UN Biodiversity Lab (UNBL) Global Biodiversity Framework (GBF) Mapping Project

TECHNICAL REPORT

Enabling Implementation of NBSAP and KMGBF Targets in Ghana

UNBiodiversity Lab

MINISTRY OF ENVIRONMENT, SCIENCE & TECHNOLOGY
FREEDOM AND JUSTICE
MEST

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Policy Note for Decision Makers

https://unbiodiversitylab.org/policy-note-ghana/

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1. Introduction

Ghana's land mass encompasses a wide range of ecological systems, including rainforests, semi-deciduous forests, savannah woodlands, wetlands, mangroves and coastal habitats along the Gulf of Guinea. These landscapes hold considerable biodiversity, supporting threatened species such as forest elephants, pangolins, marine turtles and manatees, alongside valuable timber and non-timber plant resources. However, pressures from deforestation, illegal mining, land-use conversion, overexploitation, and climate change continue to erode ecological integrity. The loss of these ecosystems threatens not only species survival but also the ecosystem services they provide—food production, water regulation, carbon storage, tourism potential and the cultural values embedded in local communities. Maintaining ecological health is therefore central to Ghana's ambition for inclusive, climate-resilient development and sustainable rural livelihoods.

In this context, the Kunming–Montreal Global Biodiversity Framework (KMGBF) of the Convention on Biological Diversity (CBD)—with its vision of living in harmony with nature—is particularly relevant for Ghana. KMGBF Target 1, which prioritizes biodiversity-inclusive spatial planning, offers a major opportunity for the country to operationalize nature-positive development by integrating biodiversity into land-use planning, infrastructure development, agriculture, mining, and coastal management.

Spatial data is essential for the implementation of the KMGBF targets; it will also be essential for monitoring and reporting on progress to achieve these targets: 41% of the headline indicators and 36% of the component indicators have methodology encouraging the use of spatial data. In particular, KMGBF Targets 1, 2 and 3 – which aim to spatially plan and manage all areas to reduce biodiversity loss; restore 30% of all degraded ecosystems; and conserve 30% of land, waters and seas – depend on the use of geospatial data for identifying areas for sustainable management, restoration and protection. Implementation of KMGBF Targets 4-12 and 14 can also be bolstered by spatial planning, according to a report released by the International Union for the Conservation of Nature (IUCN) in October 2024.

In this context, the Ministry of Environment, Science and Technology (MEST) of Ghana implemented the UNBL-GBF Mapping Project from Q2 2024 – Q4 2025 in partnership with key national stakeholders to support national use of spatial data to achieve KMGBF Targets 1, 2, 3 and provide powerful co-benefits for Targets 4, 7, 8, 10, 11, and 12. This work was undertaken with the support of the United Nations Development Programme (UNDP) and the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), as well as the broader UN Biodiversity Lab (UNBL) partnership. The project built on current and previous collaborations such as the UNEP-WCMC-led Nature Transitions Support Project (NTSP), implemented with the support of UNDP, and the National Monitoring Support Initiative (NMSI), implemented by UNEP-WCMC.

The UNBL-GBF Mapping Project, funded by the Gordon and Betty Moore Foundation, mobilized key national stakeholders and experts to undertake a series of activities to develop an Essential Life Support Area (ELSA) priority action map to support National Biodiversity Strategy and Action Plan (NBSAP) and KMGBF targets, to use UNBL to bolster Ghana's efforts around using geospatial data to monitor and report on the indicators of the KMGBF Monitoring Framework, and to co-develop UNBL to further increase its value to support Ghana in their commitments to the KMGBF.

In Ghana, under the leadership of MEST, the work was undertaken collaboratively with key national stakeholders. These included representatives of 16 institutions, including the Land Use and Spatial Planning Authority (LUSPA), Conservation Alliance (CA), Environmental Protection Agency (EPA), Forestry Commission (FC), and the Geological Survey Department and Centre for Remote Sensing and Geographic Information Services (CERSGIS), among others. These partners helped to select and design project activities in two ways: (1) guiding development of a spatial prioritization analysis to support NBSAP implementation and contributions to achieve the KMGBF; and (2) selecting activities most helpful to support the development of a national monitoring system and production of the Seventh National Report (7NR) to the CBD.

For the first workstream, national stakeholders provided critical input to an **integrated spatial planning process** designed to support the country to identify and evaluate potential nature-based action areas that would support the achievement of national environmental, climate, and socio-economic priorities, as defined by KMGBF Targets 1-4, 7, 8, and 10-12. This supported the government to leverage existing global and national datasets and worldclass spatial prioritization approaches to create and validate an ELSA priority action map identifying where protection/conservation measures could contribute to the delivery of KMGBF Target 3; sustainable management measures could contribute to the delivery of KMGBF Target 10; restoration efforts could contribute to the delivery of KMGBF Target 2; and enhancing green spaces and urban planning could contribute to the delivery of KMGBF Target 12. The spatial prioritization identified locations for these nature-based actions that also maximized co-benefits for achieving KMGBF Targets 1, 4, 7, 8, and 11. The resulting ELSA priority action maps can also support the implementation of the Land Degradation Neutrality (LDN) response hierarchy under the UN Convention to Combat Desertification (UNCCD). The LDN response hierarchy is a structured approach to achieve neutrality by prioritizing prevention, minimizing ongoing degradation, and restoring degraded land.

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For the second workstream, national stakeholders took part in various ad-hoc monitoring activities designed to enhance the use of the UNBL platform for monitoring and reporting on KMGBF targets in their country. These activities included: (1) creating a **central repository for national data in Ghana's UNBL workspace**; (2) executing **capacity building and training on UNBL** to enable national stakeholders to utilize features most relevant to action around the KMGBF; and (3) executing a **training on geospatial data that can support production of the 7NR**.

This work led to recommendations to achieve KMGBF Targets 1-4, 7, 8, and 10-12, and to support relevant policy development, implementation, monitoring, and reporting. The capacity building offerings developed in partnership with MEST and provided to technical experts were designed to support handover of the Ghana workspace on UNBL and the ELSA spatial prioritization data, tool, and outputs to facilitate ownership and use throughout the implementation period of the NBSAP and the KMGBF.

In this technical report, we describe in detail the methodological steps and results for the spatial analysis products and tools created to support the objectives of the UNBL-GBF Mapping Project. The final list of outputs generated in partnership with national stakeholders through the project includes:

1. **ELSA priority action maps** that identify where protection, restoration, sustainable management and urban greening efforts should be focused to lead to the best national outcomes for Targets 1-4, 7, 8, and 10-12 of the KMGBF (*summarized in section 2 of this report*).

2. Policy Note to support national use and uptake of UNBL and the ELSA priority action maps in the context of KMGBF implementation (*summarized in the* policy note).

3. **National secure UNBL workspace** for Ghana (*summarized in section 3 of this report*).

4. **ELSA Integrated Spatial Planning Tool** configuration available through the national workspace for Ghana on UNBL to support updates and iteration of the spatial prioritization analysis (*described in the* ELSA Integrated Spatial Planning Tool User Guide).

5. **Capacity development and training materials on UN Biodiversity Lab** to support national efforts around NBSAP implementation and 7NR development (*summarized in section 3 of this report*).

6. **Capacity development and training on geospatial data available to support 7NR production** (*summarized in section 3 of this report*).

Please see Annex 2 for a full list of project documents and reports related to these products, and Annex 3 for all relevant user guides, including guidance on accessing Ghana's UNBL workspace and using Ghana's ELSA Integrated Spatial Planning Tool configuration on UNBL.

2. ELSA priority action map to support KMGBF targets

The ELSA priority action map to support actions to achieve the spatial KMGBF targets was developed through five distinct project steps (Figure 1). The steps are designed around a holistic, community-centered, context-specific, and adaptive approach to integrated spatial planning.

Figure 1. Five steps for creating an ELSA priority action map to support action towards KMGBF targets (Images adapted from Rice et al.[1])

1 Rice, W.S., Sowman, M.R., and Bavinck, M. (2020). Using Theory of Change to improve post-2020 conservation: A proposed framework and recommendations for use. Conserv Sci Pract 2, e301. https://doi.org/10.1111/csp2.301.

Step 1

Convene national leadership team

The first step of the integrated spatial planning process involves engaging experts with relevant knowledge and stakeholders with vested interest or influence in the outcome. Engaging these groups to become leaders in the co-design and application of the spatial planning process is essential, because it ensures that the resulting spatial plan is credible, trusted, and applicable in policy making. The engagement of stakeholders was done through a core stakeholder working group, in charge of advancing specific questions in a timely manner, and a broader involvement of stakeholders to disseminate the results and ensure the process is understood and used, moving forward. Broad participation also helps develop a community of practice around the common objective of data-driven environmental decision-making while nurturing champions to help integrate the outputs of this spatial planning process into national and subnational policy and action.

In Ghana, the MEST acted as the convening partner to identify members of the core working group undertaking the spatial prioritization mapping exercise, in close coordination with the UNDP Country Office. Together with the UNBL team, the core working group met regularly to ensure the project's implementation.

To successfully implement the spatial planning component of the project, a series of workshops and working groups were organized. An inception workshop on 27 March 2025 co-defined project objectives and established two working groups to carry forward the work around spatial planning (Working Group 1) and monitoring and reporting (Working Group 2). The spatial planning workstream was executed through a series of meetings of Working Group 1. These included: (1) a first meeting to introduce the methodology on 15 May 2025, (2) a second meeting to co-create the spatial prioritization map on 11 and 13 August 2025, and (3) a results-sharing workshop on 16 October 2025. The first meeting of Working Group 1 discussed objectives for the integrated spatial planning process, national priorities to achieve the spatial KMGBF targets, and national data important for inclusion in the spatial prioritization analysis. In the second meeting of Working Group 1, participants and experts had the opportunity to co-create the spatial prioritization analysis used to develop the ELSA priority action map by reviewing and weighting the data layers used for developing the ELSA priority action map, assessing tradeoffs, and collectively agreeing on a map showing where nature-based actions could best achieve KMGBF Targets 1-4, 7, 8, and 10-12. Finally, during the results-sharing workshop, the results were reviewed with key stakeholders, and high-level policymakers and experts discussed next steps for implementation based on final products.

Working Group 1 brought together a subset of important stakeholders for the integrated spatial planning process, led by MEST and including different stakeholders involved in Ghana's 7NR to the CBD, with the aim of including the various approaches within the ministry and aligning with the areas working on the rapid update of the NBSAP. The stakeholders that participated in the process included the Conservation Alliance, Forestry Commission, LUSPA and the Ghana Statistical Services, among others.

Other civil society organizations that participated in the meetings include the University of Ghana-based Centre for Biodiversity Conservation Research, and the Centre for Remote Sensing and Geographic Information Services, as well as the IUCN.

Step 2

Develop a national vision

The central goal of the UNBL-GBF Mapping Project was to support Ghana in their work to implement the NBSAP in line with the KMGBF's targets. The KMGBF sets 4 goals and 23 targets to guide global action on biodiversity through 2050. KMGBF Target 1 aims to ensure that all areas are under participatory, integrated, and biodiversity inclusive spatial planning and/or effective management processes addressing land and sea use change. It also includes elements around bringing the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity, close to zero by 2030, while respecting the rights of indigenous peoples and local communities.

