Background document on subset of tools to support participatory, integrated and biodiversity-inclusive spatial planning under KMGBF Target 1

27th meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) of the Convention on Biological Diversity (CBD)
Panama City, Panama 20-24 October 2025

I. Introduction: what is spatial planning?

Growing global demands for resources is leading to increasing competition for space, thereby putting ecosystems and their services under pressure. When space is well-managed, development and conservation can co-exist, and even co-benefit, to achieve mutual gains for nature, people, and climate[1]. This was recognized in the landmark adoption of the Kunming-Montreal Global Biodiversity Framework, or KMGBF, which sets global targets for nature for 2030. Specifically, Target 1 of the Kunming-Montreal Global Biodiversity Framework calls for all areas to be "under participatory, integrated biodiversity-inclusive spatial planning" by 2030 (see Glossary in Annex 1).

Spatial planning is a collaborative process to decide where and when human activities take place, in order to achieve economic, ecological, and social goals. While there are many approaches to spatial planning[2], systematic planning approaches provide a transparent and structured way to identify, assign, and monitor actions for conservation, sustainable use, and/or restoration[3]. A central part in spatial planning is identifying where management actions can best achieve desired objectives in the most effective and cost-efficient way[4]; this is called spatial prioritization.

A wide range of software tools can be used for spatial prioritization (for a detailed overview, see[5]). While these tools differ in their speed, flexibility, and customizability, they share a common purpose: offering a science-based, transparent, and systematic approach to support decision-making in spatial planning. Compared with simple overlays, these tools allow policymakers and technical experts to make more strategic choices that balance conservation with development and other human uses. Selecting the right tool depends on the planner's technical capacity and the specific context, but all tools provide scientifically strong options for countries working to deliver on Target 1 of the KMGBF.

II. The need for participatory tools in spatial planning

Spatial prioritization can be a powerful way to guide where different management actions should take place, ensuring resources are used effectively, and benefits are shared fairly. However, there are some initial barriers for planners and stakeholders to overcome. These include the technical expertise required to use the selected software, and the need to communicate the planning process clearly to foster stakeholder understanding and engagement. This is essential for collaborative spatial planning, for building trust, and for encouraging effective participation. A transparent planning process can facilitate informed

[1]Neubert, S. et al. (2025). Multiple-use spatial planning for sustainable development and conservation. Trends Ecol. Evol. https://doi.org/10.1016/j.tree.2025.09.007
[2]Stelzenmüller, V. et al. (2013) Practical tools to support marine spatial planning: A review and some prototype tools. Mar. Policy 38, 214–227
[3]Margules, C.R. and Pressey, R.L. (2000) Systematic conservation planning. Nature 405, 243–253
[4]Tallis, H. et al. (2021) Prioritizing actions: spatial action maps for conservation. Ann. N. Y. Acad. Sci. 1505, 118–141
[5]Giakoumi, S. et al. (2025) Advances in systematic conservation planning to meet global biodiversity goals. Trends Ecol. Evol. 40, 395-410

discussions, help to define objectives and priorities more clearly while avoiding misunderstandings, and support the design of actionable spatial plans.

To address these challenges, a range of tools has been developed to democratize spatial prioritization. These tools are either easy-to-use applications of available software or independent programs. They help planners and stakeholders explore spatial plans according to their priorities and make well-informed, participatory decisions.

III. Current tools available for participatory spatial planning

This background document introduces a subset of spatial prioritization tools that aim to support national policymakers and technical experts, assisting them in understanding and accessing tools for their efforts towards conservation and Target 1 of the GBF. The tools introduced here are widely used, accessible to planners and stakeholders, and well suited to national-level applications. In practice, however, another tool may be more appropriate for specific analyses, particularly where requirements go beyond what the outlined examples can provide.

To note: The below is a non-exhaustive list of participatory tools for spatial prioritization. Additional tools for participatory spatial planning are available in the SBSTTA/26/INF/16/Rev.1, and others are in development (see[1] for more examples).

A. ELSA Integrated Spatial Planning Tool

The ELSA Integrated Spatial Planning Tool on UN Biodiversity Lab (UNBL) is a customized application of the Essential Life Support Area (ELSA) framework, a participatory process to integrated spatial planning that empowers countries to meet their biodiversity, climate, and sustainable development commitments simultaneously. The ELSA Integrated Spatial Planning Tool is designed specifically to support national action around the KMGBF targets and indicators. This free of charge, open-source, cloud-hosted tool provides stakeholders in all countries with a science-based methodology to identify national priority areas on land where protection, restoration, management, and urban greening can lead to the best outcomes across the KMGBF targets and indicators.

By leveraging global datasets and state-of-the-art spatial prioritization methods, the ELSA Integrated Spatial Planning Tool allows users to assess national priorities and make informed decisions to balance competing land uses. Users can adjust priorities, set area constraints, and undertake several iterations of the analysis to ensure critical areas are adequately protected or restored, while addressing economic and societal needs. The resulting spatial prioritization map can directly support the implementation of Targets 1, 2, and 3 of the KMGBF, with co-benefits for Targets 4-12, and has the potential to respond to needs flagged in CBD Decision 16/12. This interactive and flexible process ensures that decision-making is both evidence-based and adaptable, supporting better outcomes for people and the planet.

