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Article

Sustainability in Land Management: An Analysis of Stakeholder Perceptions in Rural Northern Germany

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Abstract: Successful sustainable land management efforts rely on stakeholder support and integration of stakeholder knowledge. This study explored the views of sustainable land management expressed by land use stakeholders and how these views contribute to land users' self-perceptions. We examined stakeholder perceptions in four case study areas in rural northern Germany. The target groups consisted of representatives from (i) agriculture; (ii) forestry; (iii) water management and (iv) rural planning and development ("cross-sector" representatives). The data were gathered using 60 semi-structured interviews and were analyzed qualitatively. The results indicate that differences in perceptions are greater between stakeholder groups than between regions; regional land management issues shape the framework of negotiations and the redefinition of concepts, whereas stakeholder group affiliations shape mindsets. The economic dimension of sustainability was emphasized, particularly by land managers; however, the social dimension was underrepresented in the statements. Furthermore, there are considerable differences between stakeholder groups in terms of the ways in which the spatial and temporal scales of sustainable land use are perceived. This study underscores the importance of examining stakeholder knowledge and understanding the complexity of land management and its benefits such that consensual management strategies may be developed.

Keywords: sustainable land use; landscape management; stakeholder analysis; qualitative analysis; semi-structured interview

1. Introduction

This study explores the views of sustainable land management expressed by land use stakeholders in four German case study areas and how these views contribute to land users' self-perceptions.

Since its introduction into a larger public discussion, the concept of sustainability has been used in a broad range of contexts both within scientific disciplines and beyond scientific discussions. After more than 25 years, the Brundtland Report's definition of sustainable development as "that [which] meets the needs of the present without compromising the ability of future generations to meet their own needs" [1] (p. 15) still serves as the smallest common denominator. The United Nations has since reaffirmed sustainable development in its three dimensions—economic, environmental and social—as being a core principle and central element of their framework [2].

There have been numerous discussions of the conceptual underpinnings of sustainability, e.g., whether and how the meaning of sustainable development changes with its context [3], our understanding of the context [4], or how economic, environmental and social aspects are integrated and interconnected within the concept of sustainability [5].

These complex interdependencies are at the heart of the challenges facing rural land use policy throughout the European Union. The current Common Agricultural Policy (CAP) framework aims at providing support for the provision of private and public goods and services by rural production systems. Especially within the context of the "greening" of the CAP, the cross-dimensional relevance of ecosystem service provision—for high-quality food production as well as for environmental services—becomes evident [6,7]. Economic viability of rural businesses, preservation of ecosystems connected to agricultural and forestry land use, as well as social inclusion and poverty reduction have been set as complimentary objectives by the EU rural development policy for 2014–2020. In order to achieve these objectives, priorities include innovation efforts and knowledge transfer between researchers and rural entrepreneurs with a focus on agriculture and forestry, improving the competitiveness of agricultural production, restoration and preservation of biodiversity, improving water and soil management, and the facilitation of diversification and overall rural development [8]. In addition, the national Joint Task for the Improvement of Agricultural Structures and Coastal Protection (GAK) in Germany is a core instrument for rural development policy, which also prioritizes competitive agriculture and forestry sectors as well as overall vitality in rural areas through support measures for agricultural and rural infrastructure [9]. The synergies and trade-offs between different ecosystem services provided by rural production and their contribution to sustainable development in its three dimensions have been gaining relevance for the agricultural and environmental policy formulation in the EU, such as agri-environmental measures and the EU Water Framework Directive [10].

The framework of sustainable land management (SLM) aims at balancing these various economic, environmental and social demands facing land use in rural areas. Its focus goes beyond management decisions at the business level of farm or forest management to emphasize the regional perspective of various goods and services provided by rural land use practices [11]. Research into sustainable land management seeks to improve our understanding of the complex interdependencies between economic, environmental and social conditions, which affect the organization of the use of land and natural resources [12]. A central component of SLM is a multi-stakeholder perspective: the implementation of an integrated SLM system on a regional scale requires collaboration among various relevant land user

groups, administrators and interest groups [13]. The inclusion of decision-makers and stakeholders is a crucial factor for the research and development of land use and management strategies.

Stakeholder collaboration in sustainable regional land management projects is more likely to be successful if the targeted groups are involved as early as possible in the planning and management process [14]. Encouraging stakeholders to become involved at an early stage can improve their acceptance of the various aspects of a project. A constant dialogue between scientists, administration officials and land users fosters a sense of ownership of the project goals and is more likely to establish legitimacy [15]. The "internal perspectives" held by land use stakeholder groups, as opposed to the "external perspectives" held by researchers and policy-makers add valuable information to a project's progression [16]. Stakeholder involvement can improve the decision-making process by integrating this additional information, new ideas and regional stakeholders' knowledge into the process, thereby increasing the likelihood of high-quality decisions [17].

An important prerequisite for successful collaboration is a shared vision among relevant stakeholders regarding the goals of sustainable land management in a specific regional framework. In order to achieve this, a holistic approach to understanding the roles of the key stakeholders involved is needed, and empirical information regarding the interests of stakeholders within this system as well as the motives that drive their decisions must be carefully examined [18]. For that reason, a deeper understanding of stakeholders' perception and interpretation of sustainability in land management is crucial.

Complex and often ambiguous concepts such as sustainability are subject to various perceptions and interpretations. Moreover, a consensus-oriented approach to stakeholder involvement often clouds the differences between worldviews and understandings of key concepts in land management [14]. Recognizing these differences and then searching for common ground is important, particularly when a broad range of stakeholder groups is involved.

It is necessary to examine more closely the ways in which sustainability in regional land management is understood by various land use stakeholders, how these views differ from one land user group to another and the extent to which these views overlap, and how this understanding shapes their views of the regional land management system.

Previous research examined the ways that concepts such as "nature" or "sustainable use of natural resources" are defined by and incorporated into the worldviews held by various groups. Burgess *et al.* [19] and Harrison *et al.* [20] examined how the concept of "nature" is understood differently by farmers and conservation scientists. The differences in worldviews have a considerable impact on the response toward management programs by land managers on the ground. Moreover, stakeholders incorporate the views and interests of other groups into their own and form interest alliances, which in turn shape the regional discourse concerning the understanding of these concepts.

In order to adequately reflect economic, environmental and social aspects in assessing sustainability, participatory development of sustainability indicators has been the focus of previous studies. Glass *et al.* [21] brought together academic and non-academic stakeholders with expertise in rural estate management and sustainability to reflect on their perceptions of sustainability using a Delphi process. Results were then used to develop a toolkit for assessing sustainable management in a particular context of land ownership. Reed *et al.* [22] focused not only on integrating stakeholders' and decision-makers' priorities and relationships into developing scenarios for sustainable national park management, but also the integration of stakeholder and scientific knowledge using new tools of communication. Other

approaches focused on particular land use sectors such as water management [23] or particular issues such as bioenergy projects [24,25].