The achievement of Target 1 is also closely linked to Target 2 (restoration) and Target 3 (protection), both of which will require spatial data and capacity for analysis and planning. Spatial data and planning can additionally support efforts around the other spatial targets, including Targets 4-12 and 14, according to a report released by IUCN in October 2024.

The national vision for the UNBL-GBF Mapping Project in Ghana was developed through stakeholder engagement sessions focusing specifically on national policy commitments aligned with the KMGBF. These sessions emphasized national goals to develop an ELSA priority action map to identify where areas to protect (Target 3), restore (Target 2), sustainably manage (Target 10) and urban green (Target 12) nature could best contribute to achieving not only KMGBF Targets 1-3, 10, and 12, but also contribute to the achievement of KMGBF Targets 7, 8, and 11. To guide the spatial prioritization process, specific area-based constraints (also called 'area-based targets') were identified for the proportion of Ghana's land area within the ELSA priority action map that should be identified for 1) protection, 2) restoration, 3) management, and 4) urban greening. Following consultations, the default area-based constraints were set as follows:

- **Protection:** 30% based on KMGBF Target 3.
- **Restoration:** 30% of degraded areas in Ghana (29.1% of land area) based on KMGBF Target 2.
- **Sustainable Management:** 5% based on expert opinion from the core project team and review by Working Group 1.
- **Urban Greening:** 30% of urban extent in Ghana (0.12% of land area) based on expert opinion from the core project team and alignment with KMGBF Targets 2 and 3, as well as final review by Working Group 1.

Note: The actions referenced here are the functional equivalent of actions of the LDN response hierarchy supported under UNCCD. 'Protect' is the equivalent of 'avoid' land degradation, 'manage' is the equivalent of 'reduce' land degradation, and 'restore' is the equivalent of 'reverse' land degradation. In summary, this equates 'Protect–Manage–Restore' with 'Avoid–Reduce–Reverse', ensuring alignment across global biodiversity frameworks. For more information on each KMGBF Target, please see the CBD website. For more information on the LDN response hierarchy, see the UNCCD website.

Step 3

Gather spatial data

Datasets were identified to support the qualitative elements of KMGBF Targets 1, 2, 3, 4, 7, 8, 10, 11 and 12 which were the targets that could be spatially mapped with available national and global data. When identifying datasets, national data took precedence over global data as they tend to better reflect national conditions, be viewed as more accurate by national users, and are more likely to be formally recognized for official use by governments.

Spatial data was compiled to meet two basic needs: 1) delineation of where nature-based actions - termed 'zones' – for protection, restoration, sustainable management and urban greening can occur, and 2) spatial proxies for KMGBF targets, termed 'planning features'. This process was aided by a foundational global data stack available through the ELSA Integrated Spatial Planning Tool on UNBL, which includes a default set of planning features based on global data selected. These initial planning features were selected either because they were directly referenced in the metadata of the KMGBF Monitoring Framework for the target, or because they were identified as an important layer to support spatial planning for the target by an independent UNBL Expert Advisory Committee. Working from this foundational global dataset significantly reduces the time needed in the data collection phase of the integrated spatial planning process by providing an initial set of data that can be screened for relevancy at the national level and used as a guide to identify national datasets for inclusion.

The identification of relevant national data was undertaken through a data hackathon where national stakeholders and data experts identified existing national datasets related to each of the KMGBF targets (Meeting 2 of Working Group 1). Once the national datasets were identified, the core team engaged national data owners and relevant national institutions to secure permission to use these data.

All national datasets were screened by the core team to ensure they were spatially explicit with area-based information, contained sufficient metadata, and were consistently mapped at the national level. Datasets were then further filtered to retain only datasets that could serve at least one of the two data needs, which were either: a) mapping possible locations for zones, or b) serving as planning features. National data used for planning features replaced global data from the foundational data stack where it better mapped KMGBF targets at the national level. Finally, any global datasets from the foundational data stack that were important for data needs not covered by national data were reviewed with Working Group 1 to ensure they were nationally acceptable.

A total of 7 national datasets for the data needs of KMGBF Targets 3 and 12 were selected to map priority action areas in Ghana. These national datasets were complemented by 27 global datasets mapping KMGBF Targets 1, 2, 4, 7, 8, 10, and 11, which also filled in additional spatial data gaps for KMGBF Target 3 (Figure 2). The primary dataset used to restrict the potential location of each nature-based action zone was global data on human footprint from Brooke et al., 2020.[2] Datasets to map planning features spanned coarse filter proxies for biodiversity, such as nationally identified important ecosystems (e.g., intact ecosystems, mangroves) and fine filter maps (e.g., key biodiversity areas) important to map KMGBF Targets 1, 2, 3, 4, and 7. Other datasets represented important spatial proxies for opportunities to either mitigate or adapt to climate change (e.g., biomass carbon density, drought abatement opportunities) important for the achievement of KMGBF Targets 8 and 11, while others represented ecosystem services important for sustainable development and human

2 Williams, Brooke & Venter, Oscar & Rehbein, José Andrés & Di Marco, Moreno & Grantham, Hedley & Ervin, Jamison & Goetz, Scott & Hansen, Andrew & Jantz, Patrick & Pillay, Rajeev & Rodriguez-Buritica, Susana & Supples, Christina & Virnig, Anne. (2020). Change in Terrestrial Human Footprint Drives Continued Loss of Intact Ecosystems. SSRN Electronic Journal. 10.2139/ssrn.3600547.

well-being (e.g., potential clean water provision, agricultural climate stress) important for KMGBF Targets 7, 10, 11, and 12. To evaluate trade-offs among broad conservation goals, each dataset was identified as supporting KMGBF targets, as well as biodiversity, climate change, or human well-being (Figure 2). A full list of input data used in the spatial prioritization analysis is included in Annex 1.

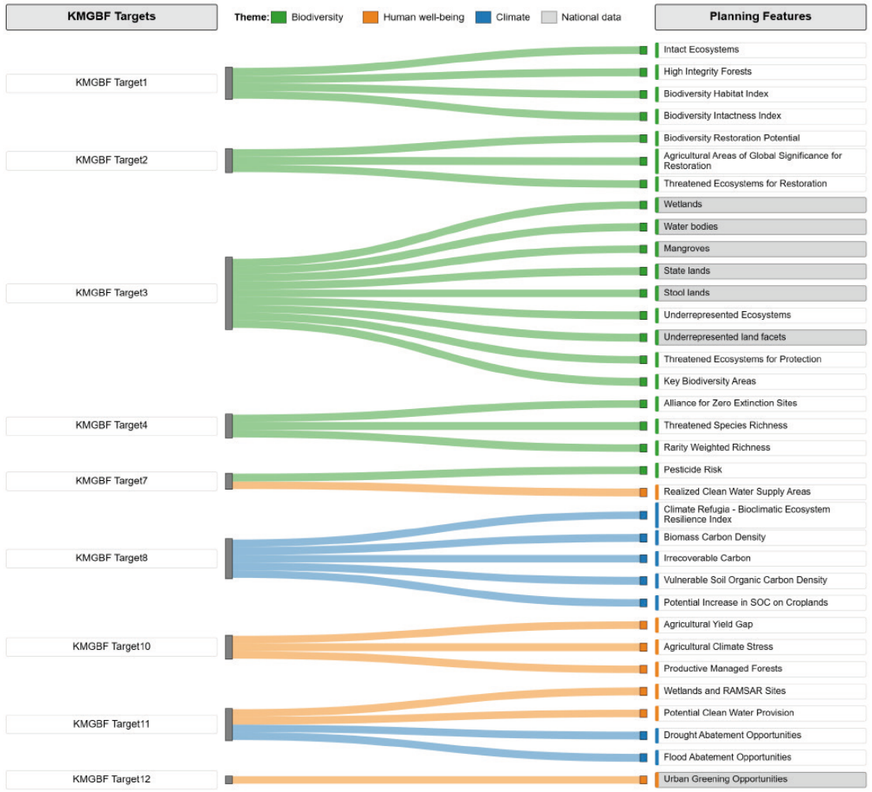


Figure 2. KMGBF targets and planning features selected for inclusion in the analysis to map priority action areas in Ghana

All spatial data was summarized into planning units, which are the individual spatial units that are evaluated for protection, restoration, management or urban greening action within the ELSA priority action map. Planning units are akin to individual pixels in a raster image. For Ghana, the planning unit size was 550m*550m. Therefore, a 550m primary resolution was used as it balances computational time against mapping precision. With this planning unit size, there are 798,414 planning units at the national scale, which is a number that results in the ELSA Integrated Spatial Planning Tool taking roughly 2 minutes to run an optimization to create an ELSA priority action map, which allows for near-real time scenario analyses. 550m*550m is also a likely sufficient resolution for national level planning of protected areas and other land management actions. Moreover, for any input datasets that were received at a higher resolution in the native form (e.g., 10m mangrove extent data), these data are summarized into the planning units at that native resolution. By doing so, this ensures that no finer resolution spatial information is overlooked when down sampling to a 550m resolution. For ad-hoc subnational planning and implementation, it might be necessary to identify a finer planning unit resolution.

Step 4

Analyze multiple actions and outcomes

The fourth step is to use systematic conservation planning (SCP) to analyze spatial priorities for protection, restoration, sustainable management, and urban greening, as well as the outcomes of these actions for all planning features. SCP is used to optimize spatially explicit conservation actions to promote the persistence of biodiversity and other natural features in situ. SCP involves a transparent and objective process of setting clear goals and objectives, and subsequent planning for conservation actions that meet them. SCP was originally developed to identify alternative proposed networks of protected areas. More recently it has evolved to consider multiple nature-based actions and objectives beyond biodiversity, making it suited for engaging with the complexity of integrated spatial planning across landscapes and nations. SCP was used to run a spatial prioritization analysis to analyze all nature-based action zones and planning features at once, thus capitalizing on spatial synergies across all KMGBF targets when identifying priority areas for KMGBF implementation. In addition to integrating multiple commitments, SCP enables diverse stakeholder groups to weigh the relative importance of the various planning features, view trade-offs that result from conflicting priorities, and foster dialogue around cross-sectoral collaboration and implementation.

The ELSA Integrated Spatial Planning Tool uses the *prioritizr* software library to run the SCP spatial prioritization analysis. The *prioritizr* package is conceptually similar to the widely used planning software Marxan but differs in its implementation of integer linear programming techniques instead of simulated annealing as the solving algorithm. The linear programming approach can solve large problems (>1 million planning units) faster than other approaches, allowing for real-time analysis with stakeholders. Moreover, it supports a broad range of objectives, constraints, and penalties that can be used to customize conservation planning problems to the specific needs of a conservation planning exercise.

