ARPHA Preprints

PENSOFT

PREPRINT

Author-formatted, not peer-reviewed document posted on 20/11/2023

DOI: https://doi.org/10.3897/arphapreprints.e115998

Integration of acceptability analyses into an adaptive landscape co-design and management – The acceptability and landscape design cycle (ALDC)

Maria Busse, Nico Heitepriem, Jana Zscheischler, Rosemarie Siebert

ARPHA Preprints *Author-formatted, not peer-reviewed document posted on 20/11/2023*. DOI: https://doi.org/10.3897/arphapreprints.e115998

Integration of acceptability analyses into an adaptive landscape co-design and management - The acceptability and landscape design cycle (ALDC)

Maria Busse[‡], Nico Heitepriem[§], Jana Zscheischler[|,¶], Rosemarie Siebert[‡]

‡ Leibniz Centre for Agricultural Landscape Research (ZALF), 15374 Müncheberg, Germany
§ State Office for Environment of the Federal State of Brandenburg (LfU), Department for Large Nature Reserves and Regional Development, UNESCO Biosphere Reserve Spreewald, 03222 Lübbenau/Spreewald, Germany
| Leibniz-Zentrum für Agrarlandschaftsforschung (ZALF), Müncheberg, Germany
¶ Department of Geography, Faculty II, University of Vechta, 49377 Vechta, Germany

Corresponding author: Maria Busse (maria.busse@zalf.de)

Abstract

1. Acceptability analyses of place-based innovations provide crucial in-depth knowledge (e.g., perceptions and values on landscapes) for the sustainability transformation of landscapes. However, previous acceptability analyses often neglect complex and on-going 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 that integrates acceptability analyses into an adaptive landscape co-design and management approach.

2. 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.

3. We illustrate the application of these phases using the case study of the Cultural Landscape Spreewald. The paper provides practical implementation guidelines of the ALDC and contributes to a better understanding of the dynamics of acceptability decisions in landscape transformation processes. Furthermore, it can advance the understanding of how coevolution of socio-ecological systems occurs.

Keywords

recursive patterns of acceptability; acceptance; landscape design; social learning; iterative innovation processes; collaborative decision-making

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. (Primdahl et al. 2019). At the same time, landscapes worldwide are either under pressure from agricultural intensification or threatened by land abandonment (Pedroli et al. 2016). Such complex situations in landscapes require well-thought design and governance processes that enable to balance the different challenges and demands for a sustainability transformation of these landscapes (Bodin 2017, Westley et al. 2011). Often such landscape transformation processes are initiated and orchestrated by landscape managing institutions, joint regional research projects, or public-funded organisations that bring first innovative ideas as 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 (Campellone et al. 2018, Westley et al. 2011). 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., 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 a successful implementation of innovations at landscape scale and thus, for promoting the sustainability transformation. Saying in other words: A small number of innovation user is often not enough to achieve the desired sustainable transformations. Thus, more innovation users are needed than were involved in the innovation co-development process to achieve scaling out effects (Moore et al. 2015) at landscape level. We argue that only in-depth knowledge of whether and why actors accept or reject innovations, innovation processes and landscape transformation can be managed 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 a personal but socially embedded decisions on any kind of place-based or 'external' innovation (Busse and Siebert 2018). These individual actor's decisions can be assigned to positive and negative acceptability degrees, such as opposition, rejection, low acceptance, tolerance, indifference, conditional acceptance, high acceptance, engagement (Busse and Siebert 2018, Sauer et al. 2005) (see Suppl. material 1 for definitions and anchor examples). This means that acceptability analyses explores complex socially-constructed phenomena (without a fixed set of

methods), whereas acceptance is one positive acceptability degree (Busse and Siebert 2018; Fournis and Fortin 2017). The factors can directly relate to the shape (if it is a governance model) or technology of an innovation (if it is a machinery or an App) but also to the actors itself (e.g., individual values of nature and landscapes) or to the context of an innovation such as procedural justice that refers with the aspects of transparency, trust, local knowledge, and co-design of solutions to the process design (Busse and Siebert 2018, Lucke 1995). 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 sustainability transformation of landscapes. This form of acceptability analysis is conceptualized very different from the type applied byd use are mostly stand-alone and ephemeral 'snapshots' 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, emerge 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 deep this innovation (Moore et al. 2015).

