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Integration of Acceptability Analyses into an Adaptive Landscape Co-Design and Management Approach—The Acceptability and Landscape Design Cycle (ALDC)

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Abstract: Acceptability analyses of place–based innovations provide crucial in-depth knowledge (e.g., perceptions and values on landscapes) for the social–ecological transformation of landscapes. However, previous acceptability analyses often neglected complex and ongoing processes. We argue that, for the design of a sustainability-oriented transformation and to address spatial and temporal dynamics in landscapes, an operational heuristic is needed; one that integrates acceptability analyses into an adaptive landscape co-design and management approach. Therefore, this conceptual–empirical paper introduces the concept of the 'acceptability and landscape design cycle' (ALDC), which is based on findings from various transdisciplinary innovation processes in the Spreewald region (Germany). It is composed of four iterative phases: (1) defining the preconditions for acceptability analysis, (2) conducting the acceptability analysis, (3) integrating the results into the landscape development strategy, and (4) re-designing and refining it. We illustrate the application of these phases using a case study of the cultural landscape in Spreewald. The paper provides practical implementation guidelines of the ALDC and contributes to a better understanding of the dynamics of acceptability decisions regarding the transformation processes of landscapes. Furthermore, it can advance the understanding of how co-evolution of socio-ecological systems occurs.

Keywords: recursive patterns of acceptability; acceptance; landscape design; social learning; iterative innovation processes; collaborative decision-making; social–ecological transformation; Germany

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1. Introduction

Nowadays, landscapes are in a constant state of change resulting from manifold, pressing challenges such as dealing with climate change, agricultural production, biodiversity loss, etc. [1]. At the same time, landscapes worldwide are either under pressure from agricultural intensification or threatened by land abandonment [2]. Such complex situations in landscapes require well-thought design and governance processes as well as adequate management that enables the balancing of the different challenges and demands of a social–ecological transformation of these landscapes [3–5]. Social–ecological transformation means a strategic, long-term and substantial change of social–ecological systems by taking into account the entanglement of societies and nature [5,6]. Often, such transformation processes in landscapes are initiated and orchestrated by landscape-managing institutions, joint regional research projects, or public-funded organisations that, first, bring innovative ideas as a starting point to address local sustainability challenges. However, it is crucial that these innovations are place-based and widely accepted but not forced from the outside or only tested by a small number of innovative actors [4,7]. Place-based

innovations refer to novel solutions that are developed by local actors and specifically tailored to a certain region or landscape. They differ from 'external innovations' that are ready-made and brought from external actors without considering local needs. Place-based innovations can range from novel technical solutions (e.g., biomass heating plants) to new forms of landscape governance (e.g., the collective management of peatland). Even if such innovations are co-designed by representatives of various interest groups, their broad acceptance by users or all affected actors is not automatically given but it is still an important precondition for the successful implementation of innovations at landscape scale and, thus, for promoting the social–ecological transformation. In other words, a small number of innovative users is often not enough to achieve the desired social–ecological transformations. Thus, more innovation users are needed than were involved in the innovation co-development process to achieve scaling out effects [8] at landscape level. We argue that only in-depth knowledge of whether and why actors accept or reject innovations, innovation processes and social-ecological transformation can be handled in a way that is socially desirable, integrative, and sustainability-oriented. Gaining and reflecting this in-depth knowledge is targeted by acceptability analyses, which are able to reveal actors' innovation-related factors and how the complex interplay of these factors lead to personal but socially embedded decisions on any kind of place-based or 'external' innovation (Figure 1). This means that acceptability analyses explore complex socially constructed phenomena (without a fixed set of methods), whereas acceptance is one positive acceptability degree [9–11]. The results of such acceptability analyses provide helpful information for landscape coordinators and sustainability managing (public) institutions on how to integrate adequately actors' interests, demands, and concerns in finding best solutions (e.g., in co-design processes). Such knowledge of local socio-economic perspectives, as a kind of social monitoring, is also needed—additionally to the monitoring of the ecological status of ecosystems—to develop a suitable strategy for the social–ecological transformation of landscapes. This form of acceptability analysis is conceptualized very differently from the type applied by, e.g., private companies that merely aim at increasing or even forcing acceptance of ready-made external innovations. The here proposed form of acceptability analysis supports the step-by-step development of solutions that create user ownership and trust, promote place-based co-design and stewardship, and build on broad local knowledge and acceptance.

However, studies on acceptability in the field of land use are mostly stand-alone and ephemeral 'snapshot' analyses conducted in one specific moment in the innovation process. They neglect that actors' decisions are often temporary and can vary over time through changing framing conditions (e.g., novel regulations and policies, funding programmes or unexpected environmental changes) and conditions that influence the practicable application of an innovation (e.g., new opportunities for business cooperation, the emergence of regional economic value creation or existence of regional best practice examples). However, deep social values and personal beliefs do not change quickly and are, therefore, rarely a trigger for changing actors' decisions and scaling this innovation deeply [8].