For any questions or enquiries related to the ELSA Integrated Spatial Planning Tool, and further capacity building materials, please reach out to Annie Virnig (anne.virnig@undp.org) and Marion Marigo (marion.marigo@undp.org).

B. Marxan Planning Platform (MaPP)

The Marxan Planning Platform (MaPP) is a free and open-source tool that helps spatial planners with the effective allocation of management actions for conservation and sustainable development. By leveraging cloud computing and cutting-edge technology, it streamlines the process of designing, analyzing, and implementing spatial plans that align with national and global priorities. MaPP equips planners with the tools to create targeted strategies that balance environmental protection with economic considerations.

MaPP enables users to design new plans, integrate existing planning efforts, and collaborate with stakeholders, all within an online platform that ensures efficient data management and privacy. The platform's ability to test scenarios, identify gaps, and generate clear visualizations ensures that plans are transparent, evidence-based, and defensible. MaPP has many functionalities of the Marxan software suite, the most widely used spatial prioritization tool for real-world conservation planning in terrestrial, marine and freshwater environments. MaPP particularly supports KMGBF Targets 1, 2, 3, 8, and 11 by enabling spatially explicit optimization for protected area expansion, ecosystem restoration, climate resilience, and ecosystem service maintenance across land, water and sea. It also supports KMGBF Target 21 by improving access to and usability of diverse environmental and spatial data. The platform's transparent, scenario-based process contributes to KMGBF Targets 14 and 23 on equitable governance and participatory decision-making. MaPP has the potential to respond to the needs around biodiversity-inclusive spatial planning highlighted in CBD Decision 16/12, and to contribute to marine spatial planning and ecosystem-based approaches, consistent with CBD Decision 16/17.

For any questions or enquiries, please contact marxanadmin@tnc.org.

C. WePlan-Forests

WePlan-Forests is an open-access tool designed to support national forest and landscape restoration efforts in tropical and subtropical countries, and thereby deliver the highest benefits for climate and biodiversity, while also considering the cost of restoration. Using environmental and economic data, WePlan-Forests helps decision-makers identify the most effective places to restore forests that work best for their country's priorities and available resources. Built to support implementation of the KMGBF, the tool can aid in turning global and national goals into practical, country-specific restoration strategies.

Policymakers and stakeholders can explore scenarios online, adjust targets, and create tailored, evidence-based plans without needing specialist training in spatial modelling or programming. WePlan-Forests supports the implementation of the KMGBF targets related to restoration (Target 2), species conservation (Target 4), and climate mitigation (Target 8). It also contributes to the goals of the UN Decade on Ecosystem Restoration by translating high-level pledges into actionable national priorities, and has the potential to respond to needs around biodiversity-inclusive spatial planning highlighted in CBD Decision 16/12. WePlan-Forests supports KMGBF Targets 1, 2, 3, 10, and 11 by allowing for the spatial allocation of actions for forest restoration, sustainable management, and ecosystem service enhancement within landscapes. It integrates multiple ecological and economic values in an accessible platform to support participatory planning, contributing to KMGBF Targets 14 and 23 on inclusive governance and equitable decision-making.

For any questions or enquiries, please contact Jamal Annaglyjova (jamal.annagylyjova@un.org).

IV. Choosing a participatory spatial planning tool

Taking a systematic approach, regardless of which participatory spatial prioritization tool is used, is already an important step towards transparent, efficient, and reproducible integrated spatial planning. Still, some practical considerations can help planners and decision-makers select the most appropriate tool for their needs.

1. The planning context of the project, such as forest restoration, marine conservation, or planning for multiple management zones, can influence which tool is most suitable, as can the geographic scale of the analysis.
2. Data availability and quality are also important considerations. Where only limited data exist, a tool with a strong foundation of pre-compiled datasets may be the most practical option. Where high-resolution regional data are available, or when data availability is generally strong, a tool that provides greater flexibility in incorporating diverse datasets might be a better fit.
3. Capacity and engagement of planners and stakeholders are additional factors to consider. Some tools offer guided processes that can be easier to use with limited technical expertise, while others provide more flexibility but may require additional skills to apply and interpret results. Similarly, certain approaches are structured to support participatory dialogue and provide outputs that are immediately useful for policy discussions, whereas others produce more technical results that may need interpretation for broader audiences.

Selecting an approach involves aligning the tool's features with the objectives, data environment, and capacity of the planning context. When considered carefully, tools for participatory spatial planning can help decision makers explore trade-offs, identify priorities, and develop plans that are inclusive, evidence-informed, and actionable.

Table 1. High-level comparison of the tools for participatory spatial planning.