The maximum utility optimization function within *prioritzr* is used for its ability to find locations for the nature-based actions that maximize the total representation of planning features, accounting for zone contributions, with the relative importance of each planning feature controlled through a weighting parameter. To promote equity in representation across planning features, the core team conducted a pre-calibration process in which a script: 1) weights all planning features equally, evaluating how well each feature is represented in the solution (e.g., its maximum utility); 2) weights each feature as 1 while setting all other features to 0, and again solving the problem to see the impact of that feature's weight on the overall solution (e.g., its maximum representation); and 3) finally, enters a calibration loop where it iteratively adjusts the weights based on the difference between the maximum utility and maximum representation for each feature, aiming to minimize the difference (delta) between these values and leading to a more equitable representation across all features. These pre-calibration weights then serve as our starting weights in the ELSA Integrated Spatial Planning Tool's server backend for the priority area map co-creation sessions (Working Group 1 meetings 1 and 2).

Step 5

Co-create the ELSA priority action map to support KMGBF targets

The final step is to use the ELSA Integrated Spatial Planning Tool to co-create the ELSA priority action map through real-time iterative scenario analyses with stakeholders. As the spatial prioritization process integrates multiple, often competing, priorities in each country, leadership from national experts and stakeholders is key for evaluating trade-offs across scenarios and iterating maps to identify a final product that best meets the diverse objectives of the national vision.

To allow full involvement of the core team and broader stakeholder group within the integrated spatial planning process, the ELSA Integrated Spatial Planning Tool configuration for Ghana was preloaded with all relevant spatial data and used to run spatial prioritization analyses during live co-creation sessions with Working Group 1. The tool allows data visualization, setting targets and weights, real-time (~2 minutes) optimization runs, display of the resulting ELSA priority action maps, and tabular analysis of the results. The co-creation of the ELSA priority action map was done using this tool through two sessions of Working Group 1. See Annex 3 for detailed guidance on accessing the tool and creating iterative ELSA priority action maps.

In the first co-creation session, weights for each planning feature were assigned by national experts in Working Group 1. During this weighting session, each planning feature – represented by a spatial dataset - was shown to stakeholders, and its source, characteristics, and meaning were discussed. Stakeholders were then asked to give each dataset two different weights: the first one consisting of a value between 0 and 10, quantifying their perspective of how important the planning feature should be in guiding the identification of priority action areas in the resulting maps and supporting national environmental commitments; the second one consisting of a discrete value of 0, 0.5 or 1, where stakeholders evaluated whether they a) did not trust the reliability of the dataset's source at all, b) were uncertain in its reliability, or c) were confident in the reliability of the dataset's source, respectively. The overall weight for each dataset, per stakeholder, was obtained by multiplying each importance score by each confidence score. These overall weights were then averaged across all stakeholders for each dataset. The final average weights were then configured as default weights for each planning feature in the ELSA Integrated Spatial Planning Tool. The tool, now preloaded with default weights set by stakeholders, was then used to create and iterate the final ELSA priority action map, as well as associated ELSA heatmaps, in the second live co-creation session.

The ELSA priority action map (Figure 3) serves to identify areas for each action (protection, restoration, sustainable management, urban greening) to achieve area-based constraints in a way that maximizes the representation of all planning features, given their weights. To evaluate the trade-offs of integrated spatial planning for this first map, the representation of each planning feature in the initial ELSA priority action map was measured. All planning features with a representation of 60% or lower in the final ELSA priority action map were then flagged and this 'trade-off' of integrated planning was discussed as a group. A voting exercise was undertaken to determine if the weights should be further adjusted to increase the representation of each or certain planning features that experienced this drop in representation. The final average weight across all stakeholders following this exercise has been included as the default weight for each planning feature in the ELSA Integrated Spatial Planning Tool configuration.

In Annex 4, we additionally provide the final ELSA priority action map segmented by region. These maps at the regional level identify the extent of current protected areas in each region, but also the extent of priority areas identified for new protection, restoration, sustainable management, and urban greening actions. The results reveal that not only are regions different in the extent to which they have already established protected areas, but also the extent to which they are identified as national priorities for further conservation action. These results can be used to support collaboration between national and regional authorities around implementation of the results of the spatial prioritization analysis.

After the second co-creation session, an in-person results-sharing meeting was held on 16 October 2025 to present the final map and give opportunities for validation and further iteration of the ELSA priority action map to key national stakeholders. The meeting also focused on identifying ways to move forward with the implementation and use of the ELSA priority action map. The project team will hand over the final ELSA priority action maps that came out of the results-sharing meeting to Ghana's government focal points, through official correspondence that shares this technical report and a policy note for high-level decision makers.

The ELSA priority action map identified through this process reflects the parameters set in the ELSA Integrated Spatial Planning Tool by Working Group 1, as well as the national configuration of the ELSA Tool based on current national targets and current national and global data. The integrated spatial planning process supported through this project is not a 'one and done' process, but rather a foundation that should be built upon as new policy commitments emerge and new and improved data are developed. The capacity building conducted through the project enables for continued re-evaluation of ELSAs to ensure their relevance for guiding landscape planning and resource allocation. National stakeholders may wish to use the ELSA Integrated Spatial Planning Tool with stakeholders across sectors, including changing input parameters and creating different scenarios that could be collectively assessed to broaden ownership of the final product.

The UNBL team is available past the close of the project to support limited annual updates to the data included in the ELSA Integrated Spatial Planning Tool for Ghana. This includes: (1) updating national data layers used as planning features when a new version is released; (2) adding a new data layer that maps an important biodiversity, climate, or human well-being value for Ghana as a planning feature to the tool. To request an update, please reach out to support@unbiodiversitylab.org.

In addition, the configuration of the ELSA tool could be updated to reflect national targets, more extensive new/updated national data, and/or customized to a subnational area in the country. These services are available at cost from the UNBL team following the closing of the project. In addition, the UNBL team can support or lead the production of derivative maps based on the ELSA priority action map that can directly support policy implementation (e.g., efforts to focus on a particular goal like climate adaptation, water security or land degradation neutrality). To explore further, please reach out to support@unbiodiversitylab.org.

Photo credit: Kofi Amponsah-Mensah, Centre for Biodiversity Conservation and Research (2025)

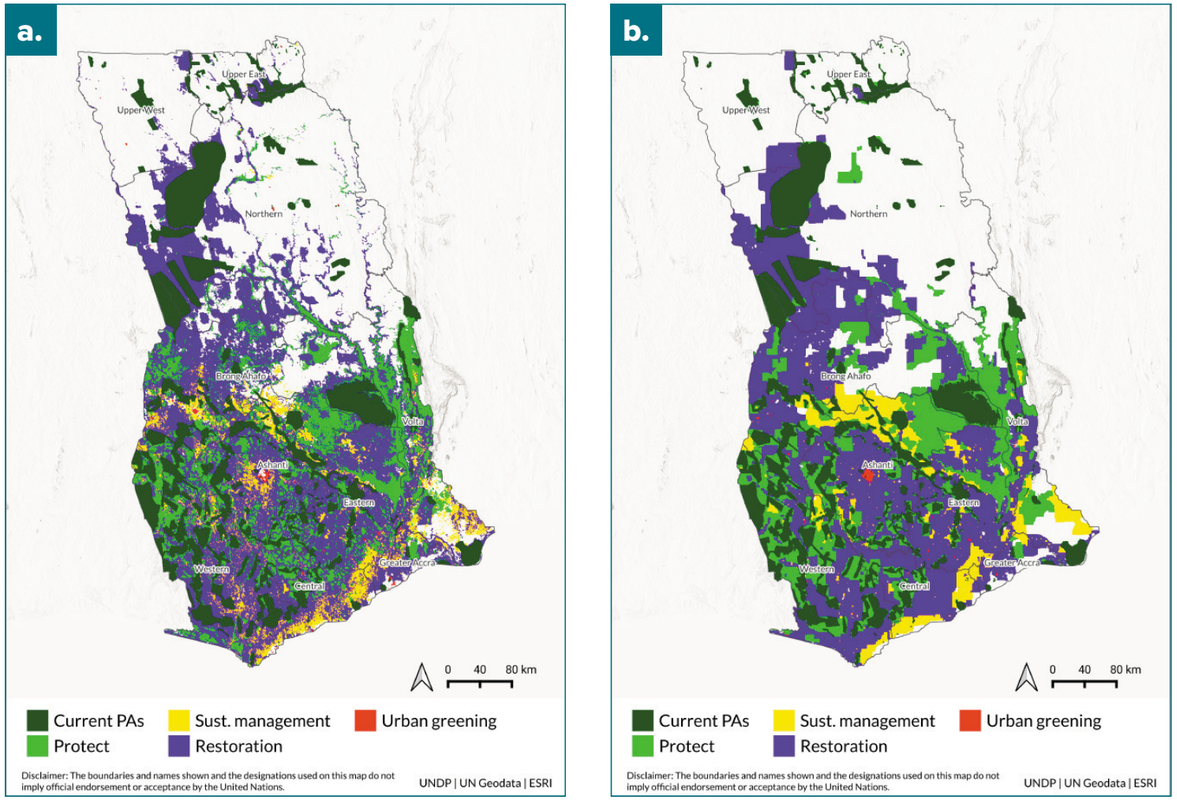


Figure 3. Spatial prioritization maps identifying where achieving 30% protection, 29.1% restoration (30% of degraded areas), 5% management, and 0.12% urban greening (30% of urban extent) in Ghana will maximize the combined representation across all planning features. For map a) the boundary penalty factor (BPF) in the tool is set to 0, which is a level that results in an unfiltered distribution of priority action areas and therefore a fine-grained spatial prioritization solution. For map b) the BPF in the tool is set to 500, which is a level that promotes spatial cohesion and management feasibility without substantially reducing the coverage of planning features, therefore resulting in a coarse-grained spatial prioritization solution (see Annex 5 for more information on the BPF). Planning features are mapped using 7 national and 27 global spatial datasets for biodiversity, climate change and human well-being, which were selected using guidance from the qualitative elements of the KMGBF. These maps have been produced at a 550m resolution.

MAP APPLICATION: These nationally endorsed ELSA priority action maps to support KMGBF Targets 1, 2, 3, 4, 7, 8, 10, 11 and 12 show where actions can most effectively achieve the greatest impact across all planning features while minimizing unacceptable tradeoffs of integrated spatial planning. It can also support the implementation of the Land Degradation Neutrality (LDN) response hierarchy under the UN Convention to Combat Desertification (UNCCD). The LDN response hierarchy is a structured approach to achieve neutrality by prioritizing prevention, minimizing ongoing degradation, and restoring degraded land. The spatial prioritization maps outline an ambitious expansion of protected areas, from 15.9% of the land area covered by existing protected areas, to 30%. This enhancement in protection could come from new protected areas or recognition of other effective area-based conservation measures (OECMs). The maps also outline critical areas to pursue sustainable management practices (5% of land area), ecosystem restoration (29.1% of land area), and urban greening (0.12% of land area) to achieve multiple environmental, climate, and sustainable development outcomes. They show a strategic, national-level perspective on important places to take action to protect, manage, restore or urban green. Before implementing actions, however, further ground truthing and engagement with local rights holders and relevant stakeholders is needed.

