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Landscape planning for transformative change in social-ecological systems: key paradoxes and ways forward for biodiversity and nature's contributions to people

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ABSTRACT

In Europe, landscape planning has demonstrated its capacity to guide more sustainable landscape development and support biodiversity and nature's contributions to people (NCP), yet its potential to enable transformative change at the scale and pace required remains insufficiently understood. This Perspective critically explores how landscape planning may need to transform in order to act as a catalyst for achieving transformative change in social-ecological systems. Building on transformative change literature and core scholarship in landscape planning, we conceptualize key tensions between transformative ambitions and planning practice as paradoxes of transformative landscape planning. We focus on three such paradoxes corresponding to major planning stages: (i) diverse versus integrated perspectives in assessing the status quo of biodiversity and NCP, (ii) radical versus acceptable futures in scenario development for landscape change, and (iii) political versus apolitical stances in evaluating impacts on ecosystem benefits, equity, and human well-being. For each paradox, we outline conceptual and methodological ways forward, illustrated through examples of planning practice with transformative potential. Synthesizing across the three paradoxes, we identify three characteristics of transformative landscape planning: systematic and contestation-aware involvement of diverse actors and knowledge systems, closer linking of planning with action to advance ecosystem restoration and sustainable use, and embedding planning within broader processes of governance change that shape the equitable distribution of nature's contributions to people. Together, these characteristics provide a coherent framework for advancing landscape planning as a meaningful contributor to transformative change in social-ecological systems, with implications for biodiversity conservation, ecosystem governance, and human well-being.

KEY POLICY HIGHLIGHTS

- Landscape planning can enable transformative change in social-ecological systems, including biodiversity, ecosystems, and human well-being, if it actively navigates tensions around plural knowledge, radical ambition, and politics.
- Assessments that combine integrated analyses with participatory processes are better able to incorporate diverse values, support deliberation, and guide adaptive action.
- Scenario development is more likely to support transformative change when radical ambitions are combined with plausible implementation pathways by embedding visions in stakeholder dialogue and existing "seeds" of change.
- Impact evaluations that address power, justice, and distributional effects can strengthen transparent trade-off negotiation and equitable governance.
- Delivering transformative landscape planning requires diverse actor involvement, parallel planning and action, and alignment with broader governance processes.

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1. Introduction

Across most parts of Europe, biodiversity, ecosystems, and nature's contributions to people (NCP) are under severe pressure. EU member states have failed to halt biodiversity loss, with unfavourable conservation status reported for 81% of habitat types and 63% of species protected under the Habitats Directive (EEA 2020). At the same time, the majority of NCP are declining (IPBES 2018; Brauman et al. 2020). Despite ambitious policy commitments including the European Green Deal, the EU Biodiversity Strategy and the EU Nature Restoration Legislation, recent ecological backlash – for example the documented regression of EU conservation laws (Durá-Alemñañ and López-Bao 2025) – underscores the persisting challenge of translating these initiatives into effective action (Sandström et al. 2023) that benefits both people and nature.

An expanding body of research highlights the need for transformative change to address the root causes of biodiversity loss and the decline of nature's contributions to people (Díaz et al. 2019). Following extensive scientific debate (e.g. Bulkeley et al. 2020; Salomaa and Juhola 2020; Lahsen and Turnhout 2021), the Intergovernmental Platform on Biodiversity and Ecosystem Services (Gurung et al. 2024) defines transformative change as fundamental, system-wide shifts in views, structures and practices that address the underlying root causes of nature's decline and respect principles of justice, pluralism, reciprocity and adaptive learning. This conceptualization of transformative change resonates with recurring themes in the literature, including the fair consideration of diverse perspectives and knowledge types (IPBES 2022), the articulation of radical and inspiring visions (McPhearson et al. 2021), and the centrality of power and justice (Larson et al. 2021). Operationalizing transformative change involves integrated 'nexus' approaches across biodiversity – water – food – health systems, explicitly addressing trade-offs, distributional effects, and the need for social and environmental safeguards to support just outcomes (IPBES 2024).