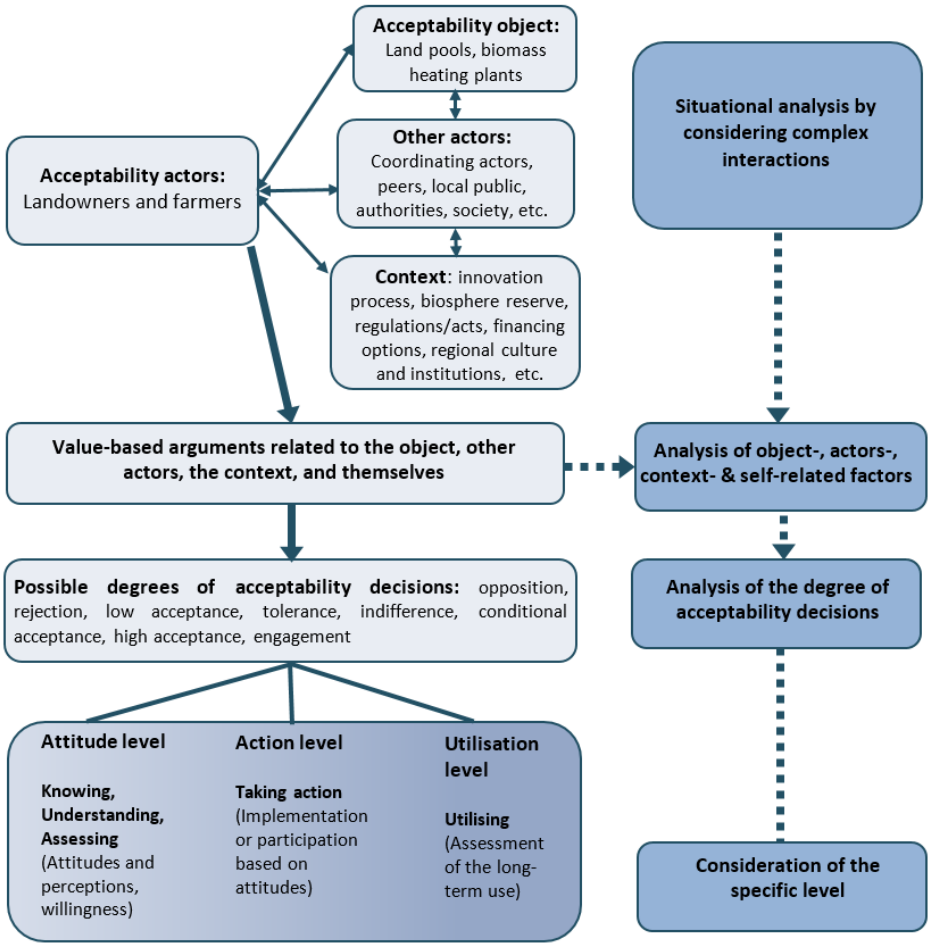

Figure 1. Conceptual framework of acceptability from a sociological perspective applied in the analysis of the land pools and biomass heating plants (own compilation, adapted from [9] in accordance with [11–15]). **Left side**: In the acceptability process, actors relate to the acceptability object, the arguments of the other involved actors and the place-based context. These interactions are the basis for value-based arguments that lead to the actors' acceptability decision. These acceptability decisions can be assigned to a particular degree and be made on a certain level. **Right side**: Researchers should take into account this complexity when analysing acceptability. This includes the analysis of the specific situation, complex interactions, and the analysis of factors.

Due to this temporality, we can assume that another 'snapshot' analysis at a different moment would also lead to partly different results. These dynamics—so-called 'recursive patterns of acceptability' [16]—should be adequately addressed to better understand the complex dynamics and real-world settings in landscapes. Even if some studies already implicitly recognise such dynamics, they are not substantially and comprehensively considered due to the constrains regarding methodology, complexity or project timelines. Unfortunately, Ganzevles et al. [16] or other researchers do not describe in detail how to cope with the 'recursive patterns of acceptability'. Until now, it has been an underexposed but necessary topic in scientific debates and the literature on innovations in social–ecological systems.

Furthermore, acceptability analyses are, in most cases, part of a broader project or a complex social–ecological issue and may indicate co-evolutionary processes in society–nature interactions. We, therefore, argue that taking into account the "recursive patterns of acceptability" can advance the understanding of how the co-evolution of socio-ecological systems occurs. Our experiences in recent research projects have taught us that integrating the results of acceptability analyses into the broader context of social–ecological transformation processes and their dynamics is a crucial step. Important questions in this sense are as

follows: (1) how do acceptability decisions change in the course of the transformation and innovation processes; (2) what role do complex actors' constellations (including diverging values and beliefs) play in determining the acceptability of place-based innovations; and (3) how can complementary innovations be effectively spatially allocated within a specific landscape considering acceptability decisions.

More theoretically expressed, the integration of acceptability analyses should be understood as an ongoing adaptive process since innovations are also developed in non-linear processes, where social–ecological interdependencies within landscapes are shaped by continuous change. Additionally, we derive the need for an integrative heuristic model from the fact that insights from landscape co-design [17,18] and adaptive co-management [19–22], landscape development of protected areas [23], and social impact assessment play, at most, an indirect role in recent acceptability analyses but are still not conceptually embedded. On the other hand, acceptability analyses are still not adequately considered in the abovementioned approaches or recommended as an external and standardized social assessment. We argue for in-depth acceptability analyses as a basis for the active involvement of local people in landscape development strategies. Furthermore, these approaches often stick to general principles of inclusiveness and social justice [22,23] without proposing how such a social integration can be performed in detail. However, it is widely acknowledged that new analytical tools and pro-active landscape governance approaches with an iterative step-wise procedure are required; ones that include a broad range of regional actors to better understand, identify, and assess future development options of landscapes [1].