The various understandings of sustainability in land management and related narratives have also been studied. Aerni [26] and Aerni *et al.* [27] examined the views of sustainability in agriculture in two countries with different agro-economic orientations and how these views are affected by the extent to which the agricultural sector is integrated into a larger trade system as opposed to being more protectionist-oriented. Van de Kerkhof *et al.* [28] apply an evaluation approach with emphasis on integrating perceptions and visions of agricultural stakeholders to assess the sustainability of the Dutch agricultural sector. There is a considerable body of literature regarding the assessment of agricultural practices and attitudes toward "traditional" rural development *vs.* new "non-traditional" land uses types held by the general public [29,30]. Several studies examined the acceptance of single land use issues, such as wind turbines [31,32] or intensive livestock production [33,34]. These studies often take a NIMBYist approach and focus on the general public's view of (obnoxious) facilities [35,36].

However, there is a lack of comprehensive research into views of land use sustainability in contrast to previous studies that focused on particular activities. Moreover, it is beneficial to focus the analysis on the perception of land use stakeholders rather than focusing on the general public. They are the agents of change and the main target groups of support programs such as the EU's Common Agricultural Policy (CAP).

This study focused on regional districts to include land use trends, topics and interdependencies between different land use activities which occur above the farm and local level as well as to reflect the jurisdictions and areas of activity of relevant administration members and interest groups. At the same time, restricting the spatial scale to regional districts helped retain a shared frame of reference with common land use issues for all stakeholders involved.

The objectives of this study were (i) to analyze how sustainability in land use contributes to the self-perceptions of various land user groups; (ii) to examine how the concept of sustainability in land use is perceived by land user groups; and (iii) to research what, if any, differences exist between land user groups regarding their views of sustainability within the specific context in which they operate.

The following sections briefly introduce the case study regions and describe the methods used in the study. The subsequent sections provide an overview of the empirical results and how these results fit into the scientific discussion of sustainability perception in regional land management.

2. Materials and Methods

2.1. Study Context

We selected a case study approach that included four case study areas with particular bio-physical settings and socio-economic structures. The four case study areas (CSAs) of Diepholz (DH), Uelzen (UE), Flaeming (FL), and Oder-Spree (OS) are located in the North German Plain. Aside from a limited number of metropolitan areas (Berlin, Hamburg, Bremen, Hannover), this plain is a predominantly rural area where agriculture and forestry are important economic factors, compared to national averages. However, there are major differences within the region concerning, for example, land cover, climate indicators, socio-economic structures and the historical development of the cultural landscape. There are gradients

in indicators from west to east in terms of the climate and other factors: the precipitation decreases and the continentality increases, economic productivity decreases, grassland and livestock farming decrease, the average farm size increases, and the areas covered by forest increase from west to east.

The pertinent land use challenges in all four case study areas are the increasing pressure on land available for rural production due to urbanization and transportation networks as well as the competition for land between food and agricultural energy production, all of which result in increased land rent rates. More details for each case study area are presented in Figure 1.

2.2. Data Collection and Analysis

The results of this study are based on an analysis of 60 qualitative interviews conducted with land use stakeholders in the four case study areas.

When discussing stakeholders, we follow the definition of Grimble and Chan [37], according to which stakeholders are persons within a system "who affect, and/or are affected by, the policies, decisions and actions of the system; they can be individuals, communities, social groups or institutions of any size, aggregation or level in society. The term thus includes policy makers, planners and administrators in government and other organizations, as well as commercial and subsistence user groups".

The target groups in this study were representatives of relevant rural land use sectors involved in decisions about rural land use practices and management within the case study areas. The land use sectors involved were agriculture (AG), forestry (FO), water management (WM) as well as a fourth group dubbed "cross-sector stakeholders" (CS).

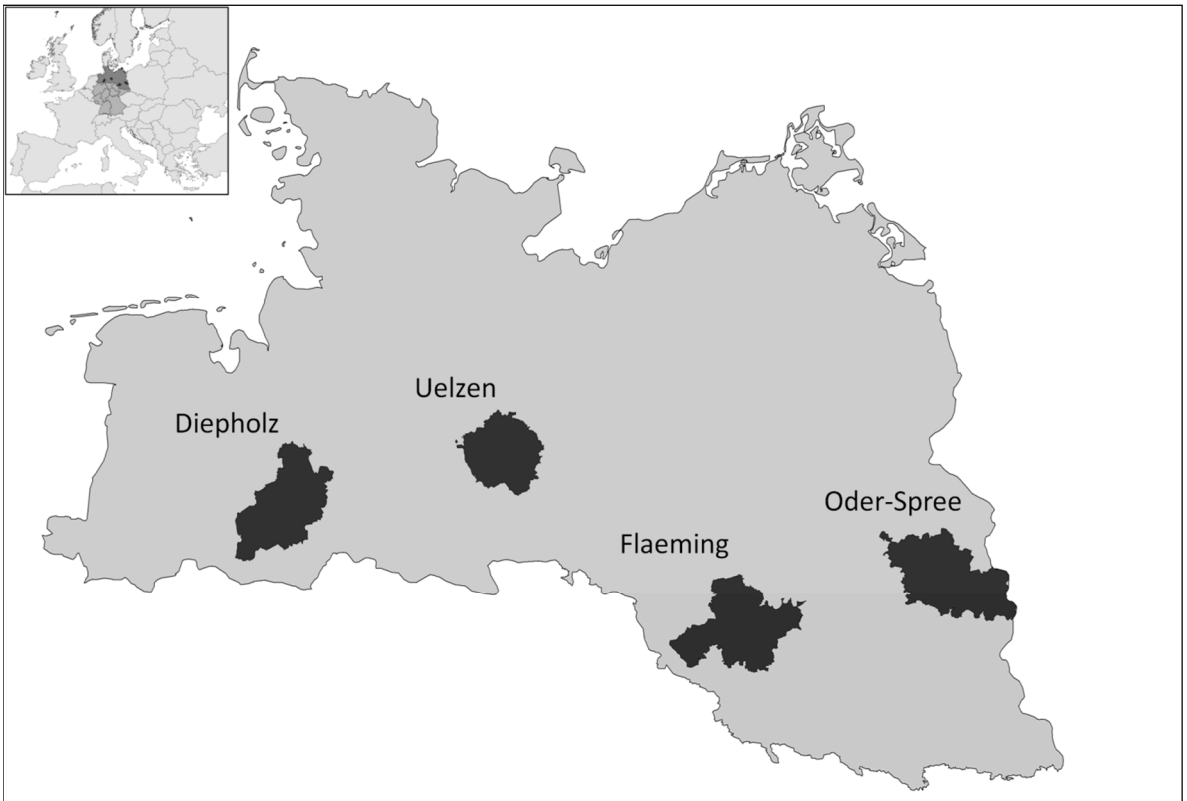
The group of agricultural stakeholders consisted of farm holders as wells as non-farm holders. Farm managers were included as well as representatives of regional agricultural administration offices and interest groups such as regional farmers' associations. The forest stakeholder group was represented by managers of private forests as well as state forest managers, regional forest and hunting administration officials, and representatives of regional hunters' associations. The water management stakeholder group included representatives from regional water body maintenance associations, private water supply and disposal companies, officials of regional water resource management administration offices, and irrigation associations.

