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IPBES Spatial Planning and Connectivity Assessment

This document guides the creation of a corpus of evidence related to spatial planning and ecological connectivity/biodiversity-inclusive planning in peer-reviewed literature. This global corpus will serve as a common knowledge base developed by TSU using a standardized and robust method for both the evaluation as a whole and for each of its chapters.

**Academic literature search**

**Documenting spatial planning and ecological connectivity/biodiversity-inclusive planning** (*sensu* definition of Chapter 1)

Search criteria:

* Abstracts, title, keywords
* Abstracts in English, Spanish, Portuguese, French, Chinese
* Full papers and reports (including conference proceedings, books and book chapters, editorials)

**R1. We will search for scientific articles and grey literature.** Documents will be retrieved from OpenAlex,and based on suggestions by the expert group. Proposed temporal limit: 1992-2025 **(TBC)**

In this review, we acknowledge the existence of similar, albeit discrete, bodies of literature on spatial planning and ecological connectivity and/or biodiversity-inclusive planning, and therefore expect that the literature may fit into one or more of these bodies of literature.

Search terms:

**1st LEVEL**

**[About biodiversity inclusive planning and ecological connectivity] and related terms**

("agricultural management planning" OR "anticipatory planning" OR "blue infrastructure" OR "community based planning" OR "community-based planning" OR "connectivity" OR "conservation planning" OR "ecologic\* corridor" OR "ecological networks" OR "ecological restoration" OR "ecosystem restoration" OR "ecosystem-based management" OR "ecosystem based management" OR "environmental impact assessment" OR "forest management planning" OR "green infrastructure" OR "habitat corridor" OR "habitat restoration" OR "inland waters planning" OR "integrated coastal zone management" OR "land allocation" OR "land governance" OR "land use governance" OR "land-use governance" OR "land use management" OR "land use model\*" OR "land use planning" OR "land-use planning" OR "land use scenario\*" OR "land-use management" OR "land-use model\*" OR "land-use scenario\*" OR "landscape governance" OR "landscape management" OR "landscape planning" OR "landscape restoration" OR "maretories" OR "marine governance" OR "nature based solutions" OR "nature-based solutions" OR "ocean use management" OR "OECM\*" OR "participatory planning" OR "place-based planning" OR "place based planning" OR "protected area\*" OR "regional planning" OR "remote ocean areas" OR "reserve design" OR "restoration ecology" OR "restoration planning" OR "rewilding" OR "scenario planning" OR "sea use management" OR "sea-use management" OR "seascape governance" OR "seascape planning" OR "sectorial planning" OR "spatial composition" OR "spatial configuration" OR "spatial conservation prioriti\*" OR "spatial development" OR "spatial forest planning" OR "spatial governance" OR "spatial planning" OR "spatial prioriti\*" OR "spatial prioritization" OR "spatial transformation" OR "stepping stones" OR "strategic environmental assessment" OR "territorial planning" OR "urban planning" OR "wildlife corridor" OR "zoning") AND ("environ\*" OR "conserv\*" OR "biodivers\*" OR “ecosystem\*” OR “nature\*” OR “planet\*” OR “Earth” OR “biosphere” OR habitat\* OR “ecolog\*” OR “restor\*” OR “specie\*” OR ocean\* OR sea\* OR coast\* OR "protected area\*" OR "nature futures framework”)

**Note:** [use dictionary suggested by Aidin and used for the Transformative Change Assessment]

**2nd LEVEL: Chapter and section-specific refinements of the 1st level search**

**AND Keywords for Chapter 1**

Keywords (can be multiple sets):

1. ("land use planning" OR "spatial planning") AND ("biodiversity goals" OR "ecosystem services") AND ("societal needs" OR "value-based planning")
2. ("adaptive planning" OR "scenario planning" OR "transformative pathways") AND ("monitoring" OR "feedback mechanisms")
3. ("evidence-based planning" OR "precautionary principle") AND ("Indigenous knowledge" OR "local knowledge" OR "ILK")
4. ("multi-level governance" OR "transparent governance" OR "accountable planning") AND ("customary governance" OR "policy coherence")
5. ("participatory planning" OR "community engagement") AND ("co-design" OR "stakeholder participation")
6. ("equity" OR "rights-based approaches" OR "land tenure") AND ("indigenous rights" OR "fairness" OR "just outcomes")
7. ("ecological connectivity" OR "land-sea connectivity" OR "cross-scale planning") AND ("nexus interdependencies" OR "climate-biodiversity linkages")

Research questions:

Section 1, chap 1:

Why is biodiversity-inclusive spatial planning, with ecological connectivity at its core, essential for addressing the interlinked drivers of biodiversity loss and for building resilient, sustainable socio-ecological systems?