To narrow these gaps and to answer the question mentioned above, the aim of this empirical–conceptual paper is to introduce a new model that integrates acceptability analyses in adaptive landscape co-design and management processes. This model is called the 'acceptability and landscape design cycle' (ALDC). It is mainly suitable for place-based innovations that contribute to the social–ecological transformation of landscapes. The model was inductively developed from our lessons learnt from the case study on the cultural landscape Spreewald (Germany) and is based on the empirical acceptability analyses that have been published recently [9,24,25]. As a central part of this conceptual–empirical paper, we describe the different phases of the ALDC model and illustrate them using the abovementioned case study region.

2. Material and Methods for Developing the ALDC Model

We developed the ALDC model on the basis of a multi-year, multiple-case study on landscape change in the Spreewald region. The Spreewald region in Eastern Germany is a historically grown cultural landscape with diverse land uses and landscape elements such as ditches, riparian strips, forests, wetland meadows, and arable land (Figure 2). For visitors and locals, this landscape has a high value, not only referring to economic income (e.g., for the tourism sector) but also as a place with a unique biodiversity and cultural heritage. Due to this unique cultural–historical significance and the mosaic-like composition, large parts of the Spreewald regional were declared a UNESCO biosphere reserve in 1990. The often small-scaled wetland meadows with mineral and peat soil grasslands are elements of high nature value. The small meadows were traditionally mown by hand and the hay was fed to the animals on the farm, while large areas of contiguous grassland were also grazed. In recent decades, there has been a land use change towards more grazing and less mowing by hand. This has led to the abandonment of many small-scaled meadows, which is seen as an increasing social–ecological challenge in the region as it causes drastic biodiversity losses and changes the landscape scenery. The reasons for the non-use are manifold: farms lack successors, farmers have no use for nutrient-poor hay anymore, the mowing process becomes more complicated, and farmers have had cutbacks in public funding. The current dramatic situation calls for finding a new landscape development strategy to cope with regional social–ecological problems.

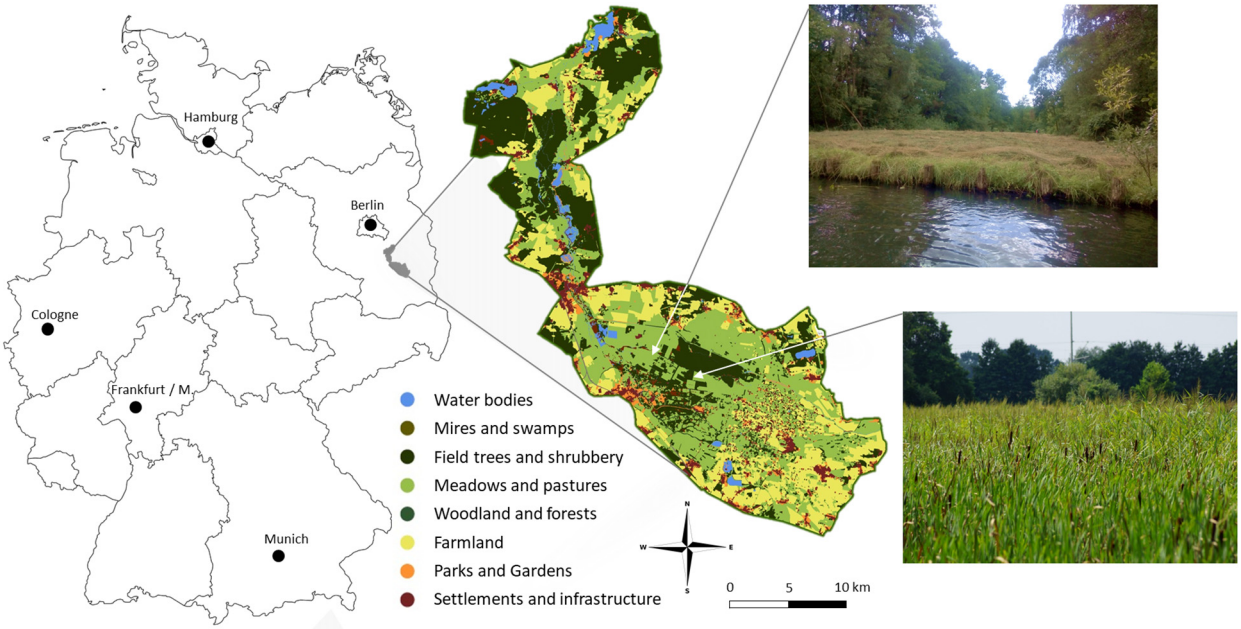

Figure 2. The localization of the Spreewald region in Germany with the UNESCO biosphere reserve as the core part of this region. The map shows the diverse mosaic of land uses in the Spreewald region on the basis of biotope mapping. Wetland meadows are an essential land use type that is under threat of abandonment; photos illustrate a traditionally mowed small-scaled wetland meadow (above) and a non-used wetland meadow overgrown with reed (below). Own compilation.