As an interdisciplinary field at the interface of biodiversity conservation, ecosystem governance, and societal decision-making, landscape planning is well-positioned to facilitate such transformative change. It has long engaged with many of the challenges now associated with transformative change, particularly through traditions such as communicative and collaborative planning that emphasize deliberation, participation, and the co-production of knowledge (e.g. Healey 1997). In this sense, contemporary calls for transformative change do not introduce an entirely new agenda for landscape planning, but rather intensify and recontextualise longstanding

concerns under conditions of increasing urgency, scale, and systemic complexity. Landscape planning has been characterized as 'a strong forward-looking action to restore, enhance or create landscapes' – with landscapes being understood as areas 'as perceived by people', shaped through the interaction of natural and human factors (European Landscape Convention, Council of Europe 2000). While planning models vary (Steinitz 1990; von Haaren 2004; Ahern 2006; Selman 2006; Steiner 2012), landscape planning typically involves iterative stages of scoping, assessment, scenario creation, impact exploration, plan development and implementation, and monitoring and revision, with stakeholder participation throughout (cf. Lyon et al. 2024). Situated at the interface between science and governance (Nassauer and Opdam 2008), landscape planning supports knowledge co-generation for decision-making and enables solution-oriented multi-actor collaborations, with planners assuming context-dependent roles ranging from expert to facilitator (Kruijff et al. 2022).

Through these functions, landscape planning has contributed to steering spatial development towards more sustainable pathways that affect biodiversity, NCP and human well-being (Arts et al. 2017; Wende et al. 2020; Pourtaherian and Jaeger 2022). However, contributions towards transformative change are unlikely to materialize as immediate or comprehensive outcomes. Rather, progress can be expected to emerge through advancements in indications of transformative potential, such as the emergence of transformative visions, knowledge and dynamics, as well as processes of emancipation and agency and new modes of governance (Schreiner et al. 2025). At the same time, persistent implementation deficits (Albert et al. 2020) point to the need for more critical reflection on how current theories and practices of landscape planning may both enable or constrain transformative trajectories at the scale and pace required. This calls for a more explicit articulation of how existing approaches can be reinterpreted, combined, and advanced to address the specific demands of transformative change.

The aim of this Perspective is to critically explore how landscape planning itself may need to transform in order to act as a catalyst of transformative change in social-ecological systems, with particular relevance for biodiversity, ecosystems, and human well-being. We recognize apparent contradictions between necessary requirements of transformative change and the existing conditions and constraints of practice-oriented landscape planning. Our intention is to consider those contradictions as 'paradoxes of transformative landscape planning'. We do not imply that currently distinct (*para*; Greek) dominant opinions (*doxa*) from landscape planning and the ambitions of transformative change cannot be reconciled. Instead,

our focus on paradoxes allows us to conceptualize these tensions not as a simple gap between ambition and practice, but as inherent and productive features of attempts to mobilize landscape planning for transformative change, thereby enabling both a critical assessment of these difficulties and the exploration of realistic ways forward.

Building on recent literature on transformative change and landscape planning, we focus on three key planning stages in which such paradoxes surface, and their manifestations become most apparent: (i) assessing state and trends, (ii) creating scenarios, and (iii) exploring scenario impacts. For each stage, we juxtapose ambitions of transformative change literature with the historic legacy and practical constraints of landscape planning, drawing on a targeted, interpretive synthesis of selected contributions that articulate core concepts and debates in both bodies of literature. Through iterative comparison of these two bodies of literature, as well as discussion within the interdisciplinary author team, recurring tensions are identified and distilled into three paradoxes (Figure 1). We then outline conceptual and methodological ways forward, illustrated through examples as ‘seeds’ of landscape planning with transformative potential. Drawing on

a diverse author team to reflect the integrative character of landscape planning, we bring together perspectives from science-policy studies, geography, environmental education, social and natural sciences, and planning. Taking the context of Western Europe as our vantage point, reflecting the institutional settings and expertise of the authors, we argue that the identified paradoxes and proposed responses speak to broader challenges in landscape planning well beyond this context. Ultimately, this paper aims to contribute to an ongoing conversation about how landscape planning theory and practice can evolve to better support transformative change in social-ecological systems for people and nature.

2. Paradoxes and ways forward

2.1. Diverse vs. integrated perspectives in assessing the status quo

The transformative change literature emphasizes the need to consider diverse perspectives, knowledge types and values in the assessment and interpretation of the state and trends of nature and its contributions to people (IPBES 2021). Scientific understanding is