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' (Ganzevles et al. 2015) should be adequately addressed in acceptability analyses to better understand the complex dynamic situation and real-world settings of landscape transformation processes. Even if some studies already implicitly recognise such dynamics they are not substantially considered due to constrains regarding methodology and complexity or project timelines. Unfortunately, Ganzevles (Ganzevles et al. 2015) 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 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 therefor argue that taking into account the "recursive patterns of acceptability" can advance the understanding of how co-evolution of socio-ecological systems occur. Our experiences in recent research projects have taught us that integrating results of acceptability analyses into a broader context of landscape transformation processes and its dynamics is a crucial step. Important questions in this sense are

1. how do acceptability decisions change in the course of landscape transformation and innovation processes;
2. which role play complex actors' constellation (including diverging values and beliefs) in landscapes for the acceptability of place-based innovations; and

3. how complementary innovations can be effectively spatially allocated within a specific landscape considering acceptability decisions.

More theoretically expressed, the integration of acceptability analyses should be understood as an on-going 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 of an integrative heuristic model from the fact that insights from landscape co-design (Nassauer and Opdam 2008, Swaffield 2013) and adaptive co-management (Folke et al. 2005, Olsson et al. 2004, Reed et al. 2016, Sayer et al. 2013), landscape development of protected areas (Dudley 2013), and Social Impact Assessment (SIA) play at most an indirect role in recent acceptability analyses but are still not conceptually embedded. Vice versa, acceptability analyses are still not adequately considered in the above mentioned collaborative landscape management approaches. For instance, SIA seeks to a continuous monitoring of social issues but suggests rather a external social assessment of previously fixed policies and projects, whereas we argue for in-depth acceptability analyses as basis for an active involvement of local people in a landscape development strategy. Furthermore, these approaches often stick to general principles of inclusiveness and social justice (Dudley 2013, Sayer et al. 2013) 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 that include a broad range of regional actors to better understand, identify, and assess future development options of landscapes (Primdahl et al. 2019).

To fulfil these gaps and to answer the question above mentioned, 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, which contribute to the sustainability transformation of landscapes. The model was inductively developed from our lessons learnt from the case study of the Cultural Landscape Spreewald (Germany) and is based on the empirical acceptability analyses that has been published recently (Busse et al. 2019a, Busse and Siebert 2018, Zscheischler et al. 2019). As central part of this conceptual-empirical paper, we describe the different phases of the ALDC model and illustrate them using the above mentioned case study region.

2. Material and Methods for developing the ALDC model

The Spreewald is a historically grown cultural and divers landscape with ditches, riparian strips, forests, wetland meadows, and arable land (Fig. 1). 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. However, the abandonment of many of small-scaled wetland meadows is seen as an increasing problem 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 feel cutbacks in public funding. The current situation calls for finding a new landscape development strategy to cope with regional social-ecological problems.

In this region, we performed two acceptability analyses and one about the preconditions for a collaborative landscape management between 2015 and 2018 (Busse et al. 2019a, Busse and Siebert 2018, Zscheischler et al. 2019). From these previous separately analysed and published case studies, we draw inductive cross-case conclusions (Yin 2019)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 patterns of acceptability?

2. We related the interpretations of the single case studies (Busse et al. 2019a, Busse and Siebert 2018, Zscheischler et al. 2019) to each other using a matrix on similarities and differences. Especially the following identified similarities between these three single case studies served for cross-case conclusions at the regional level for the Spreewald region:

- Acceptability decisions are based on environmental and ethical values, economic considerations, and the perceived fairness of the innovation process.
- Acceptability decision are not stable and may change over time (= “recursive pattern of acceptability”).
- None of the considered innovations has the acceptance potential to solely achieve the transformational goal.

  However, if these innovations will be better adapted to local needs, and then be combined, they could release greater potential. The potentials 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 (cf. Bergmann et al. 2012, Knight et al. 2006).

4. Finally, we built and discussed the operational model considering that the prototype should be general and comprehensive to test it in other cases. Our prototype model is based on the need in conservation planning of a stage operational model that integrates different disciplines, approaches, implementation strategies, and actors to facilitate action research, document processes, and justify decision-making by actor empowerment (Knight et al. 2006). 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 the adaptability need. The specific

theoretical references that serve as foundation for the ALCD are described in Table 1 and in more detail, in the four phase of the model (see result section).

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 modelling building process is the ALDC model presented here. The ALDC was to conceptualize how acceptability analyses as a kind of innovation-related monitoring of the social sphere can be integrated into the sustainability-oriented design of landscape transformation processes. The model helps co-designing, implementing, and revising accepted innovations and 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 to develop by bottom-up processes widely accepted place-based innovations (Fig. 2). ALDC is an iterative model: Once all phases have been 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 understanding 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).