In this region, we performed two acceptability analyses and one about the preconditions for a collaborative landscape management process between 2015 and 2018 [9,24,25]. From these previous, separately analysed and published case studies, we drew inductive cross-case conclusions [26], applying the following steps:

1. We interpreted each case study result according to the questions: What do the results of each acceptability study mean for achieving the overall transformational goal and landscape strategy? What do we learn from the specific case on the patterns of acceptability?
2. We related the interpretations of the single-case studies to each other using a matrix on similarities and differences. In particular, the following identified similarities between these three single-case studies served for cross-case conclusions at the regional level for the Spreewald region: (a) acceptability decisions are based on environmental and ethical values, economic considerations, and the perceived fairness of the innovation process; (b) acceptability decision are not stable and may change over time (="recursive pattern of acceptability"); (c) none of the considered innovations has the acceptance potential to solely achieve the transformational goal. However, if these innovations are better adapted to local needs, and then combined, they could release greater potential. The potential of future versions of the innovations should be further analysed by acceptability analyses.
3. We derived cross-case conclusions for the Spreewald case region and discussed their transferability to other cases, considering our manifold practical and academic experiences from similar research projects to reduce context-specific bias: There is a need to integrate acceptability analyses into the landscape design and management. To do so, operational model-building can be applied because it is an approved synthesis and integration technique for complex social–ecological problems [27,28].
4. Finally, we built and discussed the operational model considering that the prototype should be general and comprehensive in order to be tested in other cases. Our prototype model is based on the need in conservation planning for a stage operational model that integrates different disciplines, approaches, implementation strategies, and

actors to facilitate action research, document processes, and justifies decision-making by actor empowerment [28]. The specific set-up of the stages is oriented on a classical planning approach (with current state analysis and data collection/assessment), but also includes feedback loops and flexibility to address process orientation and adaptability need. The specific theoretical references that serve as foundation for the ALCD are described in Table 1 in more detail, in the four phases of the model (see result section).

Table 1. Concepts in social–ecological research that inspired the ALDC model.

Concepts in Socio-Ecological Research	Relevant Aspects for the ALDC Model
Innovation system thinking and social ecological relations [4,6,7,29]	• Social–ecological transformation of landscapes calls for innovations and interdisciplinary knowledge integration • Technical and social innovations are needed • Non-linearity of innovation processes and creation of transformation pathways • Multi-level perspective
Diffusion of innovation [8]	• Scaling out of innovation: seeking more users of an innovation • Scaling deep of social innovation: changing values and beliefs to promote innovations
Geography of innovation [30]	• Sociological analysis of place-based processes of knowledge creation and their influencing factors (overlapping cultural fields: local, personal, organisational and sectoral field)
Landscape co-design [17,18]	• Collaborative design of innovations on landscape scale • Differentiation between design and management • Recognition of spatial and social heterogeneity • Need for interdisciplinary approaches (natural and social sciences)
Adaptive co-management [19,20,31]	• Flexibility of decision making and institutional arrangements • Resilience of landscapes • Adaptability of management innovations • Collaborative management of social–ecological systems • Co-production of knowledge
Nature and landscape values [32,33]	• Including additionally to instrumental and intrinsic values also eudemonistic values • Perceiving nature values as relational values that create a mutual interaction between humans and nature

3. The ALDC Model as an Integration of Acceptability Analyses into Adaptive Landscape Co-Design and Management

The outcome of the cross-case analysis and the followed model-building process is the ALDC model presented here. The ALDC served to conceptualize how acceptability analyses, as a kind of innovation-related monitoring of the social sphere, can be integrated into the sustainability-oriented design transformation processes of the landscape. The model helps in co-designing, implementing, and revising accepted innovations and is a suitable landscape development strategy that consider the values, attitudes, and actions of local actors. By dividing the process into four phases, the ALDC offers structured guidance for landscape-coordinating institutions and projects on how to achieve their transformation goals through analysing acceptability, and develop, by bottom-up processes, widely accepted place-based innovations (Figure 3). ALDC is an iterative model; once all the phases have passed through the cycle, they can be started again until a suitable landscape development strategy has been negotiated. This model represents an ideal type, which cannot fully reflect the complex reality where processes might include more feedback loops. Nonetheless, the conceptualisation supports the understanding of the dynamics of acceptability phenomena and landscape co-design processes.

In the following, we describe the four phases, including stepwise guidance, and briefly illustrate an example of practical implementation with the case study Spreewald (see Boxes 1–4).

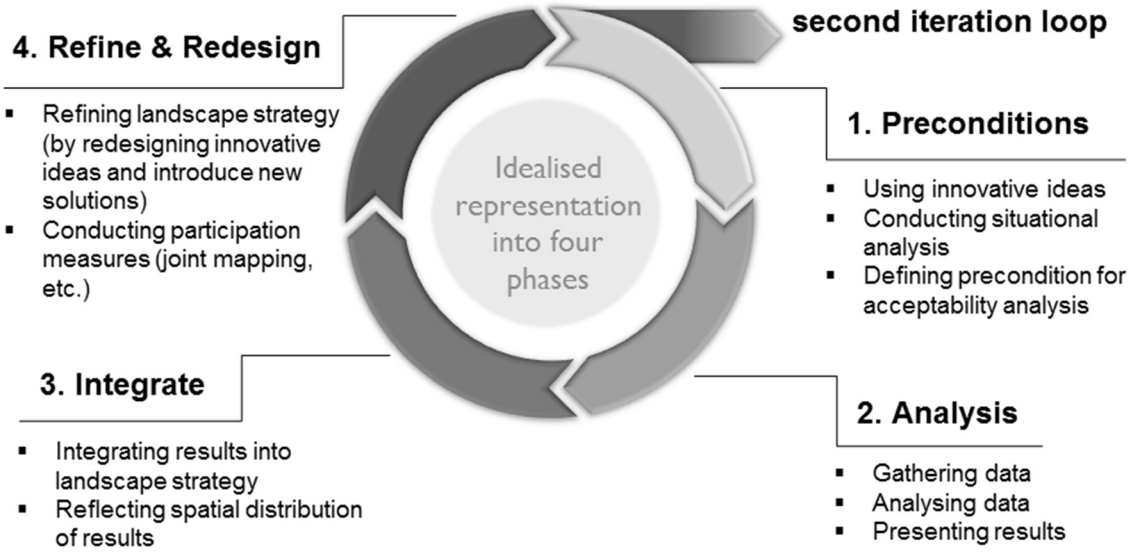

Figure 3. The acceptability and landscape design cycle (ALDC). ALDC is based on cross-case inductive conclusions from case studies in the Spreewald region (own compilation).