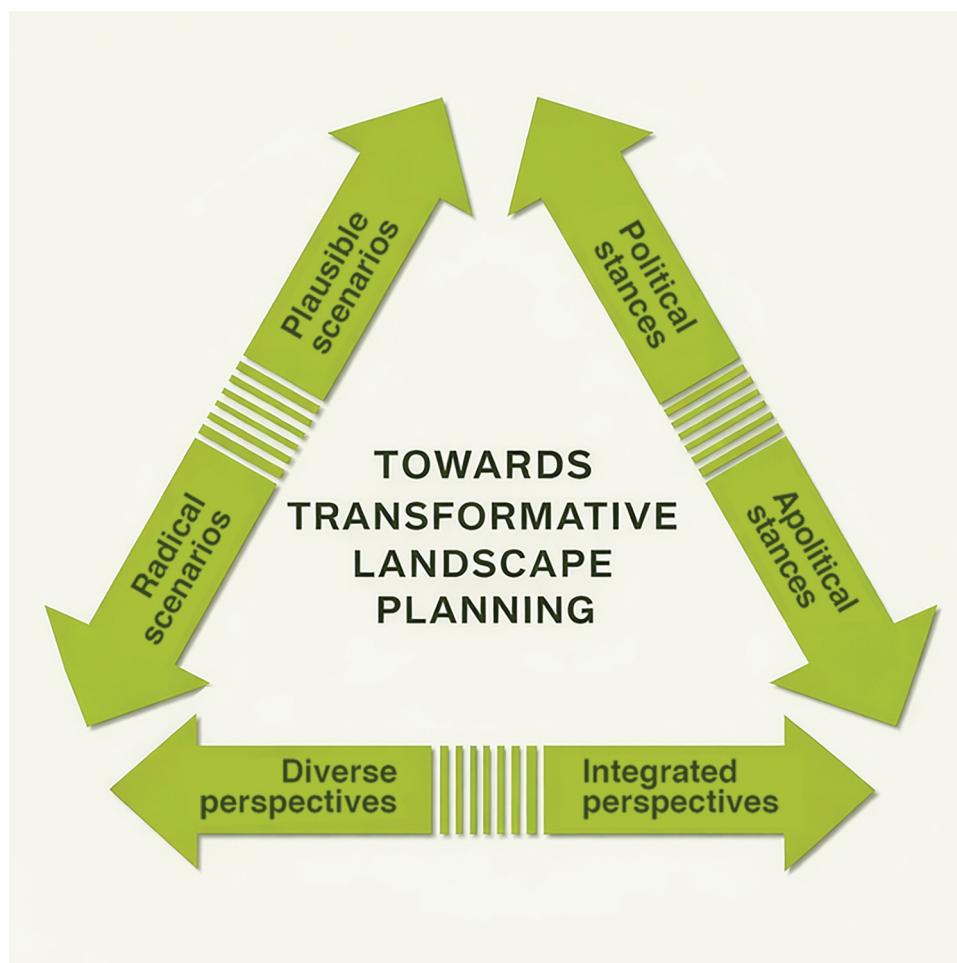


Figure 1. Three paradoxes (broad arrows) for advancing transformative landscape planning across the stages of assessing state and trends, creating scenarios, and exploring scenario impacts.

thereby considered only one of several legitimate perspectives, and thus needs to be treated equally alongside other forms of 'knowing' such as indigenous and local knowledge (McElwee et al. 2020; Osei-Amponsah and Abu Abdulai 2025). Transformative landscape planning therefore needs to actively elicit, engage with, consider and continuously respect the diversity of knowledge types and values of the various actors involved and affected (Blythe et al. 2018; Parsons and Fisher 2020; Scoones et al. 2020).

The diverse vs. integrated perspectives paradox emerges from the clash between the demand to nurture diverse knowledge types and values throughout, and the ambition of landscape planning to generate integrated and evidence-based understandings of the state and trends of nature and its contributions to people. For decades, landscape planners have experimented with participatory approaches (Luz 2000; Von Haaren and Warren-Kretzschmar 2006) to incorporate local knowledge and values, and to enhance the chances for later implementation. Participation gives agency to important knowledge holders and lets knowledge co-production serve as an instrument for justice in planning processes (Gonçalves and Pinho 2024). However, the main aim of landscape planning is to provide decision-makers and stakeholders with integrated assessments, at best based on credible scientific evidence and standardized methods (Albert et al. 2020). Landscape planners are therefore obliged to duly consider diverse perspectives and to weigh them internally as to their scientific credibility (von Haaren and Albert 2011). Furthermore, landscape planners usually face substantial limitations in resources and capacities for assessments, making it virtually impossible to comprehensively elicit alternative knowledge types and values, and to iteratively integrate them alongside scientific analysis.