MAP ACCESS: The image files for the heatmaps can be accessed here. The underlying GIS files for all heatmaps created using the ELSA Integrated Spatial Planning Tool can be accessed here. These maps should be cited as:

MEST & UN Biodiversity Lab, 2025. Technical Report for the UNBL-GBF Mapping Project in Ghana. ELSA priority action map created using spatial data and the UNBL Essential Life Support Area Integrated Spatial Planning Tool on 13 October 2025.

MAP UPDATES: These maps can be further updated, and complemented with additional optimization runs for different scenarios, through use of the ELSA Integrated Spatial Planning Tool configuration for Ghana. Please see Annex 3 for detailed guidance on accessing and using the tool.

An important supplementary component of the ELSA priority action map is the contribution across zones to representation of planning features (Figure 4). Some planning features are only represented within a single zone – for instance, for both unfiltered and filtered spatial prioritization scenarios the potential increase in soil organic carbon on croplands, agricultural yield gap, agricultural climate stress, and productive managed forests planning features are only represented within the sustainable management zone, whereas the urban greening opportunities planning feature is only represented within the urban greening zone. However, most planning features are represented across all zones, highlighting the importance of considering a range of zones for achieving the diversity of national commitments to the KMGBF targets around biodiversity, climate change, and human well-being. Put simply, often one action – whether protecting, managing, restoring or urban greening nature – can contribute to achieving multiple KMGBF targets. It is also important to note that the new protect, manage, restore, and urban greening zones would lead to a major increase in the representation of all planning features beyond their current representation in existing protected areas.

Figure 4. The contribution of existing protected areas, as well as of each priority action zone to the representation of planning features in the ELSA priority action map for (a) an unfiltered scenario with a BPF of 0, and (b) a filtered scenario with a BPF of 500.Representation measures how well each planning feature is captured across the priority action zones in an ELSA solution. The representation across zones R_f (%) is calculated as:

$$R_f = \sum_{z=1}^{Z} \left(\frac{\sum_{i=1}^{I} x_{i,z} r_{i,fz} v_{i,f,z}}{T_f} \times 100 \right)$$

where:

$$T_f = \sum_{z=1}^{Z} \sum_{i=1}^{I} r_{i,f,z} v_{i,f,z}$$

Here, $x_{i,z}$ is the decision variable (e.g., whether a planning unit i has been included (1) in a specific zone z or not (0)), $r_{i,f,z}$ is the total amount of feature f in planning unit i in zone z, and $v_{i,f,z}$ is the impact value of feature f in planning unit i in zone z.

The zone impact value ($v_{i,f,z}$) specifies how each action (protect, restore, manage, urban greening) impacts each planning feature in that zone. A value of 1.0 indicates a neutral impact, values >1 indicate enhanced impacts, and values <1 indicate reduced impacts relative to simple spatial coverage.

Representation reflects both spatial coverage and action impact - a feature may achieve high representation through either extensive coverage or through placement in zones where actions provide higher impact to that feature.

In addition to the ELSA priority action maps, ELSA heatmaps disaggregated by each nature-based action (protect, restore, manage and urban green) were produced. These heatmaps identify important locations for achieving KMGBF Targets 1, 2, 3, 4, 7, 8, 10, 11 and 12. They are the normalized sum of user-weighted planning features' values in each planning unit. Important areas (where more planning features occur, adjusted for weighting) are shown in a range of colors from green to yellow, with those in bright yellow being the most important. Heatmaps can be used to identify areas where the overall contribution of planning features to KMGBF Targets 1, 2, 3, 4, 7, 8, 10, 11 and 12 is greatest.

By evaluating heatmaps, national experts can view the aggregated user-weighted planning feature data to determine if the patterns for each nature-based action match their expectations and personal knowledge of the region. If a particular region which national stakeholders believe is particularly important for the implementation of protected areas is showing up as 'cold' within the heatmap relating to the protect action, then stakeholders could utilize the ELSA Integrated Spatial Planning Tool to increase the weight of planning features affected by the protect action that are present in this region to reflect a 'warmer' presence in the heatmap, and therefore increase the likelihood of this region being allocated the 'Protect' action in future spatial prioritization scenarios yielding ELSA priority action maps (Figure 3).

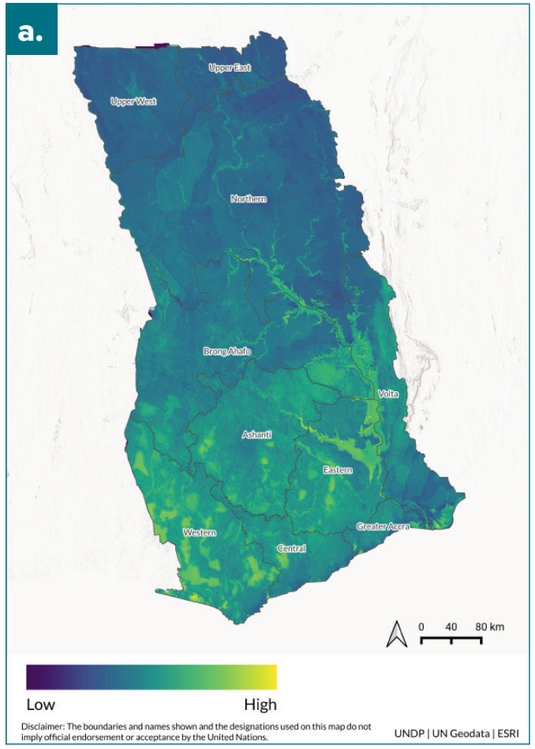
Figure 5. Heatmaps for a) protection, b) restoration, c) sustainable management and d) urban greening, depicting cold areas (dark purple) where the lowest number of planning features affected by the respective action overlap, and hot areas (yellow) where the largest number of planning features affected by the respective action overlap.

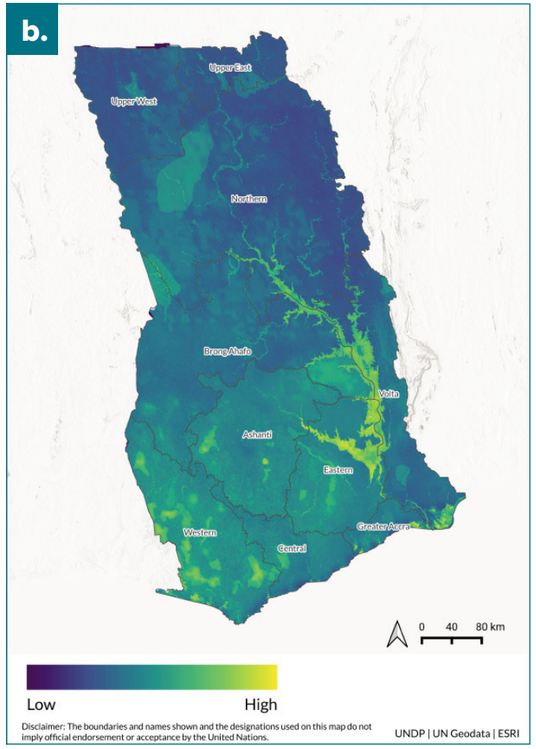
MAP APPLICATION: National stakeholders in Ghana could use these heatmaps to compare the extent to which areas identified as important for achieving KMGBF targets related to each nature-based action reflect their understanding of particular regions and therefore use these heatmaps as tools to evaluate the accuracy of the ELSA priority action map (Figure 3) and iterate additional, well-informed spatial prioritization scenarios using the ELSA Integrated Spatial Planning Tool.

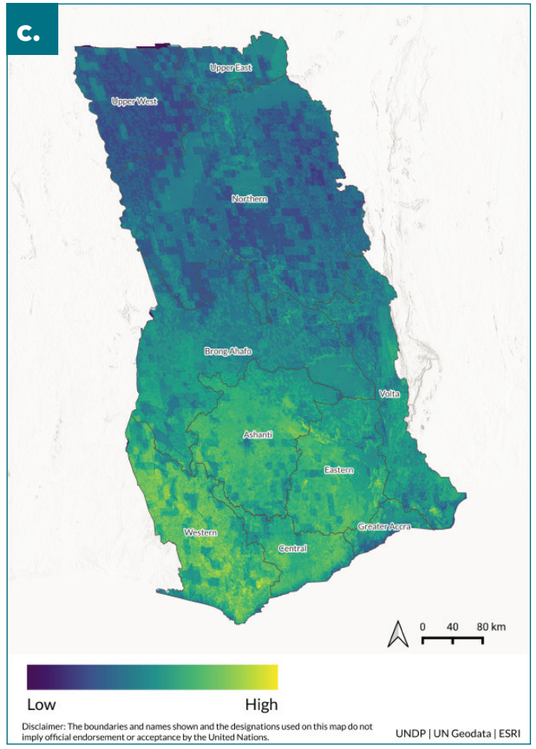
MAP ACCESS: The image files for the heatmaps can be accessed here. The underlying GIS files for all heatmaps created using the ELSA Integrated Spatial Planning Tool can be accessed here. These maps should be cited as:

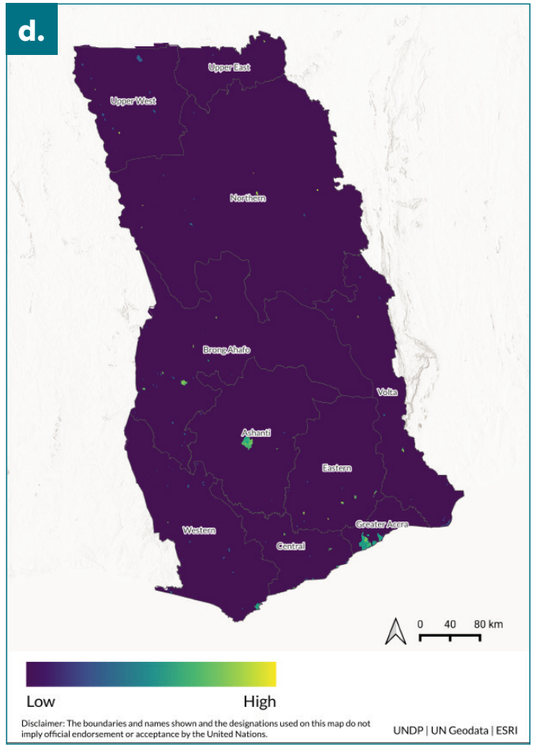
MEST & UN Biodiversity Lab 2025. Technical Report for the UNBL-GBF Mapping Project in Ghana. Heat maps created using spatial data and the UNBL Essential Life Support Area Integrated Spatial Planning Tool on 13 October 2025.

MAP UPDATES: These maps can be further updated, and complemented with additional optimization runs for different scenarios, through use of the ELSA Integrated Spatial Planning Tool configuration for Ghana. Please see Annex 3 for detailed guidance on accessing and using the tool.









3. Additional monitoring and reporting support for Ghana on UN Biodiversity Lab

In addition to co-creating the ELSA heat maps and ELSA priority action map, several ad-hoc activities were undertaken through workstream 2 to further advance Ghana's monitoring and reporting around NBSAP and KMGBF targets. These activities were implemented with a subset of national stakeholders identified by MEST to contribute to Working Group 2 on monitoring and reporting.