3.1. First Phase: Preconditions of Acceptability Analysis

In the first phase, users of the ALDC model should conduct a situational analysis and define the specific preconditions before gathering data for the acceptability analysis itself (example in Box 1). The starting point of the ADLC is usually that a first landscape strategy, an idea which innovations could support the social–ecological transformation, is already under discussion. Even if these innovative ideas have already been discussed by a co-design team (including the landscape manager), it will happen that ethical positions (that include ecological and social objectives), personal agendas, and power relations might influence the transformation goal and selection of innovations [34]. Therefore, a critical view on innovations is important. The coordinator or team should reflect on these normativities or power asymmetries [35] and consider whether the theoretical–conceptual and ethical principles of the ADCL (described in Table 1) are sufficiently addressed. The leadership style should create a space for active listening and non-violent communication (e.g., through establishing rules for communication) to avoid an unbalanced participatory process and to build mutual trust among participants [36]. However, this requires a high degree of self-reflection and communicative skills from the coordinator, the team, and all participants. Additionally, the identification of shared values can also help to overcome barriers [32]. Since there is no one-fits-all solution, it is necessary to try them out on a case-by-case basis to determine what works well in a particular case and to take countermeasures in the event of undesirable developments [35]. This requires a lot of flexibility in the process.

To prepare the acceptability analysis, it needs a comprehensive and joint reflection on the specific acceptability object (the innovation), the actors affected by the innovation (acceptability subjects), and the contextual conditions [10,12]. Since acceptability phenomena are often complex, it is necessary to perform this reflection as presciently as possible to enable a sound and in-depth analysis later on. Often, several innovative ideas are under consideration to achieve the social–ecological transformation. Each of these innovations can also pursue its own sub-goals (e.g., successfully introducing a new governance form to maintain a landscape) in addition to achieving the overall goal of the desired transformation of landscapes (e.g., maintaining a cultural landscape). Therefore, it can be useful to perform several acceptability analyses, where each innovation serves as a particular acceptability object. This structuring is especially important for the interpretation of the

acceptability results (phase 3) and helps to put these results into the broader context of the case study. Important questions in the first phase are as follows:

- Acceptability object: For which innovation (e.g., project, product, measure, etc.) should the acceptability be analysed?
- Acceptability context: What are the legal–institutional, social–cultural, and financial context conditions of this innovation?
- Acceptability subject: For which actor group(s) should the acceptability be explored?
- Is it necessary to conduct several acceptability analyses at the same time?

Before defining the most relevant actors for implementing the innovations, who serve as acceptability subjects, it is recommended to conduct an actor analysis exploring the actors' roles, expectation, interests, relationships (including power dynamics), and legitimacy to act. Additionally, it is important to ask: Who had already been included in the development process of the innovation, and who had not?

As a precondition for the acceptability analysis itself, it is crucial to identify available resources in terms of time, personnel, and financing. Such a comprehensive situational analysis is important for making explicit assumptions and being precise in choosing adequate research methods, and analysing and reflecting on the gathered data.

Box 1. Case study Spreewald—Preconditions of acceptability analysis.

*A **situational analysis** identified the objective of the social–ecological transformation, the main regional actors, and their relations. The objective was to preserve the small-scaled wetland meadows as part of the cultural landscape and introduce new management options. Therefore, a landscape development strategy was proposed that was composed of several synergetic innovative ideas. The **acceptability objects** were the following innovative ideas: land pools, on-farm biomass plants to generate local heat, and new collaborations with the tourism sector. The main **acceptability subjects** were the farmers (case study on on-farm biomass heating plants), landowners (case study on land pools) and tourism agencies (case study on cooperation). Previously, an actor analysis was conducted to identify actors' interests in the innovations, their power relations, and legitimacy to act. The main **contextual aspects** that framed the acceptability were as follows: the initiation of the transformation process by the administration of the Biosphere Reserve (BR) Spreewald, the BR designation in 1990, national and federal laws concerning nature conservation, impact regulation mitigation, emission protection, and agricultural and innovation funding programmes.*

3.2. Second Phase: Analysis of Acceptability

The second phase is dedicated to the acceptability analysis as a boundary concept of exploring complex phenomena with identifying the (1) acceptability degree and (2) influencing factors (example in Box 2). (1) The acceptability degree indicated extent to which an actor accepted or rejected an innovation. If actors' decisions can be assigned to opposition, rejection, low acceptance, tolerance, indifference, conditional acceptance, high acceptance, or engagement, there are no clear and fixed thresholds between these degrees. They are, rather, qualitative categories that can be differentiated by definitions and anchor examples (see Figure 1 and Supplementary Material). (2) The acceptability factors influence the arguments that lead to the acceptability degree. Such analysis should consider more factors than often mentioned economic aspects, but also include regional power arrangements, trust among actors, and procedural justice within the innovation process [16,37,38]. Additionally, the underlying values of nature and the landscape that influence decisions should be taken into account [16,32,33,38].