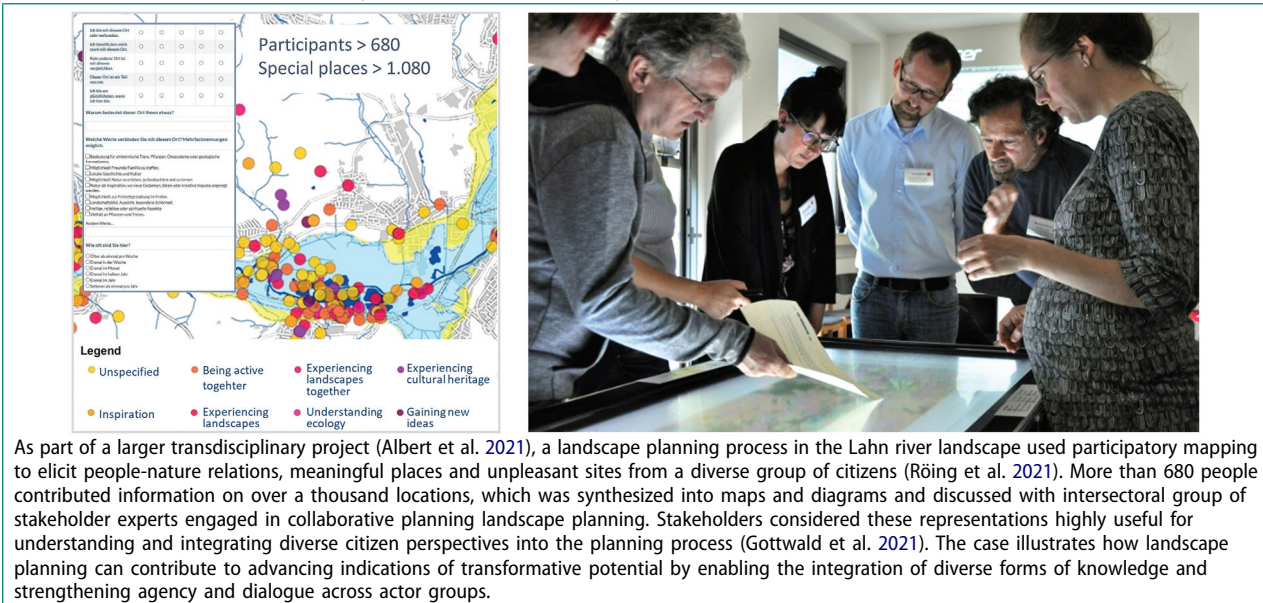
To move beyond this paradox, assessments for transformative landscape planning need to conceptualize integration not as the production of a single, comprehensive representation of reality, but as a procedural and reflexive practice of relating diverse perspectives over time (Raymond et al. 2025). Rather than seeking to fully reconcile or harmonize different knowledge types and values, ways forward lie in creating assessment processes that make diversity visible, enable comparison and deliberation, and transparently justify how different perspectives inform interpretation and action. This implies a shift from a linear conception of knowledge-society relations – where knowledge production is distant from and informs decision making – to one that understands knowledge, values, and actions as inextricably intertwined (Turnhout et al. 2019).

Building on this conceptual shift, assessments can harness opportunities, wherever feasible, to engage with diverse perspectives and values and to translate them into formats applicable within formal planning

processes. Landscape planners should assess the quality of 'knowledge claims' (Rydin 2007) and consider the broad spectrum of (integrated) valuation approaches (IPBES 2022), including deliberation about meanings and implications for action (Kueffer et al. 2019). Novel technologies have greatly enhanced the availability of detailed and up-to-date data (Galle et al. 2019) across systems (McPhearson et al. 2021) and scales (Yigitcanlar et al. 2019). They also allow for engaging more comprehensively with diverse values and knowledge types through actively or passively contributed information (Stahl Olafsson et al. 2022). When appropriately interpreted and prepared, these data can usefully inform planning processes (Makki and Morello 2026) and promote greater consideration of perspectives held by diverse local actors in governance (Schaal-Lagodzinski et al. 2024).

Following this process-oriented understanding of integration, divergent actor perspectives can be mobilized into constructive dialogue (see Box 1 for an example). This means embracing rather than avoiding contestations of beliefs, values, worldviews, and paradigms (i.e. personal sphere), of related systems and structures (political sphere), and of behavioral and technical responses (practical sphere) (O'Brien 2018). Practically, events such as workshops or field excursions should be tailored to create opportunities for people to participate in formulating problems, characterizing systems, clarifying points of similarity as well as divergence and conflict, and discussing ways to move forward (Osei-Amponsah and Abu Abdulai 2025). Creating shared understandings or comprehensive assessments should not be overemphasized, as such efforts can paralyze processes, deepen conflicts (Metzger et al. 2014) and delay action (Lahsen and Turnhout 2021). Whenever possible, outputs from assessments should explicitly acknowledge contestations, for example by appending qualitative information to quantitative assessments and providing levels of confidence and uncertainty. Creating interactive assessment outputs can allow for the simultaneous consideration of multiple perspectives and communication of how perspectives on the status quo change according to value judgements.