The "cross-sector" group refers to stakeholders with knowledge of regional development in general or of specific issues that related to more than one land use sector. Stakeholders in this group represented district administrations, regional spatial planning authorities, nature conservation groups and tourism associations. Table 1 provides more details about the four groups of stakeholders involved in the study and the number of interviewees per group.

Stakeholders were identified using a combination of desk research, snowball sampling [38] and the support of regional project partners. The data collection was conducted in 2011 as semi-structured face-to-face interviews. Not only allows the instrument to cover a wide range of topics pertaining to regional sustainability, its flexibility and the face-to-face situation also ensured that the professional perspective and the complexity of the issues at hand were adequately reflected through the use of clarification and recognition techniques [39].

The data collection not only focused on obtaining stakeholders' technical and process knowledge, *i.e.*, information about the line of work, decision-making processes, key issues regarding land management

in their region, about other actors and groups, but also on their interpretive knowledge, *i.e.*, personal attitudes toward the issues targeted in this study and the subjective perceptions of the respondent [40].



	Diepholz (DH)	**Uelzen (UE)**	**Flaeming (FL)**	**Oder-Spree (OS)**
Population/pop. density (ih/km²)	216,469/108.9	94,020/64.7	120,446/55.7	185,000/85
Area (km²)	1988	1454	2163	2243
Land use:				
agricultural land:	74.7%	53.2%	48.8%	35%
forest land:	9.9%	33.5%	42.3%	45%
built-up land:	12.2%	8.4%	7.4%	4.7%
Primary land use challenges	- High organic nitrogen deposition, - Local water pollution, - Wetland restoration and management, - Goal of increasing the share of forest areas	- Irrigation management (90% of arable land is irrigated), - Diversification of agricultural production, - Role and acceptance of farming by the general public	- Water management of dropping groundwater levels, - Local and seasonal flooding of farm land, - Increased freshwater withdrawal from the region	- Flood management along the Oder and Spree Rivers, - Water management of seasonal changes in drought and wet conditions, - Increased monoculture energy crops

Figure 1. Case Study Areas in Northern Germany. Data and copyright: Administrative boundaries Germany: © GeoBasis-DE /BKG 2010 (boundaries for North German Plain and case study regions adapted by R. Nuske, Nordwestdeutsche Forstliche Versuchsanstalt); Administrative boundaries Europe: © EuroGeographics, © FAO (UN), © TurkStat, Source: European Commission—Eurostat/GISCO.

Table 1. Land Use Sectors and Stakeholder Groups Represented in the Study.

Land Use Sector	Stakeholder Groups Represented	No. of Stakeholders Interviewed in CSAs
Agriculture (AG)	Regional farmers' associations, regional agricultural administration, farm managers	14
Forestry (FO)	Regional forest administration, forest managers, hunters' association, state forest administration	10
Water management (WM)	Water supply companies, regional water body maintenance associations, regional administration for water resource management and coastal protection, irrigation association	13
Cross-sector (CS)	Regional tourism associations, regional planning administrations, regional LEADER management, environmental protection NGOs, regional environmental administration	22
		Total: 60

A number of topics was covered, including the role and activities of the stakeholder in their field, views of important current land use issues as identified by previous research and the respondents themselves, networking activities and cooperation with other sectors and stakeholders. The conversion of research questions into interview questions is presented in Table 2.

Each interview spanned 60 to 180 min and was recorded and subsequently transcribed. The transcripts were then coded and analyzed using the software MAXQDA 10 [41]. The analysis followed the rules of Grounded Theory: an open coding process was used, resulting in 680 initial codings of statements related to sustainability, and analytical categories were identified and redefined inductively through subsequent selective coding. This exploratory approach ensured that new topics and aspects regarding regional land use raised during the interviews could be taken into account accordingly [39,42]. After an initial analysis, a workshop was conducted in each case study area, where stakeholders from all four groups involved came together to discuss preliminary results in order to reduce potential bias of individual interviews and to ensure that stakeholder views were adequately reflected.

Table 2. Data Collection: Areas of Inquiry, Topics and Key Questions.

Areas of Inquiry	Topics/Themes	Key Questions
Concept of land use sustainability	How is sustainable land use accommodated into the worldview of the stakeholder?	- How would you define sustainable land use? - How does sustainability impact your daily work or your work priorities? - What would you view as desirable or undesirable developments in your region with regard to sustainability?
Current regional land use (activities)	What are the most important types of regional land use? Are they perceived as sustainable?	- What are the primary regional land use activities today? - What are your areas of expertise?

Table 2. *Cont.*

Areas of Inquiry	Topics/Themes	Key Questions
Future regional land use (activities)	What forms of land use should or should not be promoted from a perspective of sustainability?	- What is your agenda for land use activities in the future? - How should conditions change to increase land use sustainability?
Perspectives held by actors with regard to sustainability	How do regional land uses contribute to sustainable land use (or not)?	- Who are the primary land user groups within the region? - How would you describe your land use priorities in your everyday work? - What are the primary conflicts or most controversial land use issues?

3. Results

The analysis yielded three analytical categories to which statements were allocated: (i) self-perceptions of land user group representatives with regard to sustainability; (ii) sustainability in its three dimensions; and (iii) perceptions of spatial and time scales of sustainability in land use.

3.1. Self-Perception with Regard to Sustainability

The sector representatives displayed various levels of identification with and valuation of the concept of sustainability.

The highest of these levels associated with sustainability were expressed by the forestry stakeholders. Most of the forestry stakeholders viewed sustainability as being central to forestry ever since the term first appeared in von Carlowitz's Sylvicultura Oeconomica 300 years ago [43].

Forestry stakeholders also expressed the most specific definition of sustainability. They referred to sustainable land use in forestry as a combination of "land sustainability"—defined as maintaining the amount of land under forest production—and "biomass sustainability"—defined as maintaining the amount of wood within a forest while simultaneously earning revenue from forest products. While they recognize that sustainability has become a fashionable term applied to many areas of modern life, they focus on its original meaning:

> "…sustainable work guarantees, through careful use of resources, the freedom of choice in the actions of future generations" (FO/OS).

Forestry was declared as sustainable per se because forest managers not only adhere to this tradition but also follow strict rules and regulations regarding what is deemed sustainable (such as Bundeswaldgesetz, Federal Forest Legislation). The forestry stakeholders also stressed their specific sensitivity to the long-term stability of resources and production. Intergenerational equality was mentioned as a cornerstone of sustainability more often by the forestry representatives than by the other land use sector stakeholders.

Agricultural stakeholders emphasized their role in shaping the regional landscape, which they view primarily as a result of their decades-long work.

In a few cases, this perception is intertwined with a sense of interpretative prerogative of how sustainability is defined. Their statements ranged from the notion that farmers are merely improving the cultural landscape of the region to the conviction that farming is inherently sustainable (as long as it is in accordance with laws and regulations):

> "Farmers have an inherent interest in sustainability in agriculture; they don't want to damage soil quality. To not work sustainably is therefore impossible" (AG/UE).