There are different methods of studying acceptability; qualitative and quantitative methods—each have their advantages. The selection of a suitable method depends on the research epistemology, the research question, and available resources. Explorative and qualitative studies that often use qualitative content analysis can reveal in-depth knowledge, explore unknown acceptability phenomena, and identify unexpected factors [39]. To identify conditions or bundles of factors that lead to a certain acceptability decision (acceptance or rejection), the qualitative comparative analysis (QCA) is an appropriate choice of method [40]. Quantitative methods are usually used to capture the attitudes of a large number of participants and allow empirical generalization about a certain population group [41,42]. Regardless of the method, interview guidelines or questionnaires should always include questions about the degree of acceptability and the underlying factors.

Before conducting interviews or surveys, the acceptability level should also be identified: acceptability can be studied at the attitude level—before implementing an innovation; at the action level—directly after implementation; or at the long-use level—after a certain use of the innovation [10].

Box 2. Case study Spreewald—Analyses of acceptability.

The two acceptability analyses in which we applied the above-described theoretical concept revealed the attitudes towards land pools and biomass heating plants of potential users.
Acceptability of land pools: *Land pools are a type of biodiversity banking, where various small land plots (with the agreement of the landowners) are pooled to finance the maintenance measures for this area. In 19 problem-centred interviews, landowners were asked if and why they would agree to give their land to the land pool. All interviewees stated that the maintenance of wetland meadows is very important as part of the cultural landscape heritage, places for recreation or hunting, as well as income for the tourism sector. In both example areas, landowners were found who accepted, showed conditional acceptance, or rejected land pools. There are diverse factors that influence acceptability decisions. A 'KO criterion' for rejection was the restriction of the user rights. The importance of a fairly organized innovation process was stated by all respondents. They wanted to be involved at an early stage and have a voice in the innovation process. This is directly connected to trust. If landowners trust in the coordinating actors, it is more likely that the innovation process will be perceived as fair. Furthermore, trust goes hand-in-hand with previous experiences with those actors. Some stated that they lost trust in the coordinating actors because they had not been sufficiently involved in previous projects (e.g., a long-term nature conservation project or designation phase of the biosphere reserve in 1990). For detailed results, see [9].*
Acceptability of innovative biomass plants: *Seventeen small and large farmers were asked if they were interested in installing a biomass plant on their farm within five years. The fsQCA showed that the acceptance was relatively low, and identified three types of farmers: potential adopters, ethically concerned opponents, and open-minded refusers. Biomass plants were likely to be accepted if farmers stated an ethical acceptance of and interest in technology, a need for a new heating system, the availability of sufficient feedstock, and a perceived readiness level for technology as unproblematic. Farmers rejected a biomass plant if one of the following factors existed: ethical concerns about 'burning hay', satisfaction with their current oven, the low availability of feedstock, or a perceived low readiness for technology. For detailed results, see [24].*

3.3. Third Phase: Integration of Acceptability Results

The aim of the third phase is to align ecological objectives and social acceptability by integrating the results of acceptability analyses into the broader context by assessing their relevance for the overall landscape development strategy (example in Box 3). Such an integration with a critical reflection of results is a crucial part of the ongoing innovation process [7,16]. Here, it should be considered that acceptability decisions assign a certain moment in the innovation process and can vary over time [10]. Therefore, this 'recursive pattern of acceptability' [16] implies that acceptability analyses have been renewed or conducted 'in waves' to prove if acceptability has been changed or not. To enhance acceptance, knowledge on conditional acceptance can be very useful because it reveals potentials for enhancing measures such as creating just innovation processes, balancing power relations, or adapting innovations to local needs [9,43]. In contrast, the critical rejection factors identified by acceptability analyses show the limits to scaling out and scaling deep innovations [8,43]. Deep values and ethical norms are often factors that lead to opposition or rejection because they cannot easily changed [8].

In this third phase, a first practical step could consist of a mapping of results, e.g., by using GIS. This helps to answer the questions on (1) how acceptability decisions on innovations are spatially distributed in the specific landscape and (2) whether the innovations—if several are being discussed—are spatially complementary or competing to achieve the aim of the social–ecological transformation. Hence, focusing on landscapes beyond small sites or farm level is important because most ecosystem services and social–ecological interactions have effects on a larger scale [44,45]. In this step of broader contextualisation, it might be supportive to apply innovation system thinking, in which technical and social innovations are seen as the resolution of complex societal problems [7], which acknowledges that innovation processes are not linear but circular and considers multiple levels of influence (multi-level perspective), complex innovation conditions, and different possible transformation pathways [29] (see Table 1). Finally, the outputs of the former steps should be communicated to the regional actors and jointly discussed in the fourth phase.

Box 3. Case study Spreewald—Integration of results.

Reflection of the results from the acceptability analyses: *Regional actors used the detailed acceptability results for integrating them into the landscape development strategy, and for identifying actor groups that should be considered in the further innovation or planning processes (e.g., for the 'Habitats Directive management plan'). These results helped to reveal the potentials and limits of the different innovations to support the aimed sustainability goal of revalorising the wetlands. The first analysis showed that some landowners are not willing to add their properties into the collaborative pool project. Thus, land pools cannot be completely established in the two designated and suitable areas that were identified. A GIS mapping showed that these two areas cover only a small share (ca. 180 ha) of all meadows that are facing the threat of falling out of use (ca. 1500 ha). Although maintenance measures were applied in one of the proposed areas in 2018, establishing land pools in other areas currently seems unrealistic. Due to such limited acceptance and reduced spatial relevance, we conclude that the land pools will be of lower importance in the near future. Concerning the acceptance of biomass plants at the farm level, the results show that this is not a promising solution to save large parts of the wetlands 'in danger'.*