Why is it critical to align biodiversity-inclusive spatial planning with diverse policy goals (across land, freshwater, and marine realms) to reduce trade-offs, enhance synergies, and support integrated decision-making for nature and people?

Why must biodiversity-inclusive spatial planning processes recognize and incorporate Indigenous and local knowledge systems, biocultural relationships, and customary governance to ensure just, inclusive, and effective outcomes for biodiversity and people?

Section 2, Chap 2:

What does biodiversity-inclusive spatial planning mean in practice, and how does it integrate ecological connectivity, ecosystem functions, and NCP across land, freshwater, and marine realms?

What principles and characteristics distinguish biodiversity-inclusive spatial planning from conventional approaches, particularly in its ability to support multifunctional working land, freshwater and seascapes and align conservation with sustainable use and human well-being?

How do Indigenous Peoples and local communities conceptualize spatial planning and ecological connectivity, and what does biodiversity-inclusive planning look like when grounded in biocultural relationships, customary governance, and diverse worldviews?

What makes biodiversity-inclusive spatial planning a transformative approach for reconciling diverse values, goals, knowledge systems, and governance models in support of ecological and cultural connectivity?

Section 3, Chap 1:

1. Why is recognising the plurality of spatial planning approaches (across ecological contexts such as working landscapes, high-integrity ecosystems, and degraded areas) essential for tailoring biodiversity-inclusive planning to real-world conditions?
2. Why must BISP engage with diverse governance systems, legal frameworks, and scales (from global conventions to local customary governance) to ensure coherence, legitimacy, and effectiveness across sectors and jurisdictions? *.*
3. Why is it important to embrace multiple planning objectives, values, and instruments (including those reflected in the Nature Futures Framework and tools such as OECMs, PES, IPAs, and protected areas) to support inclusive, just, and transformative outcomes for biodiversity and people? *.*

**AND Keywords for Chapter 2**

Chapter 2 has many subsets that they would like to keep separate. Please see the list below.