Stakeholders participating in Working Group 2 included: LUSPA, Conservation Alliance, Forestry Commission, and the CERSGIS, among others..

The activities selected as most important for national efforts around monitoring and reporting on the NBSAP and KMGBF in Ghana included:

1. **Creating a central repository for national data in Ghana's UNBL workspace:** centralizing key national datasets on biodiversity, climate, and human well-being in Ghana's secure UNBL workspace. This provides a central repository to review national data relevant to NBSAP implementation, filter by KMGBF target and/or national target, and support visualization in tandem with global datasets on the UNBL platform. It also enables different actors to work better together, and synergize their efforts towards conservation and sustainable development.

2. **Executing capacity building and training on UNBL:** inviting decision makers and key stakeholders to take part in a series of lectures and hands-on training sessions around the various functionalities of the UNBL public platform, secure UNBL workspaces, and the ELSA Integrated Spatial Planning Tool, which supplied stakeholders with relevant knowledge and practical experience related to leveraging UNBL for their country's monitoring efforts.

3. **Training on geospatial data that can support production of the 7NR:** offering relevant training to stakeholders preparing the 7NR, including training on the review of the adequacy of global data for filling in national data gaps and, in parallel, technical support on demand to the national team.

Activity 1

Central repository for national data in Ghana's UNBL workspace

UNBL workspaces provide a secure work area where national or subnational data can be added and shared with a set of specified users. They offer users with any level of GIS expertise the ability to collaborate on important work to use spatial data as part of the development of a national monitoring plan and/or system for the KMGBF. Government policymakers and technical specialists can use a UNBL workspace to:

- Invite a community of users relevant to the development of a national monitoring plan for the KMGBF.
- Connect to existing national spatial data repositories, enabling all relevant data to be consolidated in one location and ensuring automatic updates from the original source.
- Upload national/subnational datasets and areas of interest.
- Tag national data to clearly identify the goal, target, and indicator type that it will be used to calculate.
- Visualize national/subnational datasets alongside any of the global data layers available on UNBL.
- Calculate any UNBL metrics using the official national boundary layer or official sub-national boundary layers.

Through the UNBL-GBF Mapping Project, national datasets identified as important for NBSAP and KMGBF implementation were added to Ghana's national workspace on UNBL and made available for external viewing and sharing. The goal was to provide a stable central repository to review national data relevant to NBSAP implementation, increase the visibility of Ghana's national data used around reporting on NBSAP and KMGBF targets, and bolster their effectiveness by allowing them to be viewed in tandem with over 1,000 global-scale data layers on biodiversity, climate change, and human well-being available on UNBL. Where relevant, each national dataset was tagged using the format 'KMGBF Target X' to allow users and stakeholders to easily filter and view national datasets based on the relevant policy target which they are used as proxies for. In total, 13 national data layers were uploaded to UNBL.

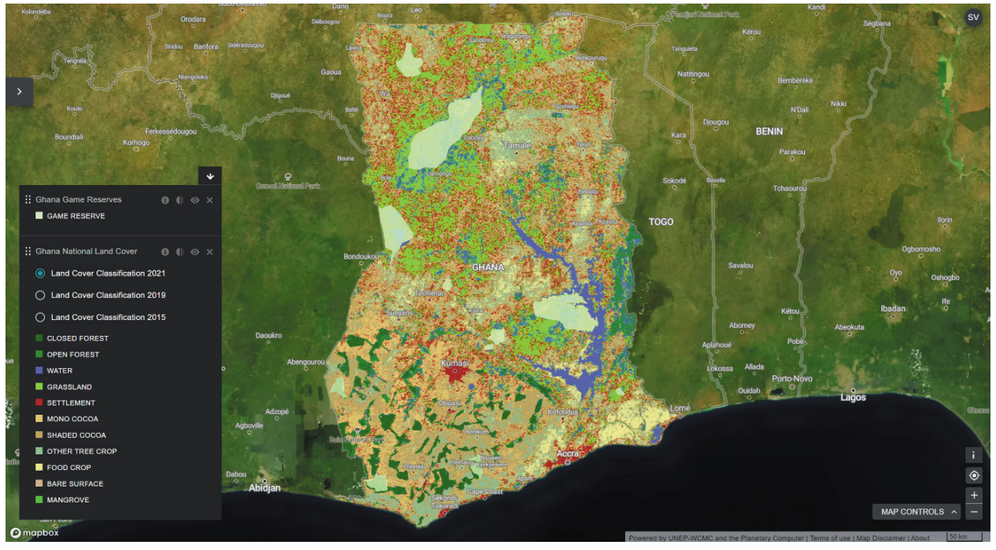


Figure 6. National datasets for Ghana on UNBL. The map shows coverage of game reserves and the 2021 National Land Cover dataset, uploaded to Ghana's secure workspace

When setting up the UNBL workspaces, government policymakers and technical specialists can assign roles to individuals or user groups to determine their level of access. These roles include:

- **Owners:** Nominated by the country to take control of the workspace. The owners will be responsible for inviting and granting access to other users, as well as adding other administrators.
- **Admins:** Can add and manage users, assign roles to users as editors and viewers, manage workspace assets via the admin tool, and view all workspace assets in the map view.
- **Editors:** Can manage workspace assets via the admin tool and view all workspace assets in the map view. Editors should have experience using GIS software to enable them to upload and edit data layers.
- **Viewers:** Can view all workspace assets in the map view. Viewers cannot access the admin tool.

The owners for Ghana's workspace on UNBL are MEST and the National NBSAP Committee. To request access to the workspace, please contact them directly.

- Emelyne Wright Hanson (emelyne.whanson@mesti.gov.gh)
- Yaw Osei-Owusu (yosei-owusu@conservealliance.org)

Activity 2

Capacity building and training on UNBL

A series of UNBL lectures and training sessions were held in October and November for national stakeholders to acquaint them with all functionalities and applications of the platform. Through two lecture sessions and two training sessions centered around UNBL's public platform and secure workspaces, national stakeholders gained key knowledge and hands-on experience around viewing UNBL datasets, calculating dynamic metrics and viewing headline indicators for their country, managing their national workspace, and using the ELSA Integrated Spatial Planning Tool configuration for their country. Stakeholders that were present in the sessions should now be equipped with the practical knowledge and tools necessary to provide training to other interested groups around utilizing UNBL to support planning and implementation of the KMGBF in Ghana (see Table 1 for relevant UNBL functionalities covered during the trainings).

The recordings and presentations are available here. In addition, user guides for UNBL are available in Annex 3.

UNBL features relevant to NBSAP implementation and the 7NR included in the training series included:

- Secure workspaces for non-commercial users to upload and manage national spatial data, tag by NBSAP target and indicator, and share privately with a curated group of users. UNBL secure workspaces have been further enhanced through the UNBL-GBF Mapping Project with user-friendly features to seamlessly connect to data from diverse national and global repositories.
- Push-button calculation of dynamic metrics at the national level and display of select headline indicators. New metrics will continue to be added for display of select KMGBF indicators and additional metrics.
- Access to over 1,000 global spatial data layers, including data referenced in the metadata of the KMGBF Monitoring Framework, curated for national use on biodiversity, ecosystem services, and human well-being to fill national data gaps, as needed.
- Curated data collections for policymakers that could be used to calculate indicators to monitor implementation of the KMGBF at national level as well as on objectives related to protected areas (KMGBF Target 3), restoration (KMGBF Target 2), and nature-based solutions for climate change (KMGBF Target 8).
- Extensive documentation and guidance to enable new users to easily apply UNBL for their needs.
- Ability to develop prioritized spatial plans for KMGBF Targets 1, 2 and 3, that provide powerful co-benefits for Targets 4-12 using the ELSA Integrated Spatial Planning Tool.

Activity 3

Training and technical support on geospatial data that can support production of the 7NR

The core project team provided training to national stakeholders on reviewing the adequacy of global data to fill national data gaps for NBSAP and KMGBF implementation. Spatial data experts from the core project team provided technical support and advice to stakeholders throughout the training period.

During the session, national stakeholders highlighted needs around having a consolidated workspace for storing spatial data, which would also be a reference point for retrieving data for KMGBF national reporting as well as similar assignments. Participants also highlighted the need for a national data collection drive and for means of verifying and updating national data to be collected for Ghana's UNBL workspace.

In addition to responding to questions from national experts and training on important considerations for reviewing the adequacy of global data to fill national data gaps, the session introduced two resources on UNBL that could be of use to national stakeholders: (1) the UNBL Data Collection on the KMGBF Monitoring Framework, and (2) the UNBL Technical Guidance on Using Spatial Data to Support the Development of Plans for National Monitoring Systems.

UNBL Data Collection on the KMGBF Monitoring Framework.

The UNBL Data Collection on the KMGBF Monitoring Framework, developed through the UNBL-GBF Mapping Project and GEF-7 Early Action Support Project, provides decision makers with a curated list of global spatial datasets that can be used for the calculation of headline, component, and complementary indicators under the Monitoring Framework. The global datasets provided in the data collection aim to support countries to fill spatial data gaps as an interim measure, where national data is not yet available.

The information made available is structured around the goals and targets of the KMGBF, including indicators that can be calculated using existing spatial data at the global level. The data listed for each indicator are the global reference datasets identified for calculation in the metadata associated with CBD/COP/16/INF/3/Rev.1. The data selected for this collection include all spatial data, where available, recommended in the indicator metadata (available on the Kunming-Montreal Global Biodiversity Framework Indicators Website and in CBD/COP/16/INF/3/Rev.1) associated with the decision adopted by the COP16 on the Monitoring Framework for the Kunming-Montreal Global Biodiversity Framework (CBD/COP/DEC/16/31) as of June 2025. The data collection includes a comprehensive list of available data for the headline and component indicators and a partial list of available data for the complementary indicators.

To explore the data collection, follow these steps:

1. Click on the ‘Discover’ tab on the UNBL home page, select ‘Data Collections’, and then click on Kunming-Montreal Global Biodiversity Framework. Alternatively, navigate directly to the UNBL data collection on the KM-GBF Monitoring Framework.

2. Browse the KMGBF goals and targets, select the goal or target of interest and view a description of the goal/target, indicators, and available global data layers that relate to each indicator.

3. Click ‘View data’ to view data layers that provide input to the monitoring of the KMGBF.

Note: UNBL also offers data collections that more broadly support planning around Restoration (KMGBF Target 2), Protection (KMGBF Target 3), and Nature-based Solutions for Climate Change (KMGBF Target 8). We highlight them here as resources that may be useful to national policymakers and technical specialists for planning around the KMGBF in Ghana, depending on national priorities and needs.

UNBL Technical Guidance on Using Spatial Data to Support the Development of Plans for National Monitoring Systems for the KMGBF.

This guidance, developed through the UNBL-GBF Mapping Project and GEF-7 Early Action Support Project, aims to support Parties to undertake a detailed assessment of available national spatial data and spatial tools that can be used as part of a national monitoring system for the KMGBF. Parties can use this document to: (1) review indicators that require spatial data for their calculation, (2) identify, view, and download the global spatial data that are referenced in the indicator metadata available on the Kunming-Montreal Global Biodiversity Framework Indicators website and in CBD/COP/16/INF/3/Rev.1 associated with CBD/COP/DEC/16/31 as of July 2025, and (3) access checklists and guidance to identify existing national spatial data as well as national data gaps. This guidance is available here to support Ghana.

