntów prywatnych w Polsce, zamieszkałych na obszarach trzech różnych form ochrony przyrody. Wykazały one, iż poza poziomem wykształcenia i etyką ochrony żaden z czynników społeczno-demograficznych i ekonomicznych nie miał istotnego wpływu na poparcie (lub jego brak) ochrony na gruntach prywatnych. Jednak czynniki zewnętrzne, takie jak typ obszaru chronionego i różnego rodzaju ograniczenia, wpływały na wyrażane postawy. Wyniki wskazały również na oczekiwania właścicieli gruntów w zakresie lepszego podziału uprawnień decyzyjnych władz obszarów chronionych względem gruntów prywatnych w ich granicach.

Niniejsze badania pokazują, że pomimo, iż problem ochrony bioróżnorodności na gruntach prywatnych w Polsce jest problemem nowym i wciąż ma charakter dość niszowy, osoby zaangażowane w jego rozwiązywanie posiadają zarówno chęć jak i możliwości do jego rozwoju. Wzmocnienie ochrony na gruntach prywatnych w Polsce wymagać będzie jednak zasadniczych zmian w polityce ochrony przyrody (która w swoich formach polegających na regulacjach lub dobrowolności nie skupiała się jak dotychczas na gruntach prywatnych) i instytucjonalnych struktur sprawowania władzy (które są obecnie scentralizowane i oparte na odgórnym przekazywaniu decyzji). Wszystkie te niezbędne działania muszą mieć silne wsparcie ze strony sektora obywatelskiego oraz odpowiednich zachęt ekonomicznych.

Acknowledgement

I would like to take this opportunity to express my gratitude to my supervisor **Professor Malgorzata Grodzińska-Jurczak** for her invaluable support, advice and guidance which sometimes extended beyond the professional domain. She committed herself to see through every bureaucratic and non-bureaucratic obstacle I faced and without her this research as well as my four years in Poland would not have been possible. My heartfelt gratitude to her for bearing with everything!

I would like to thank my team, namely, **Dr Agata Pietrzyk-Kaszyńska, Dr Joanna Cent, Katarzyna Nieszporek, Justyna Gutowska** and **Marcin Rechciński**. They were my support system but more than that, they became my dearest friends. I am grateful to them for their company, their advice during my research and most of all for the patience they showed each time they had to translate anything from Polish to English! Here, I would also mention **Wojtek Tokarz** for his help in part of my research.

I express my gratitude to the ECOLOGY “team”, especially **Dr hab. Maria Niklińska, Dr Dominika-Wloch-Salamon, Dr hab. Joanna Rutkowska, Dominika Dragosz-Kluska** and **Agnieszka Cader** for helping me maneuver through each tide of paperwork. I knew a doctoral study involved a lot of bureaucratic paperwork, but didn’t realize it increased when you are a foreigner and without them I would still be figuring out my way to Poland! I would also like to thank all the professors and PhD students at the Institute of Environmental Sciences, Jagiellonian University for their company and making me feel at home here. In this context, I would also like to thank **Dr Marcin Kocór** from the Institute of Sociology, Jagiellonian University, for his invaluable contribution to my research and for being a dear friend.

Part of my research was conducted at Yale School of Forestry and Environmental Studies and this was made possible by **Professor Timothy Gregoire**, to whom I am forever grateful. I also thank **Professor Susan Clark** and **Bradford Gentry** for taking me under their wings and for their invaluable advice during my research.

Finally, I would like to thank my family, my skeletal system that kept me from falling apart. Words cannot express my gratitude to my husband **Dr Sanjay Gurung**, and my two sets of parents **Kamal Barman** and **Manjula Barman, Bina Gurung** and **C K Gurung** for being patient and being there by my side through my low and high moments. I am where I am only because of you. Also, my best friend **Silpi Kamal**, who also happens to be my sister, and her tiny little family **Sumanta Sharma** and **Atharv Sharma** for cheering me up and listening to my frustrations without saying a word!