List of sets: each set is produced via the original 1st level string + AND

1. **GBF-1 - Urban: (**urban OR cit\* OR periurban OR OR metropolis)
2. **GBF-1 - Rural: (**rural OR agricultur\* OR forest\* OR mountain)
3. **GBF-1 - Freshwater: (f**reshwater OR lake\* OR stream\* OR current OR river\* OR wetland\* OR watershed OR groundwater OR aquifer\* OR lagoon\* OR peatland\*)
4. **GBF-1 - Marine: (**sea OR marine OR ocean OR coast OR mangrove OR seagrass OR saltwater OR “brackish water” OR "tidal flats" OR "intertidal zone" OR subtidal)
5. GBF - 2 (Ecosystem restoration): (restoration OR degrad\* OR regeneration OR “ecosystem rehabilitation” OR “environmental rehabilitation” OR rewilding OR abandonment OR “let nature do the job” OR renaturalization OR reclamation OR conservation OR protection)
6. Target 3 (Protected areas / conservation coverage): ("protected areas" OR conservation OR connectivity OR "biodiversity hot spots" OR OECMs)
7. Target 4 (Species extinction & genetic diversity): (extinction OR "human-wildlife conflict" OR "genetic diversity" OR "Red List of Threated Species" OR “Red List of Ecosystems” OR RLE)
8. Target 5 (Wild species trade & use): ("Wildlife trade" OR harvesting OR overexploitation OR poaching OR CITES)
9. Target 6 (Invasive alien species): (“invasive alien species” OR "invasive species" OR "alien species" OR IAS)
10. Target 7 (Pollution): (pollution OR "nutrient runoff" OR "excess nutrients" OR pesticide\* OR \*plastic OR “PFAS” OR “forever chemicals” OR contamination OR eutrophication OR “industrial liquid waste” OR “solid waste” OR waste OR “saline intrusion”)
11. Target 8 (Climate change & resilience): (“climate change” OR resilience OR "nature-based solutions" OR "ocean acidification")
12. Target 9 (Wild species management & use): (“wild species management” OR “sustainable use of wild species” OR “indigenous people\*” OR IPLC\* OR “community-based management”)
13. Target 10 (Sustainability in agriculture, aquaculture, forestry & fisheries): (agriculture OR agroecology OR forestry OR "fisheries aquaculture" OR “land use management” OR “water use management” OR "recreational fisheries")
14. Target 11 (Nature’s contributions to people / ecosystem services): (“ecosystem services” OR “nature’s contributions to people” OR NCP\* OR “people’s contributions to nature”)
15. Target 12 (Green & blue spaces, urban planning): (“green space\*” OR “blue space\*” OR “urban planning” OR “green infrastructure” OR “blue infrastructure” OR “green areas”)
16. Target 13 (Genetic resources & benefit sharing): (“genetic resources” OR “benefit sharing” OR ILK OR “traditional knowledge” OR “Nagoya protocol”)
17. Target 14 (Biodiversity integration in decision-making): (“ biodiversity policy” OR “environmental impact assessment” OR EIA OR “strategic environmental assessment” OR SEA OR “biodiversity valuation” OR “biodiversity action”)
18. Target 15 (Business & financial institutions disclosure & risk): (compan\* OR "corporate responsibility" OR business\* OR "supply chain\*" OR “corporate biodiversity reporting” OR “social responsibility” OR business OR investment)
19. Target 16 (Sustainable consumption): (“sustainable consumption” OR waste OR footprint)
20. Target 17 (Biosafety): (biosafety OR biotechnology OR GMO OR “genetically modified organisms”)
21. Target 18 (Harmful incentives / subsidies): (subsidies OR incentives OR PES OR "payments for ecosystem services")
22. Target 19 (Finance mobilisation): (“finance mobilization” OR “funding” OR“private sector” OR “biodiversity investments”)
23. Target 20 (Capacity building, technology & cooperation): (“capacity building” OR education OR technology OR cooperation OR innovation)
24. Target 21 (Data, knowledge & monitoring): (“data governance” OR monitoring OR research OR evaluation)
25. Target 22 (Participation & inclusion): (“indigenous peoples” OR ILK OR “local communities” OR youth OR “participatory governance” OR minorit\* OR "procedural justice" OR non-human OR women OR girls OR rights OR defender\* OR activist\* OR guardian\*)
26. Target 23 (Gender equality): (gender OR women\* OR woman\* OR girls)
27. Related to spatial planning process: (“planning phases” OR “planning stages” OR “planning steps” OR “planning cycle” OR policy formulation OR “decision-making” OR “local planning practices of indigenous people” OR “traditional practices of indigenous people” OR “planning guidelines”)

The following sets, still for chapter 2, should all begin with this string, followed by AND: (SDG OR "sustainable development" OR "rural development" OR "urban development") AND

### **SDG 1 – No Poverty Keywords:** (poverty OR "income inequality" OR "social protection" OR livelihoods OR "economic growth")

### **SDG 2 – Zero Hunger Keywords:** (food OR agricultur\* OR \*nutrition OR hunger OR farm\*)

### **SDG 3 – Good Health and Well-being Keywords:** (health\* OR mortality OR diseases OR pandemics OR well-being OR wellbeing)

### **SDG 4 – Quality Education Keywords:** (education OR literacy OR learning OR training OR teach\* OR school\*)

### **SDG 5 – Gender Equality Keywords:** (women OR gender OR equal pay OR reproductive rights OR discrimination OR intersectionality OR “gender equality”)

### **SDG 6 – Clean Water and Sanitation Keywords:** (\*water\* OR sanitation OR hygiene OR WASH OR “blue infrastructure”)