From this perspective, participatory involvement and just consideration of diverse perspectives requires time for longer-term collaboration to build mutual understanding and trust, adding to the credibility of outcomes of planning processes (Glendell et al. 2025). Transformative landscape planning needs to develop and deploy innovative methods that save time and resources but also curb expectations of speed at the expense of diversity. The goal of transformative landscape planning may also shift from delivering a one-time, fully integrated assessment towards facilitating a continuous, inclusive integration of diverse

Box 1. Example of diverse and integrated landscape planning.

knowledge types and values (Orta-Ortiz et al. 2025). Such inclusive integration would represent an ongoing, iterative process of knowledge and value elicitation and interpretation in constructive dialogue. This enables an accumulation and re-interpretation of insights or perspectives when they emerge. With this procedural characteristic, assessments could much better support the necessary shift towards more adaptive forms of landscape governance.

2.2. Radical vs. plausible futures in developing scenarios

Proponents of transformative change argue that to avoid reproducing the status quo, it is necessary to create radical narratives and framings that depart substantially from current ways of thinking and doing about the conservation and sustainable use of biodiversity and NCP (Kueffer et al. 2019; McPhearson et al. 2021). Radical visions should address root causes (e.g. reconnecting citizens to nature), consider multiple pathways of change, and expand the action arena, for example by mainstreaming sustainable development goals (SDGs) into local planning (Bulkeley et al. 2020). They also need to consider how ambitious higher-level policy goals can be operationalized while ‘taking plural pathways seriously’ (Scoones et al. 2020). Visioning is inherently political and contested; harnessing emerging contestations as opportunities for deliberation, negotiation, and conflict resolutions strengthens their transformative potential (Orta-Ortiz et al. 2025).

The radical vs. plausible futures paradox arises from the tension between producing spatial plans that are transformative for biodiversity and society while still being perceived as plausible and actionable. Landscape planners, together with diverse

knowledge holders, usually co-create scenarios (plausible pathways of landscape change) and ‘alternative futures’ (modelled land use and cover change) to support joint planning, learning, and decision making (Steinitz 1990; Albert et al. 2012). Creativity must be balanced with plausibility to foster new thinking while ensuring stakeholder support (Shipley and Michela 2006). Yet, truly radical visions – as needed for transformative change – carry the risk of being perceived by stakeholders as not feasible or too detached from current governance contexts (Adem Esmail et al. 2025; Brömmelstroet and Brandsma 2025). Radical visions, by their very nature, give rise to objections, especially given people’s tendency to prefer the status quo over transformative change.

To advance futures that are both radical and broadly supported, transformative landscape planning needs to first establish conceptual conditions that allow ambition and feasibility to coexist. The planning process should explicitly surface contestations, integrate diverse knowledge types, and explore multiple pathways of change. Productive deliberation over trade-offs, risks, and value conflicts allows stakeholders to collectively negotiate what is desirable, feasible, and plausible, while maintaining transformative intent (Orta-Ortiz et al. 2025). Embedding visions into narratives that highlight existing ‘seeds’ of change or emergent innovations illustrates how incremental actions may cascade into systemic transformations, fostering richer, more credible, and actionable futures than utopian scenarios alone (Pereira et al. 2020). Conceptually, these mechanisms reconcile the paradox of radical vs. plausible futures by treating plausibility as an emergent, negotiated property rather than a static constraint.

Building on these principles, landscape planners operationalize vision-led transformative change through participatory design practices (see [Box 2](#) for an example). Involving visionary thinkers (Pauleit et al. 2019), communicators, alongside diverse citizen groups – including affected communities and intergenerational representatives (Wen et al. 2018; Albrechts et al. 2020; Parsons and Fisher 2020) – can help surface novel ideas and contestations. Visualization, storytelling, and co-created narratives make radical futures tangible and open to deliberation, anchoring transformative characteristics early in participatory processes (Pereira et al. 2020; Kirby et al. 2023; Adem Esmail et al. 2025). In practice, planners enhance perceived actionability not by reducing ambition but by fostering discourses on feasible sequences of actions, leveraging existing opportunities, and building on emergent ‘seeds’ of change (Pereira et al. 2020; Riedy and Waddock 2022).

These participatory design practices should openly engage with contested implications, such as restrictions, habit changes, and trade-offs across actor groups, thereby providing inputs for cooperative solutions and, where appropriate, compensation mechanisms. Drawing on historical examples of rapid and just transitions, planners can inspire and inform processes that initiate and sustain transformations (Dryzek et al. 2019; Newell and Simms 2020).