3.1 First phase: Preconditions of acceptability analysison title

In the first phase, user of the ALDC model should conduct a situational analysis and define the specific preconditions before gathering data for the acceptability analysis itself. The starting point of the ADLC is usually that a first landscape strategy, an idea which innovations could support the landscape 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, personal agendas, and power relations might influence the transformation goal and selection of innovations (Steger et al. 2021). Therefore, a critical view on innovations is important. The coordinator or team should reflect on these normativities or power asymmetries (Barnaud and Van Paassen 2013) 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 (Horcea-Milcu et al. 2022). 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 (Busse

et al. 2019b). Since there is no one-fits-all solution, it is necessary to try out on a case-by-case basis what works well in the particular case and to take countermeasures in the event of undesirable developments (Barnaud and Van Paassen 2013). 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 (Busse and Siebert 2018, Lucke 1995). 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 sustainability transformation. Each of these innovation 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 desired landscape transformation (e.g., maintaining a cultural landscape). Therefore, it can be useful to perform several acceptability analyses, where each innovation serve then as 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:

- 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?
- It is 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 was already included in the development process of the innovation, who not?

As 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, analysing, and reflecting on the gathered data.

Box 1: Case study Spreewald - Preconditions of acceptability analysis

- *A **situational analysis** identified the objective of the sustainability transformation, the main regional actors, and their relations**:** The **objective** is 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 is composed of several synergetic innovative ideas. The **acceptability objects***

are these innovative ideas: land pools, on-farm biomass plants to generate local heat, and new collaborations with the tourism sector. The main ***acceptability subjects*** *are 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 frame the acceptability are: the initiation of the landscape transformation by the administration of the Biosphere Reserve (BR) Spreewald, the BR designation in 1990, national and federal laws concerning nature conservation, impact regulation mitigation, and emission protection; as well as agricultural and innovation funding programmes.*

3.2 Second phase: Analysis of acceptability

The second phase is dedicated to the acceptability analysis as boundary concept of exploring complex phenomena with identifying

- acceptability degree and
- influencing factors.

1. The acceptability degree indicated to which extent an actor accept or reject 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 also supplementary material).
2. The acceptability factors are influencing 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 (Ganzevles et al. 2015, Gross 2007, Schenk et al. 2007). Additionally, the underlying values of nature and the landscape that influence decisions should be taken into account (Ganzevles et al. 2015, Kenter et al. 2015, Ott 2015, Schenk et al. 2007).

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 which often use qualitative content analysis can reveal in-depth knowledge, explore unknown acceptability phenomena, and identify unexpected factors (Patton 2019). 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 (Schneider and Wagemann 2013). Quantitative methods are usually used to capture the attitudes of a large number of participants and allow empirical generalization about a certain population group (Black 2005, Stockemer 2019). 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 (Busse and Siebert 2018).

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., long-term nature conservation project or designation phase of the biosphere reserve in 1990). For detailed results, see Busse et al. (2019a).*
- ***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 the readiness level of 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 Busse et al. 2019a.*

3.3 Third phase: Integration of acceptability results

The third phase aims at integrating the results of acceptability analyses into the broader context by assessing their relevance for the overall landscape development strategy. Such an integration with a critical reflection of results is a crucial part of the ongoing innovation

process (Campellone et al. 2018, Ganzevles et al. 2015). Here, it should be considered that acceptability decisions assign a certain moment in the innovation process and can vary over time (Busse and Siebert 2018). Therefore, this 'recursive pattern of acceptability' implies that acceptability analyses have been renewed or conducted 'in waves' (cf. Ganzevles et al. 2015) 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 (Busse et al. 2019a, Hitzeroth and Megerle 2013). In contrast, the critical rejection factors identified by acceptability analyses show the limits to scaling out and scaling deep innovations (Hitzeroth and Megerle 2013, Moore et al. 2015). Deep values and ethical norms are often such factors that lead to opposition or rejection because they cannot easily changed (Moore et al. 2015).