### **SDG 7 – Affordable and Clean Energy Keywords:** (energy OR solar OR wind power OR electricity OR "clean fuel\*" OR "green technology" OR agrivoltaic\* OR bioenergy)

### **SDG 8 – Decent Work and Economic Growth Keywords:** (employment OR labor OR "economic growth" OR entrepreneurship OR job\* OR work)

### **SDG 9 – Industry, Innovation and Infrastructure Keywords:** (infrastructure OR industr\* OR innovation OR technology OR manufacturing OR transport OR digital\*)

### **SDG 10 – Reduced Inequalities Keywords:** ("social inclusion" OR "economic equality" OR marginaliz\* OR redistribution OR accessibility)

### **SDG 11 – Sustainable Cities and Communities Keywords:** (urban\* OR housing OR cities OR city OR "green spaces" OR "green infrastructure" OR flood)

### **SDG 12 – Responsible Consumption and Production Keywords:** ("sustainable production" OR waste OR "circular economy" OR recycling OR "sustainable consumption" OR certification OR "resource efficiency")

### **SDG 13 – Climate Action Keywords:** ("climate change" OR emissions OR "climate resilience" OR "global warming" OR adaptation OR mitigation OR "greenhouse gases" OR "climate policy" OR "climate finance" OR "disaster risk reduction" OR "nature-based solutions" OR "NbS")

### **SDG 14 – Life Below Water Keywords:** (marine OR ocean OR coral OR fish\* OR coast\*)

### **SDG 15 – Life on Land Keywords:** (biodiversity OR \*forest\* OR desertification OR wildlife OR soil OR nature)

### **SDG 16 – Peace, Justice and Strong Institutions Keywords:** (governance OR "human rights" OR "rule of law" OR corruption OR justice OR peace OR transparency OR security OR democracy)

### **SDG 17 – Partnerships for the Goals Keywords:** (partnerships OR finance OR trade OR data OR "technology transfer" OR "multilateral governance" OR "international aid" OR cooperation)

Finally, a final set that should also follow the 1st level set, with an AND clause

1. Water: (Water\* OR Hydro\* OR Catchment OR “blue infrastructure”)
2. Food: (food OR agricultur\* OR \*nutrition OR hunger OR farm\*)
3. Health: (health\* OR mortality OR diseases OR pandemics OR well-being OR wellbeing)
4. Climate: (Climate OR energy OR emission\* OR GHG OR greenhouse gas\* OR flood\* OR drought\*)

**Research questions:**

Does spatial planning help to support the different international goals (SDGs, GBF targets, nexus elements)

**AND Keywords for Chapter 3** (including guiding questions to ask the TSU to search)

Keywords (each set is separate):

1. ("freshwater" OR "protected areas" OR "OECM" OR "other effective area-based conservation measures" OR “ITT” OR “indigenous and traditional territories” OR “conserved areas”) AND ("NBSAP" OR "National Biodiversity Strategy and Action Plan" OR “National Target” OR “downscaling”) AND ("case study" OR "best practice" OR "conservation planning" OR "spatial prioritization" OR “spatial planning”) AND ("regional" OR "national" OR "subnational" OR "mountain" OR "marine" OR "Indigenous customary land" OR "Indigenous Protected Areas" OR "transboundary cooperation")
2. (ecological restoration" OR "ecosystem restoration" OR "habitat restoration" OR "forest landscape restoration" OR "FLR") AND ("marine restoration" OR "wetland restoration" OR "freshwater restoration" OR "grassland restoration" OR "agroecosystem restoration" OR “mountains ecosystem”) AND ("inclusivity" OR "participation" OR "co-management" OR "Indigenous knowledge" OR "traditional ecological knowledge" OR "ILK" OR "local knowledge" OR "community-based restoration" OR "stakeholder engagement" OR "social equity" OR "justice" OR "gender inclusion")
3. ("restoration planning" OR "ecological restoration") AND ("ecosystem integrity" OR "ecological connectivity" OR “corridors” OR “migration pathways” OR "climate resilience" OR "participatory approaches")
4. “spatial conservation planning” OR “landscape conservation planning” OR “conservation gap analysis” OR “systematic conservation planning” OR “ecoregion conservation” OR “transboundary conservation planning”
5. “protected area planning” OR “protected area connectivity planning” OR “conservation priority areas” OR “marine protected area planning”
6. “landscape connectivity and conservation” OR “species connectivity “OR “planning conservation network” OR “ecological connectivity planning” OR “conservation corridor planning” OR “network conservation planning” OR “marine conservation planning” OR “seascape conservation planning” OR “wetland conservation planning”
7. “conservation planning” AND “ecosystem services”
8. “participatory conservation mapping” OR “community conservation mapping” OR “participatory spatial planning and conservation”
9. (“conservation effectiveness” OR “protected area management effectiveness” OR “monitoring conservation effectiveness” OR “protected area system effectiveness”) AND “spatial planning”
10. (“adaptive management” AND (“global change” OR “climate change” OR “land use change” OR “sea use change” OR “invasive species” OR “overexploitation” OR “pollution”) AND “spatial planning”)