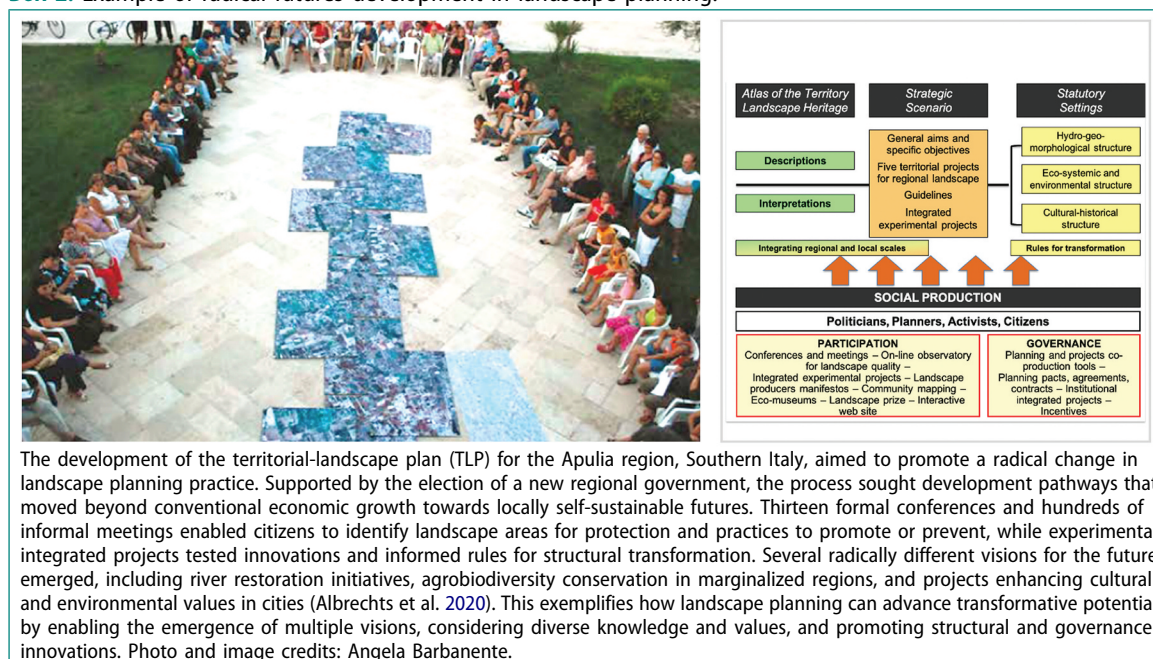
2.3. Political vs. apolitical stances in evaluating impacts

Transformative change literature places considerations of politics, justice and power at the core of

impact evaluations of biodiversity and NCP, emphasizing that planning exercises must consider contestations, power imbalances, and distributive equity across actor groups (Blythe et al. 2018; Scoones et al. 2020). Impact evaluations need to consider diverse value dimensions (Pascual et al. 2017), assess how different social groups are affected by nature, and anticipate shifts in the distribution of benefits and burdens (Daw et al. 2015). Justice considerations span the distribution of gains and costs, procedural fairness of collaboration, and the recognition of cultural differences and identities (Schlosberg and Collins 2014; Rutt and Gulsrud 2016; Buijs et al. 2024). A pluriverse perspective, moving beyond strictly anthropocentric or singular world views (Escobar 2018) can support collaborative, place-based understandings of the justice, nature, and human well-being. Conceptually, integrating these considerations transforms impact evaluations from neutral technical exercises into tools that reveal systemic power relations, foster deliberation, and enable more inclusive and transformative governance.

This political-apolitical tension emerges because landscape planning traditionally aims to provide evidence-based and ostensibly neutral decision-support. Standard approaches model scenario impacts by drawing on policy goals, using pre-defined indicators, synthesizing results into maps and diagrams, and feeding them into public deliberation processes (von Haaren et al. 2014), which may sideline key questions of who defines legitimate evidence, whose values are represented, and how the trade-offs are negotiated. Planners follow ethical

Box 2. Example of radical futures development in landscape planning.



standards to select indicators and methods that best capture societal interests and for which data are available (Albert and von Haaren 2016). However, the inherently value-laden choices in defining indicators, methods, and priorities often remain invisible, and political considerations are treated as external to the evaluation exercise. A transformative change perspective, by contrast, considers these aspects as integral to impact evaluation, and therefore addresses the challenge to embed power and justice issues into the evaluation itself, despite typical constraints on resources and capacities.