There is an understanding that sustainable land use is essential to farming and is therefore implemented regardless of political frameworks; therefore, there were few references to any guidelines regarding sustainable farming beyond such regulatory frameworks as Cross Compliance, which is part of the CAP.

In addition, statements of self-perception among the agricultural stakeholders focused, among other topics, on the regional farm structure itself, and there were considerable differences from one case study area to the next. Stakeholders from Uelzen and Diepholz favored a diverse structure of small-scale, family-oriented farming as the ideal model for sustainable agriculture. Several practitioners referred to their heritage of several generations of farmers and the idea of sustainability that is embedded therein:

> "My view is shaped by the long tradition of farming in my family. I work to keep this chain of generations intact. I took over the farming business 20 years ago, and I intend to hand it over to my descendants. Therefore, sustainability is by far the most important thing" (AG/UE).

The stakeholders in the eastern German regions expressed a different view, particularly those in Oder-Spree: they did not view the prevalence of large-scale faming as unsustainable in itself:

> "I think stabilizing the agricultural structure with its traditions is important; however, the discussion of small-scale *vs.* large-scale farming, which is mostly imported from the West [of Germany], is not helpful; we do have these large businesses in our region anyway…" (AG/OS).

Aside from farmers' self-perceptions, the agricultural stakeholders in the agricultural sector exhibited the largest degree of sensitivity to the perception of their sector by the public.

Several statements suggested that farmers question the changing image of farming within society. Farming practices enjoy less acceptance by the public, and the stakeholders connected this trend to a lack of first-hand experience with farming even among the rural population:

> "Some twenty years ago, a lot of people could say that their parents worked in agriculture; today, it's their grandparents' generation at best. […] Farming and farmers themselves need to improve their public image" (AG/FL).

The self-perception statements expressed by representatives of water management did not fit any one regular pattern. Irrigation specialists viewed themselves as closely aligned with farmers and therefore shared the views held by farmers regarding land use priorities and development goals. The representatives of water supply companies regarded themselves as entrepreneurs with the specific economic interest of providing high-quality water to households and other businesses. With regard to

land use sustainability, they emphasized the need for access to uncontaminated water supply sources. The representatives of water maintenance associations often positioned themselves between environmental conservationists and the agricultural stakeholders. They provide access to water for farmers, but they also emphasized their role in the maintenance and development of clean water bodies for the benefit of the general population. The objectives of the European Water Framework Directive were often cited as key reference points in their work.

The cross-sector stakeholders largely focused on their contributions to the integration of various land uses to achieve regional sustainability. Sustainable land use should meet the demands of all important user groups and minimize conflicts. In general, the cross-sector stakeholders viewed their role from a regional perspective and stressed the conservation of heterogeneity of the landscape through cooperation and integration:

> "We aim for an integrative approach that includes land use activities with a certain significance, such as forestry, in order to preserve a cultural landscape" (CS/OS).

3.2. Dimensions of Sustainability

Numerous stakeholders' statements explicitly or implicitly referred to one or more of the three dimensions of sustainability: the economic, environmental and social aspects of the concept as set forth by the UN [2]. Therefore, these three dimensions were chosen as analytical categories to examine how the stakeholder groups differ in their perceptions of land use sustainability. Table 3 provides a summary of the results.

Only three of the 60 stakeholders explicitly referred to all three dimensions of the concept and their significance in regional land use. In addition, a limited number of representatives from agriculture and forestry mentioned the multifunctionality of their activities in order to meet societal demands. The forestry stakeholders in particular recognized the role of their sector in welfare provisions, which includes the soil, air, and water conservation functions of the forest as well as recreational activities besides wood production and hunting.

Table 3. Summary of land user groups' view on dimensions of sustainability.

Stakeholders/ dimensions	Agriculture	Forestry	Water Management	Cross-Sector
Economic dimension	Priority: sustainability = availability of productive resources	Priority: sustainability = availability of productive resources	- Focus on location-adapted land use—especially in areas under risk of flooding - Contribution of irrigation to economic performance (CSA specific for Uelzen)	- Diversity of land use structure—"cultural landscapes" - Role of rural production for regional stability (Flaeming and Oder-Spree)/overall economic performance (Diepholz and Uelzen)
Environmental dimension	- Biodiversity—harmful impact of current trends such as increase of energy crops - Conservation of natural, productive resources	- Biodiversity—relation to climate change impacts - "Close-to-nature" forest management	- Biodiversity—harmful impact of current trends such as increase of energy crops - Impact of N deposition (CSA specific for Diepholz)	Landscape diversity; distinctiveness of regional features; ecological networks
Social dimension	- Lack of skilled labor - Farm transition - Role in rural economy *vs.* public image	- Lack of skilled labor - Multifunctionality of goods and services	- Lack of skilled labor - Flood management (CSA specific for Flaeming and Oder-Spree) - Irrigation management (CSA specific for Uelzen)	Impact of demographic development on labor and service provision of rural land use activities

3.2.1. Economic Dimension

In a general sense, land managers, *i.e.*, farming and forestry practitioners, view sustainability primarily as an issue of resource availability or scarcity for rural production. Land managers view themselves primarily as entrepreneurs. Consequently, most of the stakeholders in agriculture and forestry stressed the economic dimension of sustainability. In particular, a number of these stakeholders in Uelzen viewed sustainability as

> "the use of available resources, such as climate, soil, and property, to their optimum from an economic perspective" (AG/UE).

Although they recognized the possibility of conflicts between societal demands and the private interests of the land user, most of the stakeholders in agriculture and forestry in particular emphasized the primacy of their economic objectives.

As a consequence, the scarcity of resources for production was a pressing issue for land managers when discussing land use sustainability, and this issue was often connected with their responsibility to future generations.

Of particular importance among the agriculture and forestry stakeholders in all the case study areas was the scarcity of land as a resource. These stakeholders criticized the loss of agricultural land due to urban development; the agriculture stakeholders in particular emphasized that soil quality and land availability are at the center of their interests:

> "For farmers, soil is the most important thing and they are therefore interested in preserving this resource" (AG/FL).

The finite availability of land was often mentioned as a source of conflict between land user groups. Forestry stakeholders criticized demands from conservation advocates to exclude more forest areas from production, emphasizing the role of forestry and related activities in rural areas in general and the risk of timber shortages to the economy and energy production in particular. In contrast, the conservation stakeholders in the cross-sector groups criticized intense harvesting in certain forests, which focuses heavily on yields and disregards native species, as unsustainable.

However, there was mutual consensus among the stakeholders in all sectors that current land consumption for housing and transportation was harmful to rural land use activities.

The cross-sector stakeholders usually took a more generalized view rather than focusing on specific activities. They also stressed the importance of location-adapted land uses as a basis for sustainable land use, which includes production in areas with favorable conditions:

> "Land use should be aligned with what the region has to offer in terms of site characteristics—soil quality, water supply, climate conditions—rather than narrow [production] interests, which lead to worsening soil qualities and the like" (CS/OS).