Research questions:

* What are the principles to account for when planning for effective ecological restoration?
* What are the objectives of spatial restoration planning?
* How can planning for restoration inside and outside PAs/OECMs be operationalized through integrated spatial-planning tools and decision frameworks that are transparent, evidence-based and locally legitimate?
* What are the criteria for measuring the progress of restoration including those from ILK (e.g. absence of threats, physical conditions, species composition, structural diversity, ecosystem functions, external changes)?
* How is spatial conservation planning defined/conceptualized? How widely do these definitions vary across geography, culture, knowledge systems, level of economic development, governance mechanism?
* What are the basic principles of spatial planning for biodiversity conservation? Do these principles vary across measures? What are the differences between planning for a single site versus a network of sites?
* What are we monitoring for, process or outcomes and for which response variables?
* Which methods are used in assessing progress towards Target 3? ? How do these vary geographically, culturally and across knowledge systems? How do we weave indicators from different knowledge systems?
* How can conservation and restoration targets be effectively integrated in planning?
* What does adaptive management mean in the context of spatial planning?

**AND Keywords for Chapter 4** (including guiding questions to ask the TSU to search)

**Keywords (can be multiple sets):**

1. "ecologic\* connectivity" AND review article (Document Types)
2. ("ecological connectivity" OR "habitat connectivity" OR "landscape connectivity" OR "wildlife corridor\*" OR "biological corridor\*") AND (benefits OR advantages OR positive OR impacts OR opportunities) AND (risks OR drawbacks OR negative OR impacts OR challenges) AND ("ecosystem services" OR ecosystem management")
3. ("structural connect\*" OR "functional connect\*")
4. ("connectivity analysis" OR "network analysis" OR "circuit theor\*" OR "least-cost path\*" OR "graph theory" OR "resistant kernels" OR "agent-based models" OR "Conefor" OR "pattern-oriented model\*" OR "state-space model\*" OR "corridor model\*" OR "simulated individual" OR "movement paths" OR "hidden Markov models" OR "effective connectivity" OR "gene flow")
5. ("ecological connectivity" AND (indicator\* OR index OR metric\* OR objective))
6. ("ecological connectivity" OR "landscape connectivity" OR "functional connectivity" OR "connectivity conservation") AND (policy\* OR framework\* OR governance OR "planning instrument" OR initiative OR agreement OR global OR international OR "regional strategy" OR "transboundary cooperation" OR "joint management" OR "cross-border conservation" OR "bioregional planning")
7. ("ecological connectivity" OR "spatial governance") AND ("multi-level governance" OR "cross-scale governance" OR "transboundary governance") AND ("inclusive governance" OR "community-based management" OR co-management) AND ("Indigenous Peoples" OR "Local Communities" OR IPLCs) AND ("policy coherence" OR "cross-sectoral integration") AND ("land tenure" OR "property rights" OR "private land conservation")
8. (dispersal OR migration OR nomadism OR "landscape permeability")

**Research questions:**

* What is connectivity and why do we need it?
* What are the benefits of connectivity to biodiversity, people and climate change mitigation/adaptation?
* What is functional versus structural connecitvity and how do we measure/model these across different spatial and biologic scales
* How should connectivity relate to and be integrated into connectivity planning?
* How would we know if our work to maintain, restore or enhance connectivity are working at different scales and thus what do we need to measure/report on?
* How is connectivity explicitly or implicitly related to the GBF and other global and regional and national frameworks/policies?
* What governance considerations need to be considered and incorporated into conservation planning?
* What are the knowledge, policy implementation, institutional and financial gaps, and what are the opportunities for innovation?