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 sustainability 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 (Werling et al. 2015, Wolsink 2018). In this step of broader contextualisation, it might be supportive to apply innovation system thinking in which technical and social innovations are seen as resolution of complex societal problems (Campellone et al. 2018), 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 (Geels and Schot 2007) (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 who 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 identified areas. **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 are 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 maintain or transfer all 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. For this purpose, also the transformation pathway should be re-thought and alternative pathways taken into consideration to maximize synergies and minimize trade-offs between innovations (Campellone et al. 2018). This step is grounded in reflexive and iterative learning processes that are powerful to support changes (Geels and Schot 2007, Pahl-Wostl 2009). Learning processes are most fruitful if different actor groups with their ideas and opinions are involved (Campellone et al. 2018). In this context, local knowledge about the landscape of different knowledge provider should be interlinked in such a way that most suitable place-based solutions can be developed (Shearmur et al. 2018). Farmers, landowners or local people are valuable knowledge providers and should not be seen as mere recipients of innovations but also being involved in the design process (Reed 2008). 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 position and avoid conflicts or power asymmetries by finding shared visions and new solutions (Busse et al. 2019a, Kenter et al. 2015). Generally, participation is a long-term process for mutual trust, good relationships, and learning from each other to discuss potential solutions (Reed 2008). The leadership style should be adapted to these goals and create a space for collaboration at equal eye level and encourage active listening (Horcea-Milcu et al. 2022). 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 (Barnaud and Van Paassen 2013). 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 testing 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 sustainability transformation of the wetland meadows are responsible to breathe 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, it has turned out as being recommendable to develop a joint vision of how the future landscape should look. Therefore, a broader study* (Zscheischler et al. 2019) *and a actors' workshop has been conducted about identifying*
  - *shared objectives among different actors and*
  - *suitable areas for implementing the innovative ideas.*

  The authors show that there are some opportunities for initiating and establishing a collaborative landscape management, but also challenges. Opportunities include that most regional actor groups have shared problem awareness and some interactions between actors already exist. Challenges are the tense social relationships among some actors, a lack of trust in the regional coordination, and a 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.). Turning again 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 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, which instruments or incentives could be promising to finance maintenance measures by tourists or tourism agencies have been discussed in a workshop. On 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, and step by step, new ideas should be jointly developed. Applying our online tool box on acceptability (https://akzeptanz-strategisch-steigern.de/) can support regional processes on the run, avoid trade-offs before they emerge, and provide acceptance enhancement measures.

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 a landscape co-design. At the one hand, we contribute with ALDC to the theoretically better understanding of the dynamic characteristic of acceptability decisions or so-called 'recursive patterns of acceptability' (Ganzevles et al. 2015). Such pattern phenomena can be observed in many cases and need to be recognized in scientific studies and practice projects (Busse and Siebert 2018, Ganzevles et al. 2015). 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, ALDC contributes also to advancing landscape approaches by addressing not only the ecological but the social integrity of landscape development as well to prevent unintended side effects and trade-offs of landscape developments (Campellone et al. 2018). Additionally, it fosters bottom-up innovations, enables social co-learning for building up social capital, and encourage co-design and experimentation at the local level (Campellone et al. 2018, Westley et al. 2011). The design components in 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 Nassauer and Opdam (2008) and Peat et al. (2017).

Although, the ALDC has been developed from our experiences in the Spreewald region, the purpose is to be open for 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 powerful medium for collaborative experimentation and innovation (Opdam et al. 2018). It can be used to analyse sustainability transformation regarding cultural landscapes that face land abandonment, such as terraced landscapes (Kizos et al. 2010), highland grasslands (McGinlay et al. 2017) or mountain landscapes (Latocha et al. 2018, Plieninger et al. 2013). This kind of land abandonment is widespread in Europe and can decrease the functioning of the ecosystem, biodiversity, and cultural values of landscapes (Plieninger et al. 2013). The ALDC is also appropriate for bioenergy projects in landscapes concerning smart biomass use or wind parks (Dale et al. 2016, Wolsink 2018), nature conservation projects or projects that address the linking of urban and rural spaces. Since the principles in the ADLC 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 sustainable

landscape transformation in the respective case, the landscape approach principles by Sayer et al. (2013) 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. Therefore, we encourage researcher and landscape manager to apply the ALDC to test and validate the approach in other case studies. This also supports a refinement of this model. Such validation steps are commonly recommended when developing operational models (Knight et al. 2006).

It must be considered that the use of the ALDC has some further implications: Regarding place-based innovation processes, a landscape coordinator is needed 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/) 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 are time-consuming and costly. Resources might be funded through long-term research and nature conservation projects or through federally funded permanent positions in the above mentioned institutions. Especially establishing transdisciplinary research projects or landscape-oriented real-world labs, which include different scientific disciplines, diverse practitioners (especially the coordinating landscape manager), and local-regional actors as collaborating partners might be beneficial (Zscheischler et al. 2019). 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 central part of the ALDC can be found in the tool box developed by the authors (https://akzeptanz-strategisch-steigern.de). 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 the further process design. Additionally, acceptance enhancement measures and recommendations for process quality improvements are suggested.