The recordings and presentations from the session are available here. In addition to the session, the UNBL team offered ad hoc support to Ghana on these topics.

Photo credit: Kofi Amponsah-Mensah, Centre for Biodiversity Conservation and Research (2025)

4. Project Outcomes and Recommendations

Through the UNBL-GBF Mapping Project, a series of stakeholder engagement sessions and spatial analyses were undertaken with Working Group 1 on spatial planning with the central objective of providing actionable science to support planning and implementation for KMGBF Target 2 on restoration, Target 3 on protected areas and OECMs, Target 10 on sustainable management, and Target 12 on urban greening. Our specific objectives, guided by national stakeholders and the national priorities of the country, were to develop a national ELSA priority action map that identifies priority areas to protect, manage, restore, and urban green in Ghana. The results are presented through figures with associated 'map application' insights through this report. Here we provide some further insights that span these results.

KMGBF Target 3 to protect 30% of land, sea, and freshwater areas represents the goal of ensuring enough areas of particular importance for biodiversity are protected to contribute (alongside other goals and targets) to reversing the extinction crisis and stabilizing the global climate system, and do so in an inclusive and participatory way. However, past area targets (e.g., Aichi Biodiversity Target 11) have resulted in protected areas being established primarily in sub-optimal locations, often places that are simply high and far from human settlements, irrespective of their environmental values.[3] The integrated spatial planning tools and maps provided as a result of this project respond to the ambition outlined in KMGBF Target 1 around biodiversity-inclusive spatial planning and can inform further protected area expansion and recognition of other effective area-based conservation measures (OECMs) recognition in more optimal locations, ensuring that these new conservation areas lead to significant conservation of important ecosystems and species, prioritizing those with additional ecosystem service co-benefits. Moreover, KMGBF Target 2 represents the most ambitious target within the CBD Framework to restore native and essential ecosystems at the national and global levels. Targets 10 and 12 likewise raise ambition around sustainable management practices and urban greening.

The maps provided by this project are a response to support Ghana to increase the necessary efforts around conservation, restoration, sustainable management, and urban greening and help decision makers to identify where to take appropriate actions in locations that will maximize environmental outcomes to deliver on qualitative elements of KMGBF Targets 1-4, 7, 8, and 10-12. The actions used in this spatial prioritization are additionally the functional equivalent of actions of the LDN response hierarchy supported under UNCCD. 'Protect' is the equivalent of 'avoid' land degradation, 'manage' is the equivalent of 'reduce' land degradation, and 'restore' is the equivalent of 'reverse' land degradation. In summary, this equates 'Protect–Manage–Restore' with 'Avoid–Reduce–Reverse', ensuring alignment across global biodiversity frameworks. The resulting ELSA priority action maps can therefore also support the implementation of the LDN response hierarchy under UNCCD.

The ELSA priority action maps that are derived from this project combine the best available national spatial data and state-of-the-art global spatial data with novel technology and a robust spatial planning methodology in SCP, thereby enabling national experts, practitioners and decision makers to undertake interactive spatial prioritization activities to support Ghana's national priorities. The resulting maps are useful for identifying the most critical regions and ecosystems to focus conservation, restoration, sustainable management, and urban greening efforts. This information can be used by MEST, Forestry Commission, Lands Commission, Environmental Protection Authority, LUSPA, and other relevant ministries or equivalent entities, to identify the most critical subnational districts to engage. Much of the data is relevant at the subnational scale, but further ground truthing will be needed, such as incorporating more accurate subnational data or undertaking field

3 Venter, O., Magrach, A., Outram, N., Klein, C.J., Possingham, H.P., Di Marco, M. and Watson, J.E. (2018). Bias in protected-area location and its effects on long-term aspirations of biodiversity conventions. Conservation Biology, 32 (1), pp.127-134. doi:10.1111/cobi.12970

campaigns to validate national maps in the local context. For restoration in particular, the resource guide to Target 2 of the KMGBF could be helpful to identify site-specific practices for implementation of restoration activities. Moreover, a new project to build a downscaled set of data and tools for specific subnational regions would result in a more subnationally relevant priority map.

ELSA is listed as an example of relevant data sources and methods in the metadata for KMGBF indicator 1.1. The ELSA priority action map produced by this project therefore could be used by MEST to address questions for the binary indicator 1.b. ELSA only applies to terrestrial land use change and inland water land use change.

In addition, the input data used as part of the ELSA Integrated Spatial Planning Tool has been selected to align with the data recommended in the metadata of the Monitoring Framework. Therefore, ELSA can be used as part of a continuous feedback loop between monitoring, implementation, and reporting. The ELSA priority action map can ensure that implementation is most likely to lead to benefits for the targets; as such, using the action map should positively influence monitoring outcomes. The priority action areas identified in the ELSA priority action map could likewise be considered as priority for on-the-ground monitoring efforts. However, the ELSA planning approach is not in itself an indicator for monitoring and reporting.

This report presents maps that were created through an extensive consultation process with national experts, yet they should not be viewed as static products that are inflexible to future updates. Since the methodology enables decision makers to undertake new iterations of the process through the ELSA Integrated Spatial Planning Tool (Annex 3), new alternate and updated scenarios going beyond those explored in this project could be developed. This may include updating datasets and running new scenarios using the ELSA Tool. For instance, during the co-creation sessions, participants spoke to the importance of stool and state lands, which had been mapped using national spatial data. However, they also flagged that these were a subset of important land types in Ghana. They suggested that future iterations could incorporate additional data mapping important ecosystems not captured within stool or state lands. Further capacity-building activities on these approaches were facilitated through a series of lectures and hands-on trainings with relevant national focal points on the use of the UNBL platform and the ELSA Integrated Spatial Planning Tool. The aim of these sessions was to cultivate national trainers that would continue strengthening capacities at national and subnational levels with additional relevant stakeholders.

In parallel, activities were undertaken with national stakeholders in Working Group 2 on monitoring and reporting aimed to respond to national needs to national needs with relation to monitoring of the KMGBF, and production of the 7NR to the CBD. These activities, selected by national stakeholders, focused on important foundational elements around the use of spatial data, including supporting the identification of key national data and consolidating it in Ghana's national workspace on UNBL, providing capacity building and training on features of UNBL that could be useful to support national needs, further practice for national stakeholders on the UNBL platform, and technical support and training on reviewing adequacy of global data to fill national data gaps. As with workstream 1, these activities and products could be used by national stakeholders to respond to additional national needs around monitoring and the production of the 7NR. Further collaboration with the UNBL team through future projects could additionally support the development of custom features on UNBL based on national needs.

5. Next steps

MEST is now equipped to continue using the ELSA Integrated Spatial Planning Tool configuration for Ghana on UNBL and further train national stakeholders to undertake new iterations of the spatial prioritization analysis to create new ELSA priority action maps. MEST is also able to utilize its UNBL workspace as well as other UNBL functionalities to support monitoring and reporting on the NBSAP and KMGBF.

Ghana plans to use the results of the UNBL-GBF Mapping Project maps in the new NBSAP that is being updated and will be officially launched in September 2026 – following a specific timeline that ensures a whole-of-society and whole-of-government approach in the country. The UNBL-GBF Mapping Project results will contribute to national goals related to Target 1, Target 2 and Target 3 of the KMGBF, among others.

MEST, in collaboration with the national consultant supporting the 7NR reporting, have been very definite with their appreciation of activities done and support received on this project. Moving forward, the parties agree that the UNBL is a very useful tool to consolidate national spatial data required for the 7NR, subsequent reporting, and similar national assignments. Discussions have been held around plans and strategies required to collect data on a national scale and may be the subject of subsequent support. Also, support to further train and equip additional staff on the use of the UNBL, particularly with respect to uploading and managing data on the Ghana workspace of the UNBL, will be a priority.

As the Ghana team gears up in completing the 7NR report led by MEST, incorporating spatial data is of importance to the team. The discussions held at the recent meeting of the Subsidiary Body on Scientific, Technical, and Technological Advice to the CBD (SBSTTA27), where the country had the opportunity to present at a side-event to showcase the country's work towards the 7NR and KMGBF Targets 1, 2, and 3, as well as the support already received and further required on the use of the UNBL, will be key in providing inputs into national reporting and activities.

Annexes

Annex 1: Input data list

This table depicts all data layers used in the integrated spatial planning process to identify priority action areas in Ghana and support implementation of the KMGBF.

Type	Theme	Layer name	Data scale	KMGBF Target	Source	UNBL map view
	Biodiversity	Intact Ecosystems	Global	KMGBF Target1	Beyer et al., 2020	View
	Biodiversity	High Integrity Forests	Global	KMGBF Target1	Hansen et al., 2019; Grantham et al., 2020	View
	Biodiversity	Biodiversity Habitat Index	Global	KMGBF Target1	Harwood et al., 2022	View
	Biodiversity	Biodiversity Intactness Index	Global	KMGBF Target1	Tim Newbold et al., 2016	View
	Biodiversity	Biodiversity Restoration Potential	Global	KMGBF Target2	Newbold et al., 2016; UNEP-WCMC, 2020	View
	Biodiversity	Agricultural Areas of Global Significance for Restoration	Global	KMGBF Target2	Bernardo et al., 2020	View
	Biodiversity	Threatened Ecosystems for Restoration	Global	KMGBF Target2	Beyer et al., 2020; Keith et al., 2022	View
Planning features	Biodiversity	Wetlands	National	KMGBF Target3	LUSPA, EPA and Forestry Commission	View
	Biodiversity	Water bodies	National	KMGBF Target3	Ghana Hydrological Services (2021)	View
	Biodiversity	State lands	National	KMGBF Target3	Lands Commission (2020)	View
	Biodiversity	Stool lands	National	KMGBF Target3	Lands Commission (2020)	View
	Biodiversity	Mangroves	National	KMGBF Target3	Forestry Commission, EPA and LUSPA	View
	Biodiversity	Underrepresented Ecosystems	Global	KMGBF Target3	Beyer et al., 2020; Keith et al., 2022; UNEP-WCMC & IUCN, 2022	View
	Biodiversity	Underrepresented Land Facets	National	KMGBF Target 3	Geological Service Department (2020)	View
	Biodiversity	Threatened Ecosystems for Protection	Global	KMGBF Target3	Beyer et al., 2020; Keith et al., 2022	View
	Biodiversity	Key Biodiversity Areas	Global	KMGBF Target3	Birdlife International, 2021	View
	Biodiversity	Alliance for Zero Extinction Sites	Global	KMGBF Target4	Birdlife International, 2021	View