Effectiveness to achieve the sustainability objective: *According to the current state of knowledge, both innovative ideas are not sufficient for maintaining or transferring all the wetland meadows in use. The concepts of land pools and biomass plants could either be modified or supplemented with other innovative ideas (e.g., collaborations with the tourism sector for financing maintenance measures) for a thriving transformative process. To prepare the next phase of identifying, collecting and integrating complementary innovative ideas for the landscape development strategy, actors must be well-informed about the acceptability outcomes of different innovative ideas in advance.*

To share the studies' results*, the existing communication network of the regional firms and institutions has been used. The information has been forwarded in an aggregated form (short papers, manuscripts, handbooks, leaflets, etc.). Additionally, collaborative governance instruments should also be applied to include critical acceptability aspects.*

3.4. Fourth Phase—Refinement and Re-Design of the Landscape Strategy

The main issue of this phase involves revising the landscape strategy. A joint discussion of the third phase results initiates the next participatory step that is to jointly apply suitable acceptance enhancement measures (e.g., optimizing the participation process or re-designing existing innovations) and to co-design new ideas (example in Box 4). For this purpose, the transformation pathway should also be re-thought and alternative pathways taken into consideration to maximize synergies and minimize trade-offs between innovations [7]. This step is grounded in reflexive and iterative learning processes that are powerful in supporting changes [29,46]. Learning processes are most fruitful if different actor groups with their ideas and opinions are involved [7]. In this context, local knowledge about the landscape of different knowledge providers should be interlinked in such a way that the most suitable place-based solutions can be developed [30]. Farmers, landowners or local people are valuable knowledge providers and should not be seen as mere recipients of innovations but also be involved in the design process [47]. In this phase, the participation process and co-design activities (e.g., techniques from design thinking) take place to manage disagreement on goals and ethical positions and avoid conflicts or power asymmetries by finding shared visions and new solutions [9,32]. Generally, participation is a long-term process for mutual trust, good relationships, and learning from each other to discuss potential solutions [47]. The leadership style should be adapted to these goals to create a space for collaboration at equal eye level and encourage active listening [36]. However, this requires a high degree of self-reflection and communicative skills from the coordinator and all participants. Since there is no one-fits-all solution, it is necessary to try out what works well in the particular case and to take countermeasures in the event of undesirable developments [35]. This requires a lot of flexibility in the process. Participatory mapping can be one appropriate activity for interactive spatial design. The revision of the landscape strategy in joint workshops may continue after the testing of innovative solutions and conducting ex-post acceptability analyses that explore the long-term use of innovations. This shows that the ALDC model includes not only the design of the landscape strategy but also the iterative and step-by-step implementation of suitable options.

Box 4. Case study Spreewald—Refinement and re-design.

Precondition for collaboration and developing a joint vision: *All regional actors that have a stake in the social–ecological transformation of the wetland meadows are responsible for breathing life into the landscape strategy. To make intelligent decisions on which set of innovative ideas could be the best to reach the regional development objectives, developing a joint vision of how the future landscape should look is recommended. Therefore, a broader study [25] and an actors' workshop have been conducted about identifying (1) shared objectives among different actors and (2) suitable areas for implementing the innovative ideas. The authors show that there are some opportunities for initiating and establishing a collaborative landscape management approach, but also challenges. Opportunities include most regional actor groups having shared problem awareness and some pre-existing interactions between actors. Challenges are the tense social relationships among some actors, a lack of trust in the regional coordination, and the moderate collaborative capacity of the local actors.*

Refinement of the landscape strategy: *Which innovative ideas gain momentum often depends on various other aspects (e.g., legislation, subsidies, institutional power, market, etc.). Again turning the gaze towards the three proposed innovative ideas, we can summarize the following points for the refinement phase: if the applied maintenance measures in the land pool show positive effects on biodiversity and landscape scenery, this could serve as a demonstration project to convince new proponents. Our study revealed that, more often than not, farmers are interested in providing their hay instead of installing their own biomass plant. This brings about the opportunity to build a community-based biomass plant. One step in this direction consists of jointly mapping the potential land plots for providing feedstock with the interested farmers. Recently, with actors in the tourism sector, the instruments or incentives that could be promising in financing maintenance measures by tourists or tourism agencies have been discussed in a workshop. On the basis of this discussion, a visitor donation box promoted through local tourism agencies has been introduced. Further studies should be conducted, e.g., on the acceptability of such tourism instruments and a community-based biomass plant. Additionally, new ideas should be jointly developed step by step.*

4. Discussion: Application of the ALDC Model and Further Implications

In this empirical–conceptual paper, we introduced a novel model, the ALDC, which seeks to integrate acceptability analyses of sustainability and place-based innovations into landscape co-design. On the one hand, we contribute the ALDC to a theoretically better understanding of the dynamic characteristic of acceptability decisions or so-called 'recursive patterns of acceptability' [16]. Such pattern phenomena can be observed in many cases and need to be recognized in scientific studies and practice projects [10,16]. On the other hand, we provide practical implementation guidelines by introducing procedural steps, which illustrate the integration of in-depth acceptability analyses into landscape design and management. Thus, the ALDC also contributes to advancing landscape approaches by addressing not only the ecological but also the social integrity of landscape development; in addition, it prevents the unintended side effects and trade-offs of landscape developments [7]. Additionally, it fosters bottom-up innovations, enables social co-learning for building up social capital, and encourages co-design and experimentation at the local level [4,7]. The design components of the ALDC model enable scientists and practitioners to jointly implement knowledge on landscape use and processes, and include social environmental values in their decision making as it is advocated by [17,48].