5. Conclusion

In conclusion, the paper offers practical guidance how to incorporate in-depth acceptability analyses of place-based innovations into a dynamic sustainability transformation process of landscapes and foster process reflection. This contributes also 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 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 has shaped local people's thinking and actions. The reflexive character of the ALDC can influence people's mind through co-learning about ecological issues, which can lead to changed actions and land use practice.

Acknowledgements

This work was supported by the Federal Ministry of Education and Research, Germany (BMBF) under Grant number 033L145D. The authors have no conflicts of interest to declare. This paper uses already published data. Thus, the interviewee's consent to participate were stated in the separate publications.

MB conceived the ideas and designed methodology; JZ and RS contributed to the methodological design; MB and JZ collected the data; MB and JZ interpreted the data; MB and NH led the writing of the manuscript. NH, JZ, and RS contributed critically to the drafts and gave final approval for publication.

Author contributions

MB conceived the ideas and designed methodology; JZ and RS contributed to the methodological design; MB and JZ collected the data; MB and JZ interpreted the data; MB and NH led the writing of the manuscript. NH, JZ, and RS contributed critically to the drafts and gave approval for publication.

Conflicts of interest

The authors have declared that no competing interests exist.

References

- Barnaud C, Van Paassen A (2013) Equity, Power Games, and Legitimacy: Dilemmas of Participatory Natural Resource Management. Ecology and Society 18 (2). https://doi.org/10.5751/es-05459-180221
- Bergmann M, Jahn T, Knobloch T, Krohn W, Pohl C&SE (2012) *Methods for Transdisciplinary Research. A Primer for Practice*. Frankfurt - Campus
- Black T (2005) Doing quantitative research in the social sciences: an integrated approach to research design, measurement and statistics. Sage Publ, London. [ISBN 978-0-7619-5353-1 978-0-7619-5352-4]
- Bodin Ö (2017) Collaborative environmental governance: Achieving collective action in social-ecological systems. Science 357 (6352). https://doi.org/10.1126/science.aan1114
- Busse M, Siebert R (2018) Acceptance studies in the field of land use—A critical and systematic review to advance the conceptualization of acceptance and acceptability. Land Use Policy 76: 235-245. https://doi.org/10.1016/j.landusepol.2018.05.016
- Busse M, Heitepriem N, Siebert R (2019a) The Acceptability of Land Pools for the Sustainable Revalorisation of Wetland Meadows in the Spreewald Region, Germany. Sustainability 11 (15). https://doi.org/10.3390/su11154056
- Busse M, Siebert R, Heitepriem N (2019b) Acceptability of innovative biomass heating plants in a German case study—a contribution to cultural landscape management and local energy supply. Energy, Sustainability and Society 9 (1). https://doi.org/10.1186/s13705-019-0215-2
- Campellone R, Chouinard K, Fisichelli N, Gallo J, Lujan J, McCormick R, Miewald T, Murry B, John Pierce D, Shively D (2018) The iCASS Platform: Nine principles for landscape conservation design. Landscape and Urban Planning 176: 64-74. https://doi.org/10.1016/j.landurbplan.2018.04.008
- Cleaver F, Whaley L (2018) Understanding process, power, and meaning in adaptive governance: a critical institutional reading. Ecology and Society 23 (2). https://doi.org/10.5751/es-10212-230249
- Dale V, Kline K, Buford M, Volk T, Tattersall Smith C, Stupak I (2016) Incorporating bioenergy into sustainable landscape designs. Renewable and Sustainable Energy Reviews 56: 1158-1171. https://doi.org/10.1016/j.rser.2015.12.038
- Dudley N (2013) Guidelines for applying protected area management categories including IUCN WCPA best practice guidance on recognising protected areas and assigning management categories and governance types. IUCN, Gland. [ISBN 978-2-8317-1636-7]
- Folke C, Hahn T, Olsson P, Norberg J (2005) Adaptive governance of social-ecological systems. Annual Review of Environment and Resources 30 (1): 441-473. https://doi.org/10.1146/annurev.energy.30.050504.144511
- Fournis Y, Fortin M (2017) From social 'acceptance' to social 'acceptability' of wind energy projects: towards a territorial perspective. Journal of Environmental Planning and Management 60 (1): 1-21. https://doi.org/10.1080/09640568.2015.1133406
- Ganzevles J, Asveld L, Osseweijer P (2015) Extending bioenergy towards smart biomass use Issues of social acceptance at Park Cuijk, The Netherlands. Energy, Sustainability and Society 5 (1). https://doi.org/10.1186/s13705-015-0053-9