**AND Keywords for Chapter 5** (including guiding questions to ask the TSU to search)

**Section 1:**

Keywords (can be multiple sets):

1. (Future AND (project\* OR predict\* OR forecast\* OR scenario))
2. (Future AND (pathway\* OR narrative\* OR storyline\* OR foresight OR vision\*, horizon scan\* OR trajectory OR imagination\*))
3. (Future-proof\* OR “anticipat\*” OR “forward-look\*” OR “futures thinking” OR “future-oriented” OR "prospective” OR "plausible future\*" OR "scenario planning")
4. (Foresight\* OR backcasting OR simulat\* OR “delphi method\*” OR storytelling OR “environmental scan\*” OR trend\* OR megatrend\*)
5. (Model\* AND scenari\*)

Research questions:

1. What does future-proofing mean?
2. Why does foresight matter for spatial planning & ecological connectivity (e.g., decision-making under uncertainties, surprises, moving targets, shifting-baseline syndrome, inspiration/imaginations as prerequisite for transformative change)?
3. How can foresight contribute to transformative change and shape/better inform spatial planning policy?
4. How different foresight tools (e.g., scenarios, visioning, horizon scanning, participatory foresight and ILK/LK integration) support spatial planning.

**Section 2:**

Keywords (can be multiple sets):

Search keywords for this section should be the same as Section 1.

1. Research questions:Whether, and how, various “broad” future-proofing methodological approaches (scenarios, visioning, horizon scanning, …) could fit and be used under different archetypes of spatial planning systems.
2. How biodiversity-inclusive principles underpin specific suitable/good practices (methods and their variants) within different future-proofing methodological approaches, and how suitable/good practices may vary across archetypes of spatial planning systems.
3. To document real-world spatial planning applications of the methodological approaches (section 2.1) and practices (section 2.2), including ILK/LC-led initiatives, and multiple contexts (e.g., informal settlements, neighborhood-oriented planning) to identify what approaches and practices are used, how, and for whom.

**Section 3:**

Keywords (can be multiple sets):

**1. Set 1 (Drivers)**: ("drivers of change" OR "biodiversity driver" OR "social-ecological driver" OR "technological driver" OR "perennial driver" OR "emerging driver" OR "cascading driver")

**2. Set 2 (Methods for drivers): ("**Integrated assessment" OR "land-use change model" OR "Scenario model\*" OR "Social-ecological model\*" OR agent-based model\*" OR "telecoupled systems model\*" OR "hybrid model\*" OR "participatory model\*" OR "data-driven foresight model\*")

**3. Set 3 (Gaps): ("**value-based driver" OR "compound driver" OR "interacting driver" OR "distant driver")

Research questions:

1. What are the potential drivers of change and their trajectories?
2. How are drivers represented in existing modelling of biodiversity, ecosystem services and ecological connectivity.
3. How these drivers are considered in spatial planning processes
4. What are the gaps in model representation and planning considerations (e.g. limited consideration of compounding/cascading effects, insufficient modeling of telecoupled systems and distant divers, underrepresentation of ILK and value-based drivers)

**Section 4:**

Keywords (can be multiple sets):

**1. Set 1 (Interactions)**: (Synerg\* OR tradeoff\* OR trade-off\* OR nexus OR win-win OR "cross-sectoral interaction\*" OR co-benefit\*)

**2. Set 2 (Response options): ("**Integrated planning" OR "multifunctional\*" OR "nature-based solution\*" OR "adaptive governance" OR "cross-sectoral governance")

**3. Set 3:** (Spatial OR temporal OR thematic OR cross-scale) AND (Synerg\* OR tradeoff\* OR trade-off\* OR nexus OR win-win)

Research questions:

1. What does future (biodiversity-inclusive) spatial planning tell us about synergies and trade-offs in the biodiversity-food-water-health-climate-energy nexus? Discuss how spatial planning can serve as a cross-sectoral interface that mediates these nexus relationships.
2. How spatial planning could help identify and improve synergies and reduce trade-offs?
3. Identify policy and planning responses (e.g., integrated land-water-climate planning, nature-based solutions, multifunctional landscapes, adaptive governace) that reduce tradeoffs, promote/maximize synergies
4. What kinds of synergies and tradeoffs ILK/LC consider in their future-looking spatial planning? And how do they do so? What do they leave out?