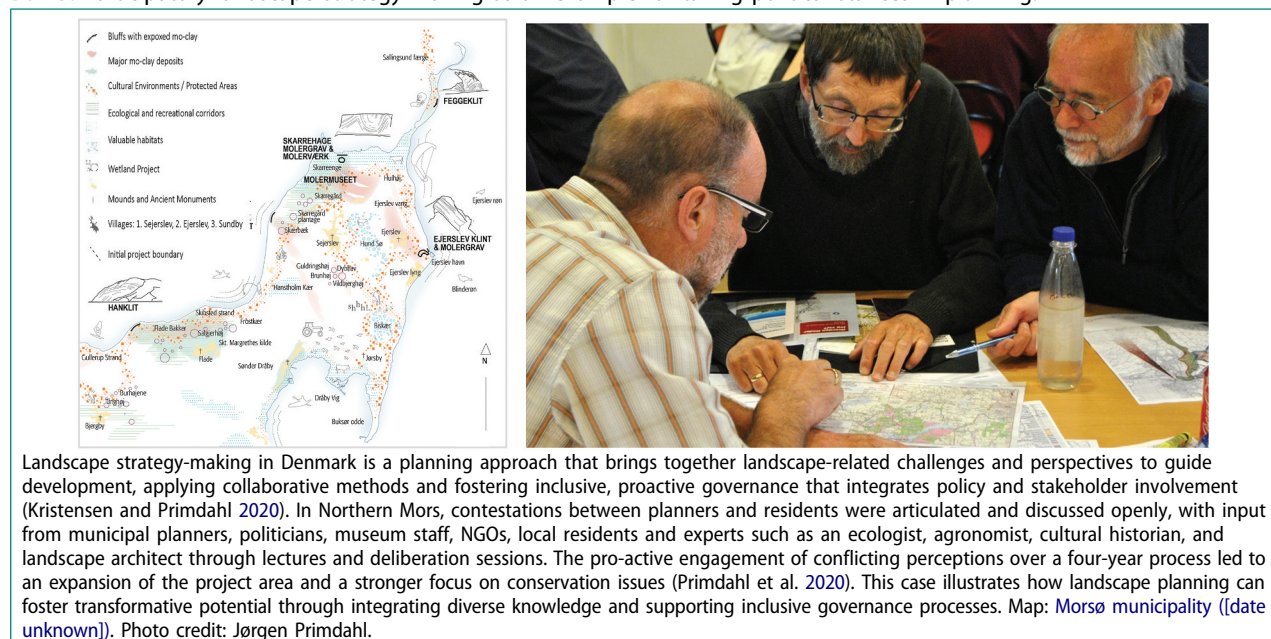
Resolving this paradox requires acknowledging and making explicit the value-laden nature of impact evaluations. Landscape planners can draw on experiences from NCP research that increasingly incorporates questions of power, equity, and justice (Loos et al. 2023). Evaluations should report confidence levels, stakeholder agreement, and the distribution of positive and negative impacts across groups (Calderón-Argelich et al. 2021), while documenting emergent contestations and potential mitigation strategies (Iwaniec et al. 2019). Explicitly addressing trade-offs and dilemmas – such as conflicts between wind energy and wildlife (Straka et al. 2020), green space loss due to densification (Haaland and van den Bosch 2015), or socio-spatial inequalities (Anguelovski et al. 2020) – enhances deliberation and enables targeted governance responses (see Box 3 for an example). Proactive engagement with resistance and power imbalances is essential, particularly for vulnerable groups (Bulkeley et al. 2020; Turnhout et al. 2020).

Impact evaluations can be further strengthened by opening decisions about what and how to evaluate, enabling multidimensional valuation (Pascual et al. 2017) and justice assessment. Such a process would allow landscape planning to explore, argumentatively contest and eventually adapt or expand the selection of indicators, methods and evidence. This involves co-designing evaluation frameworks with natural and social scientists, local and indigenous knowledge holders, and disadvantaged and underrepresented groups. Although resource intensive, such co-design can help demonstrate the social, economic, or ecological value of these approaches and thereby secure policymaker support. Communication strategies using values-based, arts-based, or technology-enhanced approaches – such as virtual or augmented reality and GIS – can enhance engagement and comprehension (Silvennoinen et al. 2022; Adem Esmail et al. 2025). Ultimately, by framing nature and landscape not merely as environmental concerns but as integral to justice among individuals, communities, and generations, impact evaluations can contribute directly to transformative potential by revealing contested values, informing equitable governance, and fostering stakeholder agency.

3. Outlook

This paper has identified key paradoxes in efforts to advance transformative landscape planning, proposed ways forward, and illustrated their practical relevance through case studies that link theory and practice. In

Box 3. Participatory landscape strategy making as an example for taking political stances in planning.



summary, these paradoxes concern the need to:

- ensure the inclusion of diverse perspectives *while* developing an integrated understanding of landscape contexts and future trends;
- create radical futures that substantially deviate from the status quo *while* securing broad societal ownership; and
- recognize the political and justice dimensions of scenario impacts *while* delivering credible and transparent decision-support.