Although the ALDC has been developed based on our experiences in the Spreewald region, the purpose is to remain open to other applicability options aiming at a more general model that offers application possibilities and transferability to similar cases. Thus, the model is suitable for many place-based projects and promotes the role of landscapes as a powerful medium for collaborative experimentation and innovation [49]. It can be used to analyse social–ecological transformation regarding cultural landscapes that face land abandonment, such as terraced landscapes [50], highland grasslands [51] or mountain landscapes [52,53]. This kind of land abandonment is widespread in Europe and can decrease the functioning of the ecosystem, biodiversity, and cultural values of landscapes [53]. The ALDC is also appropriate for bioenergy projects in landscapes concerning smart biomass use or wind parks [45,54], nature conservation projects or projects that address the linking of urban and rural spaces. Since the principles in the ALDC model are very broad and universal, the model might be applicable in the global North and global South. The identification of context-specific conditions would have to be done separately for each case study region in phase 1 for the acceptability analysis and in phase 3 for the synthesis. For defining adequate general principles for the social–ecological transformation in the respective case, the landscape approach principles by Sayer et al. [22] are very helpful and valuable by providing a worldwide synthesis of good practices. To sum up, we would

appreciate further applications of the ALDC to other cases, which are needed to evaluate its suitability, adaptability, and generalizability. We see particular potential for application in transdisciplinary research approaches such as living labs. Since transdisciplinary processes are very time-consuming, take several years and require a lot of effort, the number of cases in which we have been able to apply it ourselves is limited. Our intention for this article is to encourage other researchers and landscape managers to test such an approach in their case studies. In the case study of the Spreewald region, the approach made it possible to analyse the acceptance conditions of various solution options and to discuss, evaluate and, in some cases, test them together with the regional stakeholders. These included, for example, the installation of a biomass heating plant or the introduction of the meadow share (a commodification approach). However, we still see the need for further empirical validation and refinement of the model [28].

It must be considered that the use of the ALDC has some practical limitations and further implications. Going through all four phases in an iterative procedure is resource-intensive in terms of time, budget and expertise. As we are presenting an ideal–typical model, it is also clear that the iterative process will probably never come to an end but would have to run continuously. Our recommendation for such place-based innovation processes is to engage a landscape coordinator who is dedicated to manage the landscape design processes in the region. The position of this landscape coordinator could be located in different institutions, in which caring and studying cultural landscapes is a core task. Appropriate institutions are, for instance, regionally operating and practice-oriented research institutions, biosphere reserves (as it is the case in the Spreewald region), institutions of the Landcare Europe network https://www.landcare-europe.org/ (accessed on 21 February 2024) or other organisations (e.g., NGO) dealing with sustainable land use and cultural landscape heritage. Governance arrangements can look very different and vary depending on the specific contextual situation. However, the landscape coordinator position should be permanently equipped with sufficient resources to conduct the long-term process studies on an ongoing basis, as conducting multiple acceptability analyses and other design, planning, and management steps is time-consuming and costly. Resources might be funded through long-term research and nature conservation projects or through federally funded permanent positions in the abovementioned institutions. In particular, establishing transdisciplinary research projects or landscape-oriented real-world labs, which include different scientific disciplines, the practitioners (especially the coordinating landscape manager), and local–regional actors as collaborating partners might be beneficial [25,55]. The tasks to be performed by such a landscape coordinator are demanding; the landscape coordinator needs excellent skills in coordinating and supervising such a complex process of knowledge integration. She or he should have an extended professional expertise in biophysical and socio-ecological landscape issues as well as in legal–political framework conditions and socio-technical subjects. Usually, having such a central role and complex field of work, social skills with respect to transparent communication and participation, integrative teamwork or negotiation processes are equally important. Finally, the landscape coordinator should be well intergraded in the region, accepted by a broad range of regional actors, and be available for continuous communication with locals.

Recommendations and information on how to conduct and reflect in detail an acceptability study as a central part of the ALDC can be found in the tool box developed by the authors: https://akzeptanz-strategisch-steigern.de (accessed on 21 February 2024). This tool box offers assistance for defining the preconditions of the study and provides information on suitable methods for the analysis itself and how to interpret or use the results for further process design. Additionally, acceptance enhancement measures and recommendations for process quality improvements are suggested.

5. Conclusions

In conclusion, the paper offers practical guidance on how to incorporate in-depth acceptability analyses of place-based innovations into a dynamic social–ecological transformation process of landscapes and foster process reflection. This also contributes to scientific knowledge expansion and integration by conceptually capturing the notion of 'recursive pattern of acceptability' and promoting insights from landscape approaches in the research field of acceptability analyses. Furthermore, the ADLC contributes to a better understanding of the co-evolution of socio–ecological systems by revealing how actors' values and the transformation of the landscape can influence each other. On the one hand, through the bottom-up and circular development of sustainability innovations that considers the 'recursive pattern of acceptability', these innovations are adapted to local conditions, which enables the transformation of the landscapes into a more sustainable state. As a result, people change their landscape (flora, fauna, and habitats) with their land use practices. On the other hand, the landscape shapes local people's thinking and actions. The reflexive character of the ALDC can influence people's minds through co-learning about ecological issues, which can lead to changed actions and land use practice.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/land13040513/s1, Table S1: List of anchor examples for acceptability degrees.

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