In general, the role of rural production in society was emphasized but with slightly different focal points: the stakeholders in Diepholz and Uelzen tended to stress strong agricultural production and refinement as an important pillar of the regional economy. In Flaeming and Oder-Spree, the cross-sector stakeholders focused more on the stabilizing effect that rural production has on regional stability and employment in areas where net population losses and structural economic problems are prevalent. Rural

production in agriculture and forestry was also perceived as a crucial factor in shaping a typical "cultural landscape", which, among other factors, promotes a regional identity and the economic success of, for example, a rural tourism industry.

3.2.2. Environmental Dimension

The environmental aspects of land use have often focused on a balance between various land uses for production and conservation efforts. A majority of the stakeholders emphasized the importance of adapting land uses to site-specific characteristics. There were different views of what constitutes a sustainable distribution of rural production and conservation areas, and these views were largely guided by the particular interests of the land managers themselves. The agriculture representatives stressed the importance of conserving natural resources, particularly soil quality:

> "It's not about just getting as much from your field as possible. You have to conserve the soil for your descendants" (AG/FL).

However, resources are largely perceived as factors of production; therefore, conservation serves to preserve the means of production and enables long-term land use activities. These stakeholders stressed that farmers are agents of conservation because they have a vested interest in maintaining soil quality.

The forestry stakeholders also place production aspects ahead of conservation, at least when considering private forest areas. Conservation efforts are a means to ensure the long-term productivity of forest areas. Site-specific production is emphasized, and forestry is viewed as conservation in itself; all of these stakeholders favored the concept of "close-to-nature forest management".

Furthermore, the importance of biodiversity was stressed by the stakeholders in all of the case study areas, although there were differences in perspectives.

There were numerous mentions of increasing land use for energy crops, particularly maize. In all case study areas, these current trends were criticized as excessive for a variety of reasons: large-scale monocultures of energy crops would lead to more soil degradation if crop rotations are disregarded, decrease genetic diversity, place more pressure on water quality due to increased fertilizer and pesticide applications, decrease biodiversity in general and negatively affect the cultural landscape's image.

The forestry stakeholders emphasized the importance of a diverse range of species and the avoidance of large monoculture forest areas with regard to adaptation to climate change and solving such problems as damage inflicted by large wildlife stocks, which is a problem associated with monoculture.

The stakeholders in agriculture and water management also explicitly mentioned the impact of climate change on land availability. The agricultural stakeholders in Uelzen described the importance of having available agricultural land with appropriate water management measures (such as irrigation) to counter the effects of climate change, such as the succession of stronger droughts and wet periods. The water management stakeholders, particularly those in Oder-Spree, emphasized the need for regional management directed at the effects of increased local and seasonal flooding events as a result of climate change. The stakeholders also stressed the importance of balancing conflicting demands for land and seeking acceptance of necessary conservation measures:

> "Land consumption for coping with climate change impacts has to be constantly emphasized [to the public]. We can only reach consensus if we do not jeopardize the livelihoods of land users in all areas under threat, be it Spree, Neisse or Oder [regional river systems prone to flooding]" (WM/OS).

Water management stakeholders stressed a diverse production structure that is adapted to local site characteristics, particularly in areas susceptible to flooding. In addition to the obvious risks to land use posed by flooding, areas at risk could also present an opportunity to experiment with new activities, such as extensive livestock farming with adapted species, which would increase biodiversity.

The cross-sector stakeholders and representatives of water management emphasized the role of biodiversity in enhancing the image of the regions themselves. Small-scale landscape structures and diverse landscape elements are viewed as valuable features. These stakeholders also focused on the importance of conserving the genetic diversity and distinctiveness under specific regional conditions. Many activities for conserving diversity were cited and ranged from maintaining crop rotations to land set-asides for conservation.

3.2.3. Social Dimension

The social dimension of sustainability played a considerably smaller role among the interviewed stakeholders. Most references were made to the image of rural production in the public eye, which was perceived as being at odds with increasing societal demands on rural production. The agricultural stakeholders stated that they face increasing demands regarding product quality and environmental standards while facing constant criticism for increasing food prices and public subsidies for agriculture. In addition to food and energy production, the agricultural stakeholders mentioned the services they provide, including maintenance and development of the cultural landscape, employment in rural areas and the consequent stability of rural communities; these services were particularly mentioned in Flaeming and Oder-Spree. Several agricultural stakeholders in all regions criticized the poor public image and the lack of acceptance of agricultural activities, a problem which requires improvement in communication and public relations work.

The forestry stakeholders once more focused on the multifunctionality concept and explicitly included the recreational functions of forests, which serve social welfare by providing opportunities to enjoy outdoor activities.

Regarding the regional socio-economic structure in the case study areas, stakeholders from all sectors emphasized problems stemming from the lack of skilled labor, out-migration, the decreasing interest among young people to work in agriculture and problems with farm transition. These tendencies are perceived as serious threats not only to farm and forest enterprises but to rural communities in general, where industrial and service jobs are already in short supply:

> "[… E]mployment and sustainability are connected; in particular, young people are leaving the rural areas. Seventy years from now, we will have almost no young people in the countryside, and our communities will be in deadly peril" (FO/UE).

The cross-sector stakeholders in particular referred to the negative impacts of demographic changes on the labor and services that rural areas provide to society.

The agricultural stakeholders in Oder-Spree explicitly mentioned cooperation between farms and schools in rural areas to increase interest in agriculture as an effort to address these problems.

3.3. Spatial and Time Dimensions of Land Use Sustainability Perceptions

When discussing their roles as agents of sustainability, the stakeholders among the various land user groups tended to argue with regard to specific spatial and time scales.

Given the spatial limitations inherent in a case study approach, most of the discussions focused on topics specific to a given case study area. Most comments on the spatial perspective of sustainability therefore concerned the land user's sphere of action—primarily the regional land use activities that the stakeholders represented.

In general, the land managers in forestry and agriculture displayed a stronger local focus. They often shared insights into their work environments, e.g., regarding soil and water quality, key products, and local competition between businesses. However, several of the stakeholders specifically mentioned the spatial frame of reference in which the sustainability of certain land uses needs to be assessed. Statements of the representatives in Uelzen in particular emphasized the role of the regional agricultural system in the international economy. A region with favorable conditions needs to take advantage of these conditions and bring them to economic fruition so that other, less-favored regions do not need to be burdened with inappropriate land uses.

> "It's about intensification of agriculture up to a point where we achieve food security—for ourselves, but also for Europe and the rest of the world. If we can use the soil and water here, we should do it and not somewhere else where it's less sustainable" (AG/UE).

The stakeholders in Flaeming and Oder-Spree did not focus as strongly on the integration of rural production into international markets. More emphasis was placed on the spatial impact of political decision-making, *i.e.*, the large influences of the EU Common Agricultural Policy (CAP) and various conservation laws at the national level. According to these stakeholders, the views of sustainable land use therefore should not only focus on the regional level.

With regard to time scales, the intergenerational character of sustainability was expressed by most of the stakeholders. Sustainability is generally associated with long stretches of time by nearly all land use stakeholders in all regions. In some cases, "long-term development" was used as a synonym of sustainable land use.

However, there were differences in what is regarded as "long-term", and these differences were more evident between land use sectors than between regions.