**Section 5:**

Keywords (can be multiple sets):

1. ("Adaptative management" OR "Adaptative governance" OR "Transformative adaptation" OR "Adaptive systems" OR "Adaptive foresight")

2. Uncertainty quantification: ("Model uncertainty" OR "data uncertainty" OR "decision-making under uncertainty" OR "planning uncertainty" OR "scenario uncertainty" OR "epistemic uncertainty" OR "ontological uncertainty")

1. ("Tipping points" OR Thresholds OR "Planetary boundaries" OR "Nonlinear system dynamics" OR Surprise)
2. ("Cascading risk" OR "Risk management" OR "Environmental shocks" OR "Environmental risks" OR "Precautionary approach")

Research questions:

1. How limitations in available data, assumptions, and predictive models affect planning and decision-making, and how to account for these uncertainties. Explain how uncertainty may propagate across stages of planning.
2. How can foresight approaches be used to plan for an uncertain future and account for changing societal demands, environmental change, and shifting global contexts? Highlight how foresight moves beyond prediction – enabling preparing for multiple plausible futures rather than a single forecast.
3. How to deal with future risks (uncertainties) in spatial planning policy and decision-making (e.g., precautionary principles, risk assessments, adaptative management)
4. How ILK conceptualizes uncertainty, surprises, and how to navigate them, and discuss complementaries between ILK approach and scientific foresight methods to emphasize co-production of knowledge for navigating surprises and transformation.

**Section 6:**

Keywords (can be multiple sets):

1. Set 1 (knowledge to action): ("Science-policy-practice" OR "transformative pathways" OR "transdisciplinary co-production")

2. Set 2 (ILK integration): ("Knowledge co-production" OR "community-based spatial planning" OR "indigenous mapping" OR "traditional knowledge" OR "participatory scenario planning")

3. Set 3 (enabling factors): ("Multi-level governance" OR "institutional capacity" OR "cross-sectoral coordination")

4. Set 4 (shocks, surprises, and uncertainties): ("Planning for uncertainty" OR "adaptive planning" OR "resilience planning" OR "anticipatory governance")

Research questions:

1. How spatial planning can act as a lever for transformation and highlight examples where foresight-driven spatial planning has catalyzed transformation (e.g., adaptive coastal zone management, multifunctional landscape planning. )
2. How foresight outputs can be translated into concrete planning tools and decision-support systems. Explore potential mechanisms for operationalization with illustration of case studies.
3. Explore barriers that influence the uptake of foresight and transformative practices.
4. Identify institutional, governance, and socio-political enablers for effective use of foresight approaches in spatial planning (e.g., cross-sectoral coordination, capacity building, learning culture)

**Chapter 5 – Keywords for cross-cutting themes**

**1. Cross cutting theme Set 1**

1. **Scales and telecoupling**

("Spatial scaling" OR "Temporal scaling" OR "Social scale" OR "Nested governance" OR "Multi-scale planning" OR "Cross-scale interaction\*" OR Telecoupling OR Teleconnection OR Metacoupling OR Spillover)

**2. Cross cutting theme set 2**

1. **Co-production in spatial planning**

("Indigenous and Local Knowledge" OR ILK "Co-production of knowledge" OR "Knowledge pluralism and epistemic diversity" OR "Community-based natural resource management" OR CBNRM OR "Biocultural landscapes and seascapes" OR "Traditional ecological knowledge" OR TEK OR "Customary governance and tenure systems" OR "Participatory mapping and spatial planning" OR "Cross-cultural knowledge integration" OR "Ethical and equitable inclusion of ILK holders" OR "Gender and Social Inclusion" OR "Gender-responsive spatial planning" OR "Intersectionality and equity in decision-making" OR "Women’s roles in biodiversity governance" OR "Gendered access to resources and land rights" OR "Empowerment and capacity-building for women and marginalized groups")