Type	Theme	Layer name	Data scale	KMGBF Target	Source	UNBL map view
	Biodiversity	Threatened Species Richness	Global	KMGBF Target4	UNEP-WCMC, 2020	View
	Biodiversity	Rarity Weighted Richness	Global	KMGBF Target4	UNEP-WCMC, 2020	View
	Biodiversity	Pesticide Risk	Global	KMGBF Target7	Tang et al., 2021	View
	Human well-being	Realized Clean Water Supply Areas	Global	KMGBF Target7	Mulligan, 2019	View
	Climate	Climate Refugia - Bioclimatic Ecosystem Resilience Index	Global	KMGBF Target8	Harwood et al., 2022	View
	Climate	Biomass Carbon Density	Global	KMGBF Target8	García-Rangel, S. et al. In prep.	View
	Climate	Irrecoverable Carbon	Global	KMGBF Target8	Noon et al., 2022	View
	Climate	Vulnerable Soil Organic Carbon Density	Global	KMGBF Target8	García-Rangel, S. et al. In prep.	View
	Climate	Potential Increase in SOC on Croplands	Global	KMGBF Target8	Zomer et al., 2017	View
Planning features	Human well-being	Agricultural Yield Gap	Global	KMGBF Target10	Mueller et al., 2012	N/A
	Human well-being	Agricultural Climate Stress	Global	KMGBF Target10	Zabel et al., 2014	View
	Human well-being	Productive Managed Forests	Global	KMGBF Target10	Lesiv et al., 2020; Running et al., 2019	View
	Human well-being	Wetlands and Ramsar Sites	Global	KMGBF Target11	Gumbricht et al., 2017; Wetlands International/ Ramsar, 2022	View
	Human well-being	Potential Clean Water Provision	Global	KMGBF Target11	Mulligan, 2019	View
	Climate	Drought Abatement Opportunities	Global	KMGBF Target11	Carrão et al., 2016	N/A
	Climate	Flood Abatement Opportunities	Global	KMGBF Target11	Tellman et al., 2021; Didan & Kamel, 2015; Linke et al., 2019	N/A
	Human well-being	Urban Greening Opportunities	Global and National (national urban coverage layer)	KMGBF Target12	Karra K et al., 2021; Didan & Kamel, 2015; Tuholske et al., 2021; Land Use and Spatial Planning Authority of Ghana, 2025	View
Lock-in options	Lock-in restrictions	Existing Protected Areas	Global	N/A	UNEP-WCMC & IUCN, 2025	View
Zones	Zones	Human Footprint	Global	N/A	Williams et al., 2020	View
		Managed Forests	Global	N/A	Lesiv et al., 2020; Running et al., 2024	View
		Agriculture areas	Global	N/A	Esri, 2024	View
		Pasturelands	Global	N/A	Parente et al., 2024	N/A
		Urban areas	Global	N/A	Esri, 2024	View

Annex 2: Links to relevant project documents

Key project links (scoping reports, workshop reports, capacity building materials, and all other relevant materials)

- Policy note
- Project concept note
- Inception Workshop Recording: EN
- List of stakeholders involved through the process
- Resource guide to Target 2 of the KMGBF
- UNBL Lecture 1 on the Public Platform: EN
- UNBL Hands-on Training 1 on the Public Platform: EN
- UNBL Lecture 2 on Workspaces: EN
- UNBL Hands-on Training 2 on the Public Platform: EN
- UNBL National Workspace for Ghana (*see Annex 3 for access*)
- ELSA Integrated Spatial Planning Tool User Guide: EN
- UNBL Secure Workspaces User Guide: EN
- UNBL Public Platform User Guide: EN

Annex 3: User's guide to using the UNBL public platform, accessing Ghana's secure workspace on UNBL and using the ELSA Integrated Spatial Planning Tool on UNBL

Users who want to explore the UNBL platform and accustom themselves to its basic functions should see the UNBL Public Platform User Guide. Users who want to gain access to Ghana's secure workspace on UNBL and the ELSA Integrated Spatial Planning Tool used to undertake spatial prioritization scenarios need to request access to the workspace by undertaking the following steps:

1. Contact the national administrator of this workspace at emelyne.whanson@mesti.gov.gh with a copy to support@unbiodiversitylab.org with the subject "UNBL-GBF project workspace request for Ghana" and the e-mail address which the user registered an account on UNBL with. If the user has not yet registered an account on UNBL, they should follow instructions outlined here: 'How do I register or log-in'?

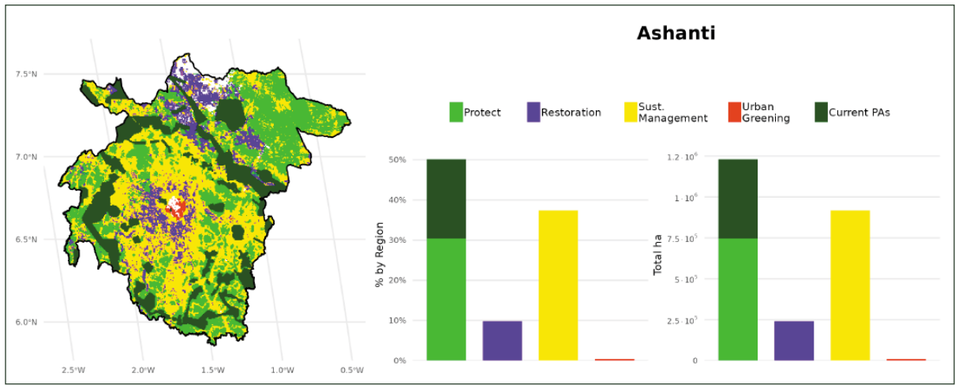
2. After contacting the national administrator of Ghana's workspace, the UNBL team will reach out with an e-mail to confirm when the user has been added to the workspace.

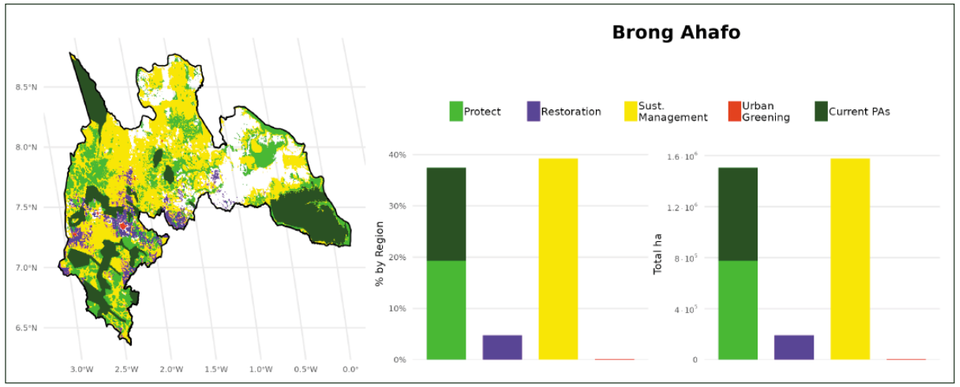
3. To access Ghana's national workspace on UNBL, see 'How do I access my workspaces'?

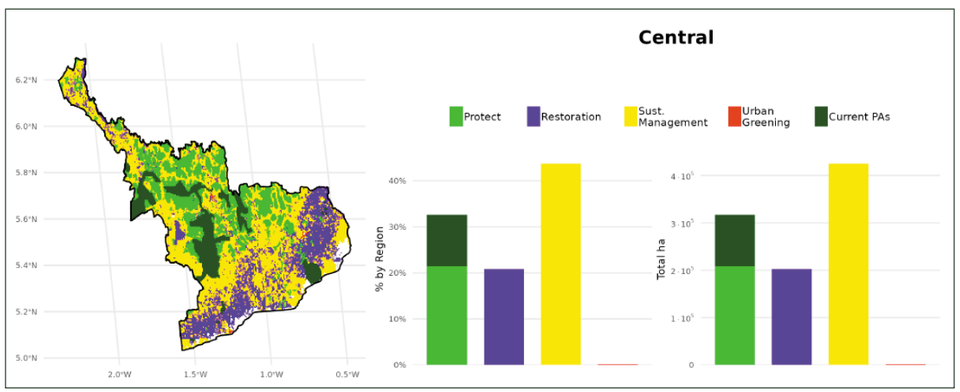
4. To access and use the ELSA Integrated Spatial Planning Tool for Ghana, as well as all other functionalities of Ghana's national workspace on UNBL, see the 'ELSA Integrated Spatial Planning Tool Guide'.

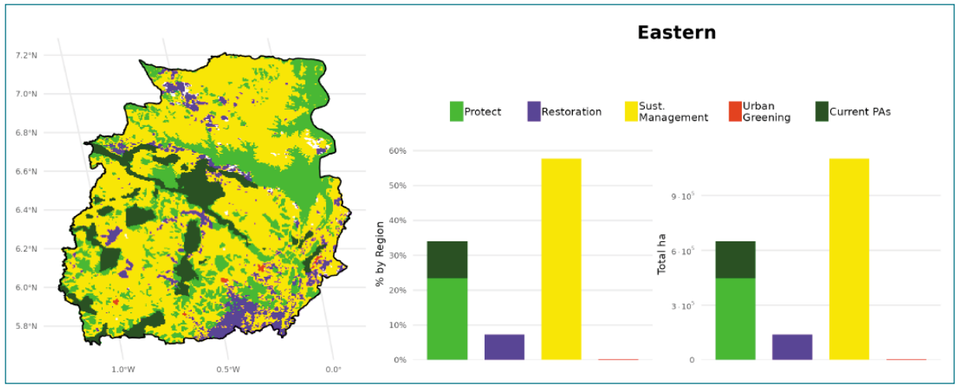
Annex 4: Regional ELSA priority action maps and analyses

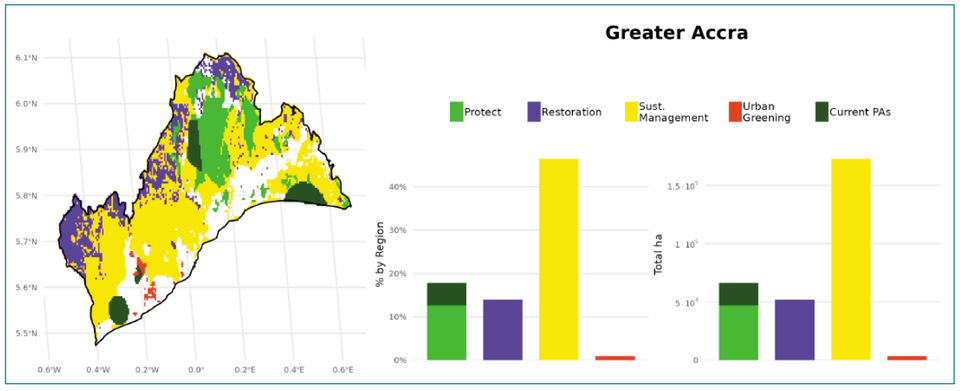
ELSA priority action maps at the region level for Ghana. Unfiltered scenario: BPF 0. The image files for these maps are available here.