The stakeholders in forestry referred to time periods of 100 years or more when discussing long-term sustainability, due to the long production cycles in forest production.

The water management stakeholders often mentioned a time span of "30 years or more" when referring to long-term sustainability, usually in connection with water pollution and cleanup efforts.

In contrast, the agriculture stakeholders usually mentioned shorter periods of time. These stakeholders emphasized flexibility in adapting to changing conditions in the future, due to comparatively short production cycles. A few of the agriculture stakeholders focused on the duration of political programs such as the CAP and their roles in providing stable conditions for land users' decision making:

> "There has to be a certain amount of reliability so that [farmers] know how to plan for the long run. While the [CAP] period of 2005–2013 was fairly stable and predictable, we do expect the same for the period of 2014 and onward" (AG/OS).

Beyond the time-span taken into account when discussing long-term sustainability, another difference was whether the perspective was forward and/or backward oriented. The stakeholders in agriculture tended to emphasize future challenges. Their focus was on the availability of limited natural resources for future agricultural production, such as topsoil and water for irrigation.

The stakeholders in forestry and water management explicitly mentioned the consequences of land use decisions in the past and their impacts on current land management when discussing sustainability, albeit from different perspectives. The forestry stakeholders acknowledged that they harvest timber resources that their predecessors nurtured. The water management stakeholders are constantly made aware of the consequences of past actions, e.g., fertilizer and pesticide use, on current water quality:

> "We do have to take long-term consequences into account. Everything that was spilled on the fields for 30 years can be found in today's groundwater. […] [The consequences of] everything that is not sprayed [onto the soil] today can be measured in the groundwater in the long run" (WM/DH).

The forestry and water management stakeholders also focused more strongly on the explicit effects of today's land use activities on future generations when discussing long-term sustainability. Long-term consequences of today's land management decisions were often discussed in the context of future framework development, such as the impacts of climate change and changes in policies targeting rural land use (such as the EU Common Agricultural Policy).

4. Discussion

The results described above indicate that the perceptions of land use sustainability and their contributions to self-perception differ more between land user groups than between stakeholders in different regions.

The land managers in the agricultural and forestry sectors have a strong sense of their roles as agents of sustainable land use. In particular, the forestry stakeholders displayed a strong sense of identification with the concept of sustainability; the long tradition of sustainability has led to a sense of ownership and serves as a strong factor in forming their group identity.

The agricultural stakeholders referred less explicitly to sustainability. However, they tend to see their work as inherently sustainable and as a "best practice" of land management as a result of the long tradition of agricultural production. Unlike in the forestry group, the group identity among agricultural stakeholders with regard to sustainability appears to be the result of self-separation from other interest groups. Other studies, e.g., of hog production, have revealed considerable differences between farmers and other stakeholder groups in assessing certain agricultural activities as assets or liabilities with regard to sustainable land management [44]. There is great sensitivity among farmers regarding these perceptions, primarily the acceptance—or lack thereof—of farming activities by the general public combined with a sense that their own experience and knowledge concerning sustainable land use needs to be better appreciated. This theme in the discussions among agricultural land managers has also been

observed in other geographic contexts [45]. These findings from the agricultural and forestry sectors also support findings by Burgess *et al.* [19]: the concept of sustainability, in this case, is understood and incorporated in a certain way by stakeholder groups while these groups simultaneously contest the understanding of other groups.

The findings from the interviews with water management and cross-sector stakeholders were less coherent, primarily due to the diverse situations of these groups. However, among the cross-sector stakeholders, there was a coherent sense of their responsibility to balance conflicting interests and pressures on land use and a sense of their role as mediators in all regions; an understanding of sustainability in land management which was mentioned less often by the other stakeholder groups.

With regard to the three dimensions of sustainability, the strong emphasis on the economic dimension by the study participants stands out. Sustainability is primarily understood as the long-term availability of productive resources, particularly by the land managers in agriculture and forestry. Land is mostly viewed as a productive resource, and land use aspects are assessed from a functional viewpoint and reflect group preferences, as previously reported in the literature [46]. Environmental issues are taken into consideration but with an emphasis on their contributions to preserving such productivity factors as soil quality. In fact, such environmental aspects as biodiversity are often viewed as a proxy for resource availability. Again, the interpretations of these dimensions of sustainability are primarily based on work experiences among the land managers; it is interest driven and thus potentially subject to struggles for interpretational prerogative in future collaborative land management efforts.

The fact that the social dimension of sustainability received less emphasis is consistent with the findings of other studies of the social aspects of rural production [47]. The reflections of the stakeholders fit a pattern of supply and demand. On the one hand, there is a demand for skilled labor by land managers, which is growing increasingly difficult to satisfy in the case study areas. On the other hand, there is a wide range of products and services supplied by rural production, which is perceived to be unappreciated by consumer groups and decision-makers. The stakeholders in agriculture and forestry discussed this disparity with a strong focus on their particular efforts, whereas the cross-sector stakeholders referred more to the general range of services provided by rural areas.

When comparing differences in understandings and usages of the term sustainability, the analysis indicated greater conformity within user groups than within regions. Self-perceptions and emphases on aspects of sustainability among the analyzed stakeholder groups were consistent across all regions. The sector traditions and work experiences appeared to be more important than a regional sense of identity. This trend was evident when the stakeholders discussed topics whose scope spanned more than one region, such as the challenge of increased energy crops.

However, regional socio-economic structures do have an impact on perceptions. The land managers in Uelzen and Diepholz, where agriculture is more competitive and more strongly integrated with international markets, place more emphasis on economic performance. In Flaeming and Oder-Spree, agriculture was more often discussed in a context of providing regional stability in otherwise economically struggling areas. In these two case study areas, such issues as recreational activities and a diverse landscape structure were more strongly emphasized. In that regard, our analysis supports findings by Aerni *et al.* [27].

In contrast, the specific land use issues in a region affect who takes part in conversations and how groups are set against one another or align themselves with specific interests. In a more general sense,

we may conclude that group affiliations shape mindsets regarding land use sustainability, whereas specific regional issues shape the arena in which negotiations and redefinitions of concepts and perceptions take place.

Variations in stakeholders' perceptions of time and spatial scales of sustainability emerged as a noteworthy issue in the analysis. The variations in the length of production cycles and related management decisions led to focuses on different time frames, particularly among land managers in agriculture and forestry. Production systems in forestry are less flexible over time, thereby requiring a long-term perspective. In contrast, agricultural production takes place over shorter cycles and is sensitive to innovations, e.g., seed development, thereby causing farmers to be more flexible. Agricultural production also depends more heavily on subsidies, which change over shorter periods of time. Water pollution impacts and cleanup processes evolve over decades, causing water management stakeholders to be more sensitive to long-term management and the impacts of past management decisions.

Similarly, the perceptions of spatial scales of sustainability correlate with practical experiences in the workplace. The cross-sector stakeholders working in regional administration tend to focus their attention on the region itself. Farmers and forest managers who produce for international markets take into account developments on a global scale more than do producers who are more strongly integrated in intraregional production chains.