	ELSA	MaPP	WePlan-Forests

Summary	A national-scale tool to identify priority areas for conservation, restoration, and sustainable management.	A web-based version of Marxan for scenario-based conservation planning.	A forest restoration planning tool that balances objectives for biodiversity, climate, and costs.
Expected outputs	A map and other summary information for actions around conservation, restoration, sustainable development, and urban greening	A map and other summary information for a wide range of user-defined actions (e.g., conservation, restoration, any type of human uses such as agriculture, energy generation, fishing, etc.)	A map and other summary information for forest restoration
Cost	Free of charge	Free of charge	Free of charge
Open access	Yes	Yes	Yes
User profile	National policymakers, NGOs, academia, intergovernmental organisations	National policymakers, NGOs, academia, spatial planners, technical staff	National policymakers, NGOs, academia, forest agencies, intergovernmental organisations
Technical expertise required	No GIS expertise; basic understanding of systematic conservation planning and spatial prioritization	Basic to medium GIS expertise; basic understanding of spatial prioritization	No GIS expertise; medium understanding of systematic conservation planning and spatial prioritization
Input data	Global layers included in analysis and available on UNBL; national data added in co-design	Some global data layers available for use in analysis; user uploads all other required data	Global layers included in analysis; no additional data upload possible
Flexibility in the analysis	Medium (adjustment of some parameters possible)	High (completely custom analysis possible)	Low (guided analysis with few adjustments possible)
Realm	Terrestrial	Terrestrial, freshwater, marine	Terrestrial (tropical and subtropical forests)
Availability	All countries	All countries	37 countries

How to access	On UNBL, by request	On the MaPP website	Through the WePlan-Forests online tool

V. Conclusion

As indicated in this document, tools for participatory spatial planning are enabling countries to take meaningful steps toward implementing Target 1 of the GBF. By providing transparent, evidence-based, and inclusive approaches, these tools support informed decision-making, facilitate stakeholder engagement, and help balance conservation and development objectives. Careful consideration of planning context, data availability, and institutional capacity remains essential to maximize the impact of these approaches. Effectively integrating participatory spatial planning tools into national processes will be key to turning global biodiversity targets into actionable, country-specific strategies that benefit nature, people, and climate.

Annex I: Glossary

This glossary is adapted from Neubert et al[1].

Geographic information system (GIS): Designated software to collect, store, analyze and visualize data linked to geographic information (spatial data).

Integrated spatial planning: Participatory, integrated, and biodiversity-inclusive spatial planning builds on traditional spatial planning by emphasizing collaboration in decision-making and by placing biodiversity at the center of the planning process. It guides the spatial allocation of human activities and actions across terrestrial, freshwater, and marine systems to simultaneously achieve social, economic, and ecological objectives, while explicitly integrating biodiversity considerations.

Systematic conservation planning: A structured approach for selecting, allocating, and evaluating areas for biodiversity conservation, restoration, or sustainable use through a series of steps. It is guided by principles such as complementarity, irreplaceability, representativeness, adequacy, connectivity, and efficiency, and frequently employs decision-support tools to balance biodiversity conservation with social and economic factors. Spatial prioritization is one step in this process.

Spatial data: Geographic information that describes the landscape, including locations of biodiversity-rich areas, land costs, or human activities, which can be used as inputs in spatial optimization.

Spatial planning (marine or land-use): A "method or process for analysing and allocating the spatial and temporal distribution of activities in a given environment in order to achieve various objectives, including ecological, social and economic objectives"[6,7].

Spatial prioritization: A subset of broader planning processes (e.g., systematic conservation planning) focused on allocating actions in space and time, using optimization or other methods.

Trade-off analysis: A method for assessing conflicting objectives in spatial planning, such as conservation versus economic development, or disparities in how different stakeholders experience costs and benefits.

Zones: Different land-use or management designations assigned to different locations within the same planning region, enabling more complex spatial allocations than simple inclusion/exclusion. These zones may support individual actions (e.g., fishing, offshore wind, conservation) or multiple actions (e.g., sustainable use zones), and may target one or multiple objectives.

Acknowledgments

This document was written by Sandra Neubert (UNDP), Annie Virnig (UNDP), and Marion Marigo (UNDP). We extend thanks to Jamal Annagylyjova (CBD), Neil Burgess (UNEP-WCMC), Melissa de Kock (UNEP-WCMC), Jennifer McGowan (TNC), Violeta Muñoz-Fuentes (UNEP-WCMC), Cristina Telhado (UNEP-WCMC), and Oscar Venter (UNDP) for their input and review of earlier versions of the document. This document was prepared by the UNBL Partnership with funding from the Gordon and Betty Moore Foundation. We welcome contributions to expand the tools and resources listed here to better support Parties in their work around biodiversity-inclusive spatial planning. Please contact Annie Virnig (anne.virnig@undp.org) with input or suggestions.

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[6]Metternicht, G. (2017). Land Use and Spatial Planning: Enabling Sustainable Management of Land Resources. Springer Briefs in Earth Sciences, Springer.

[7]IPBES. (2024). *Annex II to decision IPBES-10/1: Scoping report for a methodological assessment of integrated biodiversity-inclusive spatial planning and ecological connectivity*. IPBES. Available at: https://files.ipbes.net/ipbes-web-prod-public-files/2024-08/decision_10_1_annex_2.pdf