Taken together, these paradoxes point not to contradictions to be resolved once and for all, but to enduring tensions that must be actively navigated. Across the three planning stages considered here – assessment, scenario creation, and impact evaluation – a corresponding set of three interrelated characteristics of transformative landscape planning emerge.

First, transformative landscape planning is characterized by systematic and contestation-aware involvement of diverse actors throughout the entire planning process shaping biodiversity, NCP, and people-place relations. It places people at the center as agents of change (O'Brien 2018), conceptualizes landscape as a common good for local communities and as a pedagogical arena in which people develop place-based knowledge, care, and competence (Beery 2025), and strengthens democratic practice through meaningful participation (Gonçalves and Pinho 2024). Agency is fostered through creativity, empowerment, solidarity, and networking (Kueffer et al. 2019; Andreotti et al. 2020). Central to this approach is the recognition of people-place relations as a foundation for engaging the multiple, complementary knowledge types and values systems. Rather than reinforcing a dualism between local and scientific knowledge, transformative landscape planning weaves together multiple knowledge systems, for example through participatory strategy making (Kristensen and Primdahl 2020) or knowledge co-production (Makki and Morello 2026). This shift more strongly emphasizes the role of landscape planners as facilitators of collective sense-making and knowledge co-generation (Kruijf et al. 2022). Contestations are not treated as obstacles to be minimized, but as integral and productive elements of transformation that enable deliberation over alternative futures.

Second, transformative landscape planning deliberately intertwines planning with action. Given the urgency and scale of transformative change, it does not postpone implementation until comprehensive assessments are finalized, consensus visions agreed upon, or formal planning processes concluded (Brömmelstroet and Brandsma 2025; Makki and Morello 2026). Instead, provisional assessments and

visions – sufficiently open to accommodate diverse perspectives – can guide early action. Planning and implementation unfold in parallel, with priority given to no-regret interventions that minimize unintended consequences and avoid lock-in effects. This approach aligns with adaptive transition management, where interventions are treated as hypotheses, effects are continuously monitored, and learning and reflexivity are actively fostered within a long-term strategic orientation (Buizer et al. 2016; Caniglia et al. 2021).

Third, transformative landscape planning embeds plan-making within larger processes of governance change. It ensures political mandates, transparent rules for just stakeholder involvement, and explicit recognition of the political nature of societal transformations (Görg 2007). Collaborative planning processes provide opportunities to identify existing governance arrangements, power relations, and justice issues, and to examine how these either obstruct or enable transformative change (Turnhout et al. 2020; Patterson et al. 2021; Bruley et al. 2025). Accordingly, the outputs of transformative landscape planning extend beyond spatial plans, visions, or implementation roadmaps to include deeper insights into institutional dynamics and social practices that shape transformation processes (Steele 2011). This includes identifying needs for changing mindsets, practices and institutions (O'Brien 2018), exploring options for upscaling and amplification (Geels 2019; Lam et al. 2020), and considering appropriate combinations of structural, systemic and enabling approaches (Suleiman et al. 2026). Combining long-term strategic planning and governance with incremental, place-based action remains a key challenge and opportunity (Buijs et al. 2019).

Advancing transformative landscape planning is undeniably demanding and will require substantial investments in capacities, time, and resources. Strategies for transformation must therefore remain context-sensitive and pragmatic. Grounded primarily in Western European planning contexts, our perspective reflects the institutional settings of the author team. While we posit that the identified paradoxes likely resonate more broadly, locally specific socio-ecological, cultural, political, and institutional dynamics will shape their manifestation and opportunities for action, and additional context-dependent paradoxes may emerge elsewhere.

These insights directly resonate with the ongoing IPBES methodological assessment on integrated biodiversity-inclusive spatial planning and ecological connectivity (IPBES 2023), which emphasizes participatory approaches, multiple knowledge systems, scenarios, and enabling governance conditions for advancing biodiversity and nature's contributions to people. They also align with recent IPBES nexus perspectives highlighting that spatial planning and governance integration

across sectors and scales inevitably generate trade-offs and distributional tensions that must be explicitly navigated in context-specific settings (IPBES 2024). By articulating core paradoxes and corresponding ways forward, this Perspective offers inspiration and guidance for researchers, practitioners, and assessment communities seeking to operationalize such biodiversity-inclusive spatial planning in complex, contested real-world contexts. In doing so, it highlights the distinctive contribution of landscape planning: its capacity to navigate tensions around plural knowledge, radical ambition, and politics in advancing transformative change for people and nature.

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Author contributions

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