The implications for collaborative sustainable land management strategies are significant. Variations in perceptions of time and spatial dimensions should be taken into consideration and be disclosed to avoid misunderstandings between user groups. The challenge of finding common ground for consensual guiding principles and subsequent strategies is made more complex when different time and spatial scales are involved. We concur with Hamilton and Wills-Toker [14] in their emphasis on acknowledging differences in worldviews among stakeholders; any effort to develop consensus-oriented approaches to sustainable land management needs to address these disparities.

There has been a certain amount of scientific reflection on the connections between space, time and environmental sustainability [3] and examination of ways in which biophysical processes, such as energy, air, water and soil nutrient flows, impact agroecosystem sustainability on various time and spatial scales [48]. We argue that the perceptions of sustainability on various scales held by land use stakeholders are equally important and need to be reflected in subsequent processes aimed at integrating stakeholders in sustainable land management strategies.

In our analysis, we intentionally omitted other factors, such as path dependencies associated with land management practices in the past. Research suggests, for example, that regional history and traditions of certain land use activities affect their perceptions held by stakeholder groups [49]. Although we acknowledge such impacts, their inclusion in this analysis was beyond the scope of this study.

In addition, the chosen methodological approach has its limitations. Study results cannot be seen as representative for all case study areas and all stakeholder groups. While semi-structured interviews combine the benefits of a structured set of topics and questions to ensure a certain level of comparability between interviews with the freedom to explore new issues and assessments based on the respondents' expertise, there are risks involved. Strategic answers by respondents with a certain agenda or mixed positions provided by stakeholders who represent more than one stakeholder group in the regional land use context can result in biases in the information obtained. These biases, while being reduced through a broader sample with several interviews per stakeholder group, control techniques in the face-to-face

situations, and the additional validation through stakeholder workshops, nevertheless cannot be completely eliminated. Other analytical approaches, such as indicator-based assessment of sustainability perception may improve comparability of the results. Nevertheless, we decided to base our analysis on an exploratory approach based in Grounded Theory in order to include a broad range of topics and perceptions important from the perspective of the stakeholders themselves.

5. Conclusions

This study examined differences in attitudes toward SLM among relevant land user groups. Our study objectives were to examine how land use sustainability is perceived and how the perceptions of sustainability affects the views of land management held by stakeholders from different land use sectors and different regions with specific biophysical and socio-economic structures. An exploratory case study approach was selected, in which we targeted stakeholders in agriculture, forestry, water management and cross-sector stakeholders in four rural districts in northern Germany.

The results indicate that differences in attitudes toward sustainability were driven to a great extent by the different experiences and circumstances of the land user groups and to a lesser extent by differences in the regional socio-economic setting, particularly with regard to production issues. The self-perception of being advocates of sustainable development was prevalent among all the groups. In particular, the forestry stakeholders identify strongly with the concept due to its historic place in forestry. However, the interpretations of what sustainability encompasses in specific land use activities differed widely due to the following factors: (i) differences in interests due to land use activities; (ii) differences in the perceived importance of sustainability dimensions; and (iii) differences in the perceptions of time and spatial scales when discussing sustainability.

These differences need to be carefully examined and compared when sustainable management on a regional level is intended to include all relevant land user groups, thereby promoting consensus and cooperation. Conflicts based on the different understandings of concepts among stakeholders can inhibit the shaping and implementation of land management strategies.

The analysis also shows, however, that, even given different priorities based on group interest, stakeholders are sensitive to the different dimensions of sustainability and their own contributions thereto. A focus on how rural production activities can strengthen all three dimensions of sustainability through the provision of various ecosystem services can be a basis for rural policy development and has been picked up by current EU support programs. The analysis of stakeholder perceptions can assist in paving the way toward common strategies by pointing out potential roadblocks as well as common ground for consensus solutions.

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Author Contributions

All authors developed the study design; Andrej Lange and Tim Barkmann collected the data; Andrej Lange analyzed the data and wrote the paper; Rosemarie Siebert contributed to paper structure and provided extensive revision.

Conflicts of Interest

The authors declare no conflict of interest.

References

1. World Commission on Environment and Development (WCED). *Our Common Future*; Oxford University Press: Oxford, UK, 1987.
2. United Nations. *2005 World Summit Outcome*; Resolution Adopted by the General Assembly, A/RES/60/1; United Nations: New York, NY, USA, 2005.
3. Brown, B.J.; Hanson, M.E.; Liverman, D.M.; Merideth, R.W. Global sustainability: Toward definition. *Environ. Manag.* **1987**, *11*, 713–719.
4. Shearman, R. The meaning and ethics of sustainability. *Environ. Manag.* **1990**, *14*, 1–8.
5. Giddings, B.; Hopwood, B.; O'Brien, G. Environment, economy and society: Fitting them together into sustainable development. *Sustain. Dev.* **2002**, *10*, 187–196.
6. European Commission, DG Agriculture and Rural Development. *Overview of CAP Reform 2014–2020*; Agricultural Policy Perspectives Brief No. 5; European Commission: Brussels, Belgium, 2013.
7. European Commission. *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. The CAP Towards 2020: Meeting the Food, Natural Resources and Territorial Challenges of the Future*; COM(2010)672 final; European Commission: Brussels, Belgium, 2010.
8. European Parliament. *Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 on Support for Rural Development by the European Agricultural Fund for Rural Development (EAFRD) and Repealing Council Regulation (EC) No 1698/2005*; European Parliament: Strasbourg, France, 2013.
9. Federal Ministry of Food and Agriculture Germany. Support & Agricultural Social Policy. Available online: http://www.bmel.de/EN/Agriculture/Support-AgriculturalSocialPolicy/_Texte/FoerderungEinleitung.html (accessed on 5 December 2014).
10. Matzdorf, B.; Meyer, C. The relevance of the ecosystem services framework for developed countries' environmental policies: A comparative case study of the US and EU. *Land Use Policy* **2014**, *38*, 509–521.
11. The World Bank. *Sustainable Land Management. Challenges, Opportunities, and Trade-Offs*; The World Bank: Washington, DC, USA, 2006.