- Geels F, Schot J (2007) Typology of sociotechnical transition pathways. Research Policy 36 (3): 399-417. https://doi.org/10.1016/j.respol.2007.01.003
- Gross C (2007) Community perspectives of wind energy in Australia: The application of a justice and community fairness framework to increase social acceptance. Energy Policy 35 (5): 2727-2736. https://doi.org/10.1016/j.enpol.2006.12.013
- Hitzeroth M, Megerle A (2013) Renewable Energy Projects: Acceptance Risks and Their Management. Renewable and Sustainable Energy Reviews 27: 576-584. https://doi.org/10.1016/j.rser.2013.07.022
- Horcea-Milcu A, Leventon J, Lang D (2022) Making transdisciplinarity happen: Phase 0, or before the beginning. Environmental Science & Policy 136: 187-197. https://doi.org/10.1016/j.envsci.2022.05.019
- Kenter J, O'Brien L, Hockley N, Ravenscroft N, Fazey I, Irvine K, Reed M, Christie M, Brady E, Bryce R, Church A, Cooper N, Davies A, Evely A, Everard M, Fish R, Fisher J, Jobstvogt N, Molloy C, Orchard-Webb J, Ranger S, Ryan M, Watson V, Williams S (2015) What are shared and social values of ecosystems? Ecological Economics 111: 86-99. https://doi.org/10.1016/j.ecolecon.2015.01.006
- Kizos T, Koulouri M, Vakoufaris H, Psarrou M (2010) Preserving Characteristics of the Agricultural Landscape through Agri-Environmental Policies: The Case of Cultivation Terraces in Greece. Landscape Research 35 (6): 577-593. https://doi.org/10.1080/01426397.2010.519434
- Knight A, Cowling R, Campbell B (2006) An Operational Model for Implementing Conservation Action. Conservation Biology 20 (2): 408-419. https://doi.org/10.1111/j.1523-1739.2006.00305.x
- Latocha A, Reczyńska K, Gradowski T, Świerkosz K (2018) Landscape memory in abandoned areas—physical and ecological perspectives (Central European mountains case study). Landscape Research 44 (5): 600-613. https://doi.org/10.1080/01426397.2018.1493446
- Lucke D (1995) Akzeptanz. Legitimität in der "Abstimmungsgesellschaft". Leske + Budrich Verlag, Opladen. [ISBN 978-3-8100-1496-2]
- McGinlay J, Gowing DJ, Budds J (2017) The threat of abandonment in socio-ecological landscapes: Farmers' motivations and perspectives on high nature value grassland conservation. Environmental Science & Policy 69: 39-49. https://doi.org/10.1016/j.envsci.2016.12.007
- Moore M, Riddell D, Vocisano D (2015) Scaling Out, Scaling Up, Scaling Deep: Strategies of Non-profits in Advancing Systemic Social Innovation. Journal of Corporate Citizenship 2015 (58): 67-84. https://doi.org/10.9774/gleaf.4700.2015.ju.00009
- Nassauer JI, Opdam P (2008) Design in science: extending the landscape ecology paradigm. Landscape Ecology 23 (6): 633-644. https://doi.org/10.1007/s10980-008-9226-7
- Olsson P, Folke C, Berkes F (2004) Adaptive Comanagement for Building Resilience in Social?Ecological Systems. Environmental Management 34 (1). https://doi.org/10.1007/s00267-003-0101-7
- Opdam P, Luque S, Nassauer J, Verburg P, Wu J (2018) How can landscape ecology contribute to sustainability science? Landscape Ecology 33 (1): 1-7. https://doi.org/10.1007/s10980-018-0610-7
- Ott K (2015) Zur Dimension des Naturschutzes in einer Theorie starker Nachhaltigkeit. Metropolis Verlag, Marburg. [ISBN 978-3-7316-1150-9]