Eastern
Protect
Restoration
Sust. Management
Urban Greening
Current PAs
% by Region
Total ha


Greater Accra
Protect
Restoration
Sust. Management
Urban Greening
Current PAs
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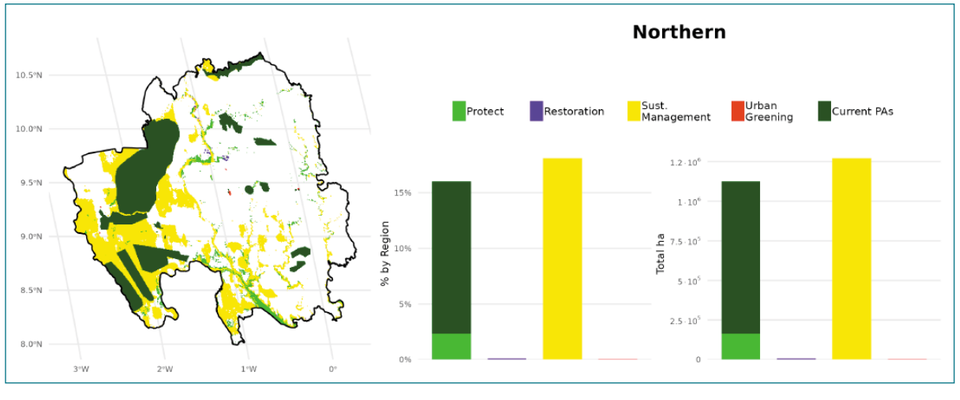
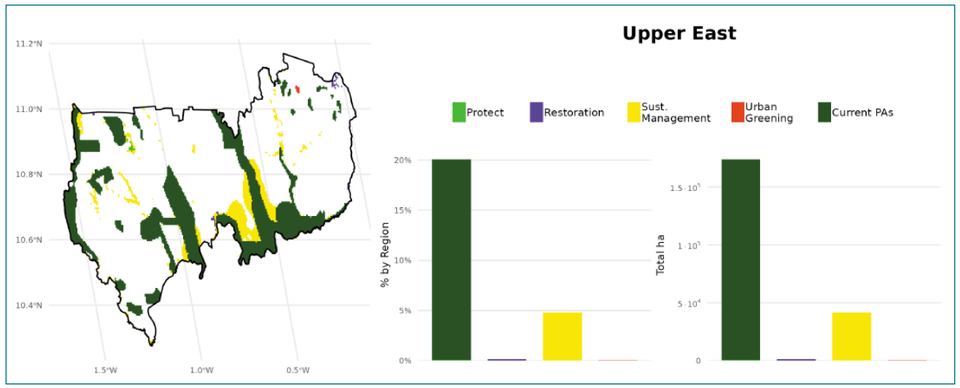
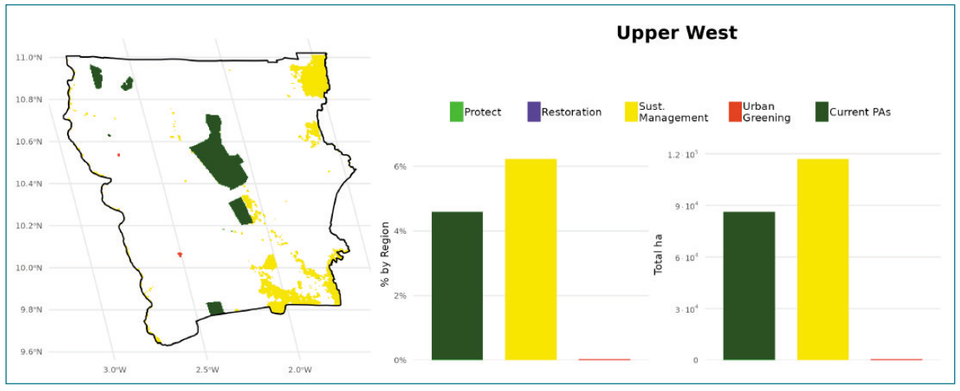
Total ha


Northern
Protect
Restoration
Sust. Management
Urban Greening
Current PAs
% by Region
Total ha


Upper East
Protect
Restoration
Sust. Management
Urban Greening
Current PAs
% by Region
Total ha


Upper West
Protect
Restoration
Sust. Management
Urban Greening
Current PAs
% by Region
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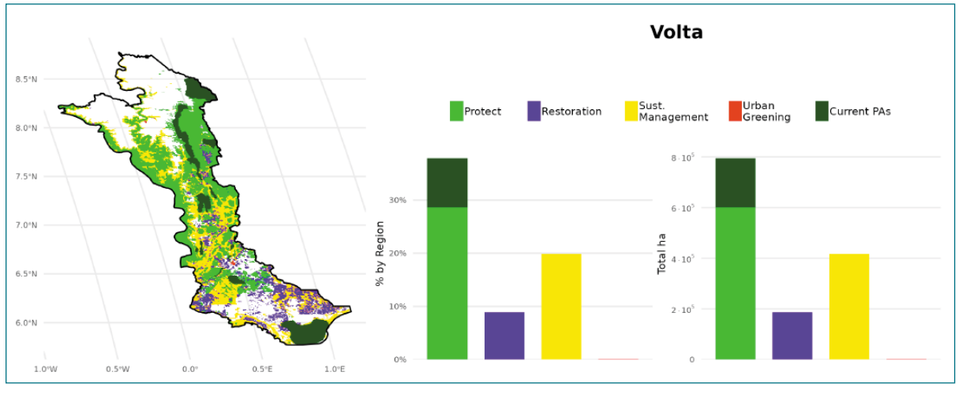
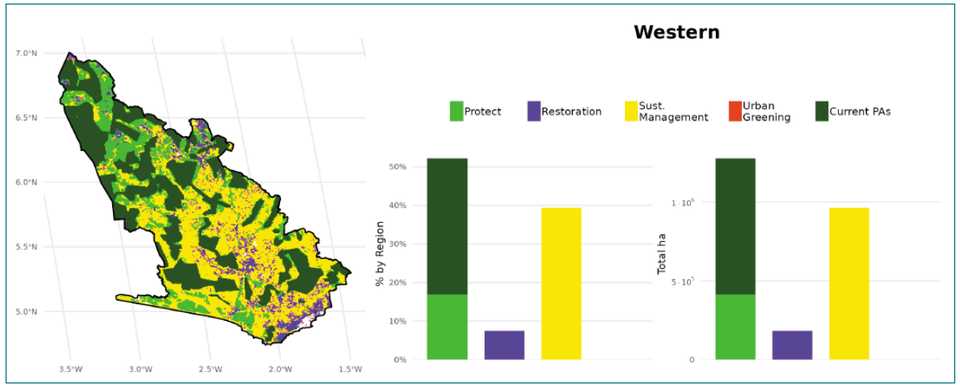

Volta
Protect
Restoration
Sust. Management
Urban Greening
Current PAs
% by Region
Total ha



Annex 5: Glossary of key terms

Term	Definition	Application in Ghana
Boundary Penalty Factor (BPF)	Solutions are penalized based on the total outer boundary or edge of the zones. By penalizing solutions with large edge length, this BPF can be used to promote spatial cohesion or clustering in the spatial prioritization zones of priority areas for KMGBF implementation.	A BPF of 0 as well as 500 was applied to produce two final ELSA priority action maps for a fine-grained and coarse-grained spatial prioritization scenario, respectively.
Area-based constraint	The maximum area (expressed as a % of the total area of the country) that can be assigned to a specific action zone (protection, restoration, management, or urban greening).	Protect: 30% Restore: 29.1% Manage: 5% Urban Green: 0.12%
Planning feature	A spatial dataset used to map spatial elements of KMGBF Targets 1-12. Each KMGBF target may be mapped by one or more planning features depending on its complexity. Planning features may include ecological classifications, habitat types, species, physical objects, processes, or any element that can be measured in a planning unit.	The ELSA tool configuration for Ghana contains 34 total planning features, of which 7 are national datasets and 27 are global datasets. These planning features map to KMGBF Targets 1, 2, 3, 4, 7, 8, 10, 11, and 12.
Decision support software	A computer application that uses information about possible actions and the limitations of those actions to assist the decision-making process in achieving a stated objective.	The ELSA tool configuration for Ghana uses the prioritizr R package in the backend. Prioritizr is designed to build and solve conservation planning problems. No knowledge of R is required to use it.
Geographic Information System (GIS)	Computer system consisting of hardware and software necessary for the capture, storage, management, analysis and presentation of geographic (spatial) data.	The ELSA tool configuration for Ghana uses GIS software through UNBL's front-end display to present spatial data to users. No GIS knowledge is required to use it.
Planning units	Planning units are the basic elements of a reserve system. A study area is divided into planning units that are smaller geographic parcels of regular or irregular shapes. Examples are squares, hexagons, cadastral parcels and hydrological units.	Coordinate reference system for the UNBL-GBF Mapping Project in Ghana: Customized Mollweide Pixel resolution or pixel size: 550x550m
Representation	In Systematic Conservation Planning, a representative system captures the full range of planning features (species, ecosystems, and ecosystem services) occurring in the planning region, not just iconic species.	In the UNBL-GBF Mapping Project for Ghana, the representation measures how well each planning feature is captured/represented by the priority protection, restoration, sustainable management, and urban greening areas in the final priority area map of an executed analysis.

Term	Definition	Application in Ghana
Systematic Conservation Planning (SCP)	A formal method for identifying potential areas for conservation management that will most efficiently achieve a specific set of objectives, commonly some minimum representation of biodiversity. The process involves a clear and structured approach to priority setting, and is now the norm for both terrestrial and marine conservation. The effectiveness of systematic conservation planning lies in its ability to make the best use of limited fiscal resources to achieve conservation objectives and to do so in a way that is defensible, accountable, and transparently recognizes the needs of different resource users.	The SCP principle is the science that allows the identification of spatial prioritization areas to assist the implementation of KMGBF targets in Ghana.
User interface	The means by which people interact with a given computer application. A Graphical User Interface (GUI) presents information in a simple way using graphics, menus and icons.	The ELSA Integrated Spatial Planning Tool on UNBL is a graphical user interface that offers stakeholders the possibility to run the spatial prioritization analysis themselves.
Weights	The weights allow users to set relative priorities within their priority policy outcomes. Values typically range from “0” (no importance) to “10” (extremely high importance).	The default weightings for the UNBL-GBF Mapping Project in Ghana were developed collaboratively through stakeholder engagement sessions. Stakeholders can modify these weightings through the ELSA tool based on changes in priorities.
Action Zones	A land use zone, equivalent to a nature-based action, which serves to enhance specific planning objects. Zones are determined by restrictions that define where an action may or may not absolutely occur. For example, these hard restrictions limit protection to intact areas (e.g., low human footprint values) and protection/restoration to areas that are moderately impacted by human activity, but not totally dominated by humans (e.g., low and medium human footprint values).	For the UNBL-GBF Mapping Project in Ghana, the zoning analysis maps four different actions: protect, restore, manage, and urban green. Data used for zoning restrictions comes from a variety of hand-picked global and national sources, and includes degraded areas, protected areas, urban areas, built areas, and agricultural areas.

Photo credit: Kofi Amponsah-Mensah, Centre for Biodiversity Conservation and Research (2025)

Photo credit: Kofi Amponsah-Mensah, Centre for Biodiversity Conservation and Research (2025)

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