12. Eppink, F.V.; Werntze, A.; Mäs, S.; Popp, A.; Seppelt, R. Land Management and Ecosystem Services. How Collaborative Research Programmes Can Support Better Policies. *Gaia Ecol. Perspect. Sci. Soc.* **2012**, *1*, 55–63.
13. Schwilch, G.; Bachmann, F.; Valente, S.; Coelho, C.; Moreira, J.; Laouina, A.; Chaker, M.; Aderghal, M.; Santos, P.; Reed, M.S. A structured multi-stakeholder learning process for Sustainable Land Management. *J. Environ. Manag.* **2012**, *107*, 52–63.
14. Hamilton, J.D.; Wills-Toker, C. Reconceptualizing Dialogue in Environmental Public Participation. *Policy Stud. J.* **2006**, *34*, 755–775.
15. Healey, P. Spatial planning as a mediator for regional governance : Conceptions of place in the formation of regional governance capacity. In *Regional Governance. New Modes of Self-Government in the European Community*; Fürst, D., Knieling, J., Eds.; Academy for Spatial Research and Planning (ARL): Hannover, Germany, 2002; pp. 13–25.
16. Hurni, H. Assessing sustainable land management (SLM). *Agric. Ecosyst. Environ.* **2000**, *81*, 83–92.
17. Beierle, T.C. The quality of stakeholder-based decisions. *Risk Anal.* **2002**, *22*, 739–749.
18. Grimble, R.; Wellard, K. Stakeholder Methodologies in Natural Resource Management: A Review of Principles, Contexts, Experiences and Opportunities. *Agric. Syst.* **1997**, *55*, 173–193.
19. Burgess, J.; Clark, J.; Harrison, C.M. Knowledges in action: An actor network analysis of a wetland agri-environment scheme. *Ecol. Econ.* **2000**, *35*, 119–132.
20. Harrison, C.M.; Burgess, J.; Clark, J. Discounted knowledges: Farmers' and residents' understandings of nature conservation goals and policies. *J. Environ. Manag.* **1998**, *54*, 305–320.
21. Glass, J.H.; Scott, A.J.; Price, M.F. The power of the process: Co-Producing a sustainability assessment toolkit for upland estate management in Scotland. *Land Use Policy* **2013**, *30*, 254–265.
22. Reed, M.S.; Hubacek, K.; Bonn, A.; Burt, T.P.; Holden, J.; Stringer, L.C.; Beharry-borg, N.; Buckmaster, S.; Chapman, D.; Chapman, P.J.; *et al*. Anticipating and Managing Future Trade-offs and Complementarities between Ecosystem Services. *Ecol. Soc.* **2013**, *18*, Article 5.
23. Ioris, A.A.R.; Hunter, C.; Walker, S. The development and application of water management sustainability indicators in Brazil and Scotland. *J. Environ. Manag.* **2008**, *88*, 1190–1201.
24. Kurka, T.; Blackwood, D. Participatory selection of sustainability criteria and indicators for bioenergy developments. *Renew. Sustain. Energy Rev.* **2013**, *24*, 92–102.
25. Buchholz, T.; Luzadis, V.A.; Volk, T.A. Sustainability criteria for bioenergy systems: Results from an expert survey. *J. Clean. Prod.* **2009**, *17*, S86–S98.
26. Aerni, P. What is sustainable agriculture? Empirical evidence of diverging views in Switzerland and New Zealand. *Ecol. Econ.* **2009**, *68*, 1872–1882.
27. Aerni, P.; Rae, A.; Lehmann, B. Nostalgia *versus* Pragmatism? How attitudes and interests shape the term sustainable agriculture in Switzerland and New Zealand. *Food Policy* **2009**, *34*, 227–235.
28. Van de Kerkhof, M.; Groot, A.; Borgstein, M.; Bos-Gorter, L. Moving beyond the numbers: A participatory evaluation of sustainability in Dutch agriculture. *Agric. Hum. Values* **2010**, *27*, 307–319.
29. Gilg, A. Perceptions about land use. *Land Use Policy* **2009**, *26*, S76–S82.
30. Williams, K. Relative acceptance of traditional and non-traditional rural land uses: Views of residents in two regions, southern Australia. *Landsc. Urban Plan.* **2011**, *103*, 55–63.
31. Warren, C.R.; McFadyen, M. Does community ownership affect public attitudes to wind energy? A case study from south-west Scotland. *Land Use Policy* **2010**, *27*, 204–213.

32. Jones, C.R.; Eiser, J.R. Identifying predictors of attitudes towards local onshore wind development with reference to an English case study. *Energy Policy* **2009**, *37*, 4604–4614.
33. Mann, S.; Kögl, H. On the acceptance of animal production in rural communities. *Land Use Policy* **2003**, *20*, 243–252.
34. Smith, J.M.; Parsons, R.L.; Van Dis, K.; Matiru, G.N. Love thy neighbor—But does that include a six hundred eighty-four cow dairy operation? A survey of community perceptions. *J. Dairy Sci.* **2008**, *91*, 1673–1685.
35. Devine-Wright, P. Rethinking NIMBYism: The Role of Place Attachment and Place Identity in Explaining Place-protective Action. *J. Commun. Appl. Soc. Psychol.* **2009**, *19*, 426–441.
36. Van der Horst, D. NIMBY or not? Exploring the relevance of location and the politics of voiced opinions in renewable energy siting controversies. *Energy Policy* **2007**, *35*, 2705–2714.
37. Grimble, R.; Chan, M.-K. Stakeholder analysis for natural resource management in developing countries. *Nat. Resour. Forum* **1995**, *19*, 113–124.
38. Miles, M.B.; Huberman, A.M. Qualitative Data Analysis. In *An Expanded Sourcebook*, 2nd ed.; Sage: London, UK, 1994.
39. Patton, M.Q. *Qualitative Research and Evaluation Methods*, 3rd ed.; Sage Publications: Thousand Oaks, CA, USA, 2002.
40. Bogner, A.; Menz, W. Das theoriegenerierende Experteninterview. In *Das Experteninterview. Theorie, Methode, Anwendung*, 2nd ed.; Bogner, A., Littig, B., Menz, W., Eds.; Verlag für Sozialwissenschaften: Wiesbaden, Germany, 2005; pp. 33–70. (In German)
41. VERBI Software GmbH. *MAXQDA 10*; Software for Qualitative and Mixed Methods Data Analysis; VERBI Software: Berlin, Germany, 2010.
42. Corbin, J.M.; Strauss, A. Grounded theory research: Procedures, canons, and evaluative criteria. *Qual. Sociol.* **1990**, *13*, 3–21.
43. Carlowitz, H.C., von, Hamberger, J., Eds. *Sylvicultura Oeconomica oder Haußwirthliche Nachricht und Naturmäßige Anweisung zur Wilden Baum-Zucht*; Oekom Verlag: Munich, Germany, 2013.
44. Petit, J.; van der Werf, H.M. Perception of the environmental impacts of current and alternative modes of pig production by stakeholder groups. *J. Environ. Manag.* **2003**, *68*, 377–386.
45. Cocklin, C.; Mautner, N.; Dibden, J. Public policy, private landholders: Perspectives on policy mechanisms for sustainable land management. *J. Environ. Manag.* **2007**, *85*, 986–998.
46. Swanwick, C. Society's attitudes to and preferences for land and landscape. *Land Use Policy* **2009**, *26*, S62–S75.
47. Boogaard, B.K.; Boekhorst, L.J.S.; Oosting, S.J.; Sørensen, J.T. Socio-cultural sustainability of pig production: Citizen perceptions in the Netherlands and Denmark. *Livest. Sci.* **2011**, *140*, 189–200.
48. Fresco, L.O.; Kroonenberg, S.B. Time and spatial scales in ecological sustainability. *Land Use Policy* **1992**, *9*, 155–168.
49. Ní Dhubháin, Á.; Fléchard, M.-C.; Moloney, R.; O'Connor, D. Stakeholders' perceptions of forestry in rural areas—Two case studies in Ireland. *Land Use Policy* **2009**, *26*, 695–703.

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