- Pahl-Wostl C (2009) A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. Global Environmental Change 19 (3): 354-365. https://doi.org/10.1016/j.gloenvcha.2009.06.001
- Patton MQ (2019) Qualitative Research and Evaluation Methods. Integrating Theory and Practice. SAGE Publications Ltd, Thousand Oaks. URL: https://uk.sagepub.com/en-gb/eur/qualitative-research-evaluation-methods/book232962
- Peat M, Moon K, Dyer F, Johnson W, Nichols S (2017) Creating institutional flexibility for adaptive water management: insights from two management agencies. Journal of Environmental Management 202: 188-197. https://doi.org/10.1016/j.jenvman.2017.06.059
- Pedroli B, Pinto Correia T, Primdahl J (2016) Challenges for a shared European countryside of uncertain future. Towards a modern community-based landscape perspective. Landscape Research 41 (4): 450-460. https://doi.org/10.1080/01426397.2016.1156072
- Plieninger T, Bieling C, Ohnesorge B, Schaich H, Schleyer C, Wolff F (2013) Exploring Futures of Ecosystem Services in Cultural Landscapes through Participatory Scenario Development in the Swabian Alb, Germany. Ecology and Society 18 (3). https://doi.org/10.5751/es-05802-180339
- Primdahl J, Pinto-Correia T, Pedroli B (2019) European Landscapes in Transition: Implications for Policy Integration and Landscape Governance. EuroChoices 18 (3): 18-23. https://doi.org/10.1111/1746-692x.12211
- Reed J, Van Vianen J, Deakin E, Barlow J, Sunderland T (2016) Integrated landscape approaches to managing social and environmental issues in the tropics: learning from the past to guide the future. Global Change Biology 22 (7): 2540-2554. https://doi.org/10.1111/gcb.13284
- Reed M (2008) Stakeholder participation for environmental management: A literature review. Biological Conservation 141 (10): 2417-2431. https://doi.org/10.1016/j.biocon.2008.07.014
- Sauer A, Luz F, Suda M, Weiland U (2005) Steigerung der Akzeptanz von FFH-Gebieten. BfN-Skripte.
- Sayer J, Sunderland T, Ghazoul J, Pfund J, Sheil D, Meijaard E, Venter M, Boedhihartono AK, Day M, Garcia C, van Oosten C, Buck L (2013) Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. Proceedings of the National Academy of Sciences 110 (21): 8349-8356. https://doi.org/10.1073/pnas.1210595110
- Schenk A, Hunziker M, Kienast F (2007) Factors influencing the acceptance of nature conservation measures—A qualitative study in Switzerland. Journal of Environmental Management 83 (1): 66-79. https://doi.org/10.1016/j.jenvman.2006.01.010
- Schneider C, Wagemann C (2013) Set-theoretic methods for the social sciences: a guide to qualitative comparative analysis. Cambridge Univiversity Press, Cambridge . [ISBN 978-1-107-60113-0 978-1-107-01352-0]
- Shearmur RG, Carrincazeaux C, Doloreux D (2018) Handbook on the Geographies of Innovation. Edward Elgar Publishing https://doi.org/10.4337/9781784710774
- Steger C, Klein J, Reid R, Lavorel S, Tucker C, Hopping K, Marchant R, Teel T, Cuni-Sanchez A, Dorji T, Greenwood G, Huber R, Kassam K, Kreuer D, Nolin A, Russell A, Sharp J, Šmid Hribar M, Thorn JR, Grant G, Mahdi M, Moreno M, Waiswa D (2021) Science with society: Evidence-based guidance for best practices in environmental

transdisciplinary work. Global Environmental Change 68 https://doi.org/10.1016/j.gloenvcha.2021.102240

- Stockemer D (2019) Quantitative Methods for the Social Sciences. Springer International Publishing https://doi.org/10.1007/978-3-319-99118-4
- Swaffield S (2013) Empowering landscape ecology-connecting science to governance through design values. Landscape Ecology 28 (6): 1193-1201. https://doi.org/10.1007/s10980-012-9765-9
- Werling B, Pennington D, Landis D (2015) Biodiversity Services and Bioenergy Landscapes. Extension Bulletin, Michigan State University.
- Westley F, Olsson P, Folke C, Homer-Dixon T, Vredenburg H, Loorbach D, Thompson J, Nilsson M, Lambin E, Sendzimir J, Banerjee B, Galaz V, van der Leeuw S (2011) Tipping Toward Sustainability: Emerging Pathways of Transformation. AMBIO 40 (7): 762-780. https://doi.org/10.1007/s13280-011-0186-9
- Wolsink M (2018) Co-production in distributed generation: renewable energy and creating space for fitting infrastructure within landscapes. Landscape Research 43 (4): 542-561. https://doi.org/10.1080/01426397.2017.1358360
- Yin R (2019) Case Study Research and Applications. SAGE Publications Ltd, Los Angeles.
- Zscheischler J, Busse M, Heitepriem N (2019) Challenges to Build up a Collaborative Landscape Management (CLM)—Lessons from a Stakeholder Analysis in Germany. Environmental Management 64 (5): 580-592. https://doi.org/10.1007/s00267-019-01205-3