**AND Keywords for Chapter 6** (including guiding questions to ask the TSU to search)

List of sets:

1. Institutional & Governance Structures: ("institutional arrangements" OR "governance structures" OR "cross-sector coordination" OR "multi-level governance" OR "inter-agency collaboration" OR "policy coherence" OR "environmental governance" OR "landscape governance" OR "seascape governance" OR "integrated landscape management")
2. Political & Strategic Leadership: ("political support" OR "environmental leadership" OR "ministerial alignment" OR "strategic prioritization" OR "national biodiversity strateg\*")
3. Socio-Cultural & Stakeholder Engagement: ("stakeholder engagement" OR participation OR co-design OR co-production OR "community-based management" OR "indigenous governance" OR "traditional knowledge" OR "Free, Prior and Informed Consent" OR FPIC OR "stakeholder workshops" OR "stakeholder dialogues" OR "public consultation")
4. Collaboration, Trust & Networks: (collaboration OR trust OR partnership OR "multi-stakeholder platform" OR coalition OR "inter-organizational network" OR cooperation)
5. Financial & Economic Mechanisms: ("biodiversity finance" OR "blended finance" OR "green finance" OR "conservation trust funds" OR "Payment of ecosystem services" OR "natural capital accounting" OR "biodiversity offsets")
6. Legal & Policy Frameworks: ("environmental law" OR legislation OR "statutory framework" OR "policy instruments" OR "regulatory mechanisms" OR SEA OR "Environmental Impact Assessment")
7. Human & Institutional Capacity: ("institutional capacity" OR "technical expertise" OR "capacity building" OR training OR "professional development" OR "institutional strengthening" OR "workforce development" OR education OR pipeline OR "diversity and inclusion" OR "gender inequality" OR "girl's education" OR "Indigenous knowledge" OR "generational knowledge" OR "institutional memory")
8. Data, Knowledge & Decision-Support Systems: ("species distribution maps" OR "land cover data" OR "protected area data" OR "monitoring and evaluation" OR "decision-support tools" OR "ecological model\*" OR "scenario planning and analysis" OR "systematic conservation planning and model\*" OR "systematic conservation planning tools" OR "biodiversity targets" OR "science communication" OR "science-practice gap" OR "participatory mapping and model\*" OR "Indigenous knowledge" OR "knowledge co-production" OR "scenario narratives" OR "evidence bridge" OR "boundary spanner and organization" OR "early adopter" OR "knowledge and data management" OR "spatial data infrastructure" OR "CARE principles" OR "FAIR principles" OR "open science" OR "information delivery" OR "data standards" OR metadata OR "data stewardship" OR "data management plan" OR "data sharing agreement" OR "data archive" OR "data repository" OR "quality assurance" OR "quality control" OR "data structure")
9. Ecological & Spatial Planning: ("spatial planning" OR "landscape governance" OR "territorial integration" OR "land-use planning" OR "ecological connectivity" OR "ecological networks" OR "ecological corridors" OR "green infrastructure" OR "nature-based Strategic spatial planning solutions" OR "restoration planning" OR "blue infrastructure" OR "blue-green infrastructure" OR "spatial decision-making" OR "strategic spatial planning")
10. Cross-Cutting Process Enablers: ("adaptive management" OR "feedback mechanisms" OR "monitoring and learning" OR "institutional innovation" OR "continuous improvement")

**Expected output-Ch6**: a list of papers that relate broadly to enabling environment **AND** biodiversity-inclusive spatial planning and ecological connectivity => nº hits

**R2. Screen for papers with concrete examples (e.g. case-studies, “example\*”) for the chapters which will look for empirical examples/cases from the literature**

* In abstracts, title, keywords
* Search criteria: (“case stud\*” OR “case” OR “study area\*” OR “example\*” OR “evaluation” OR “concrete” OR “empirical”, OR “practical” OR “initiative\*”)

Ch6 is also looking for case studies/examples, so please run the search by combining our Ch6 keywords with this R2.

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