ARPHA Preprints *Author-formatted, not peer-reviewed document posted on 20/11/2023*. DOI: https://doi.org/10.3897/arphapreprints.e115998

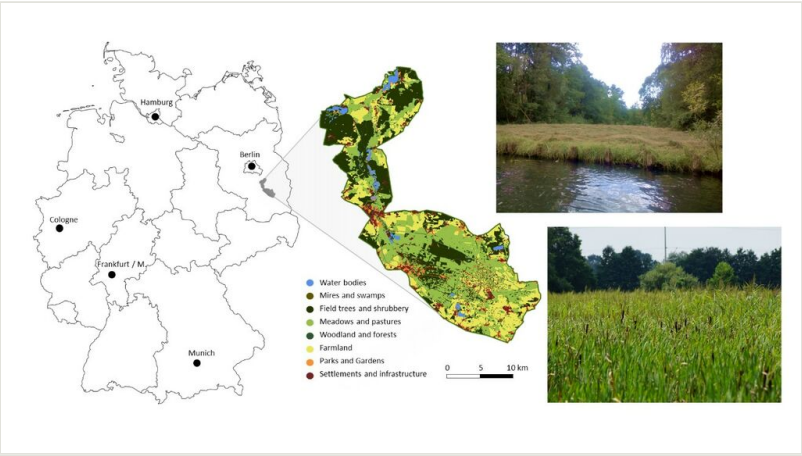

Figure 1.

The localization of the Spreewald region in Germany with the UNESCO biosphere reserve as the core part of this region. Pictures show a traditionally mowed small-scaled wetland meadow (above) and a non-used wetland meadow overgrown with reed (below).

Author-formatted, not peer-reviewed document posted on 20/11/2023. DOI:
https://doi.org/10.3897/arphapreprints.e115998

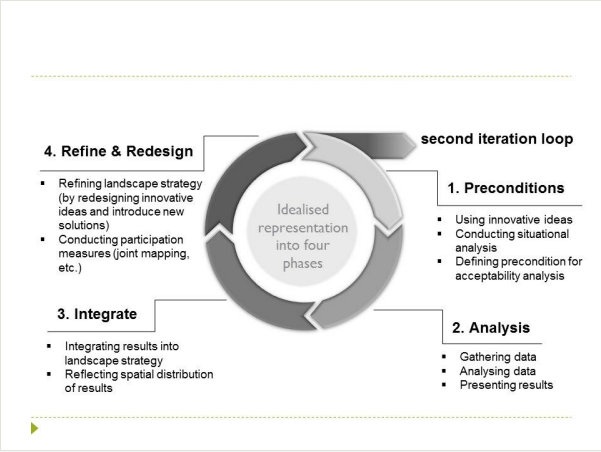

Figure 2.

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

 Author-formatted, not peer-reviewed document posted on 20/11/2023. DOI: https://doi.org/10.3897/arphapreprints.e115998

Table 1.

Concepts in social-ecological research which inspired the ALDC model.

Concepts in socio-ecological research	**Relevant aspects for the ALDC model**
Innovation system thinking (Campellone et al. 2018, Westley et al. 2011, Geels and Schot 2007)	• Sustainable transition of landscapes calls for innovations • Technical and social innovations are needed • Non-linearity of innovation processes and creation of transformation pathways • Multi-level perspective
Diffusion of innovation (Moore et al. 2015)	• 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 (Shearmur et al. 2018)	• 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 (Opdam et al. 2018, Swaffield 2013 , Nassauer and Opdam 2008)	• Collaborative design of innovations on landscape scale • Differentiation between design and management • Recognition of spatial and social heterogeneity
Adaptive co-management (Cleaver and Whaley 2018, Olsson et al. 2004).	• 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 (Kenter et al. 2015, Ott 2015)	• Including additionally to instrumental and intrinsic values also eudemonistic values • Perceiving nature values as relational values that creates a mutual interactions between humans and nature

ARPHA Preprints *Author-formatted, not peer-reviewed document posted on 20/11/2023*. DOI: https://doi.org/10.3897/arphapreprints.e115998

Supplementary material

Suppl. material 1: Framework of acceptability

Authors: Maria Busse, Nico Heitepriem, Jana Zscheischler, Rosemarie Siebert
Data type: Framework
Download file (68.00 kb)