Leveraging Artificial Intelligence

to enhance early action towards the Kunming-Montreal Global Biodiversity Framework

Authors

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Acknowledgements

The authors would like to acknowledge UNDP colleagues Reina Otsuka, Midori Paxton, Vishal Patil, Gayan Peris, Anneke Lincoln Schoeman, Goetz Schroth, and Diwen Xu for their expert review and contribution and Georgina de Moya and Alexis Legigand for their role in facilitating review and application of the methodology among countries. The authors would also like to acknowledge the support of the 54 countries that participated in the development and refinement of the methodology. Notably, the team thanks the Costa Rican Ministry of the Environment and Energy (MINAE), UNDP Costa Rica, and Roxana L. García Huezo, whose data visualizations in "Similarity Analysis of Costa Rica's National Biodiversity Strategy with the Kunming-Montreal Global Biodiversity Framework" served as a model for those in the NBSAP Target Similarity Assessments.

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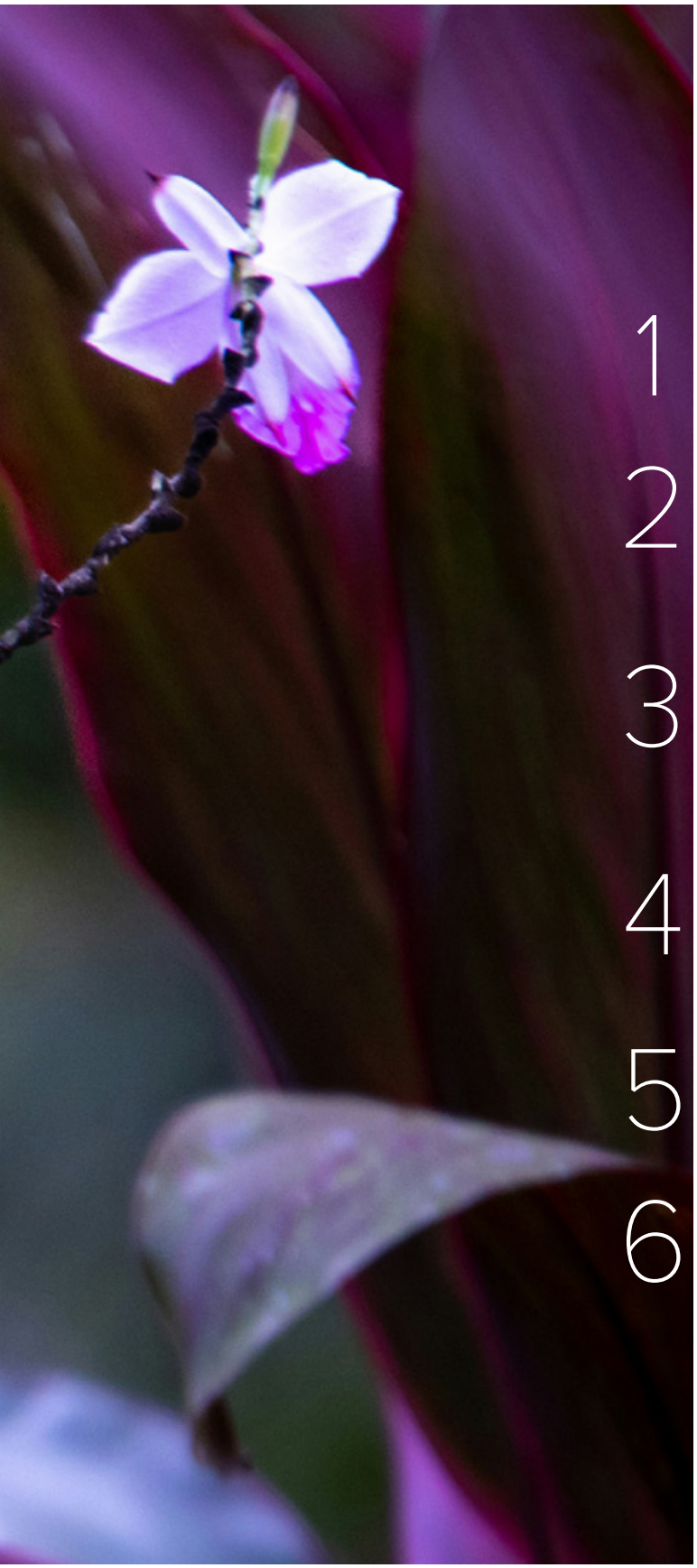

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Executive Summary

> Nature is interconnected, intertwined, and indivisible with human life, our societies, and economies. Yet we are polluting and destroying our land, air, seas, and freshwater, and threatening current and future generations. Incremental change is not enough.
>
> — UNDP Nature Pledge

The urgency to mitigate humanity's impact on global biodiversity necessitates innovative strategies within the framework of international conservation efforts. Central to these endeavors is the Convention on Biological Diversity (CBD), an international convention established in 1992 to guide the conservation of biodiversity, the sustainable use of its components, and the equitable sharing of benefits from genetic resources. Despite global commitments from 196 Parties across more than 30 years, biodiversity continues to decline rapidly due to human activities, with no global targets fully achieved yet.

National Biodiversity Strategies and Action Plans, or NBSAPs, are the main policy instruments for implementing the CBD goals at the national level, and critical for countries to establish and monitor their contributions towards global commitments. They include National Biodiversity Targets (NBTs) and national actions on nature and related environmental and sustainable development policies. At the 15th CBD Conference of the Parties (COP15) in 2022, 196 CBD Parties adopted the Kunming-Montreal Global Biodiversity Framework (GBF), which aims to put nature on a path to recovery by 2030 and achieve harmony with nature by 2050. Through updating and revising NBSAPs in line with the GBF, countries can contribute to a more sustainable future that leaves no one behind.

Yet, countries have struggled to set NBTs that match the scope and ambition of global biodiversity commitments. And, since the aims of the GBF exceed those of previous CBD frameworks, the gap between national and global targets is widening further. Less than half of CBD Parties have submitted NBTs aligned with the GBF by COP16, and even fewer have submitted updated NBSAPs. This raises concerns that the GBF could fall short of galvanizing accelerated global action at a scale sufficient to halt and reverse biodiversity loss and its impacts on humankind.

These delays are reflective of the breadth of challenges and capacity gaps countries often face when developing updated national policies toward the CBD. In many cases, Parties must first strengthen the underlying conditions for national achievement of the GBF, such as building political will and increasing capacities. Countries may also develop or fortify national coordination mechanisms with gender and biodiversity focal points, data holders, Indigenous Peoples, local communities, non-governmental organizations, and the business and finance community, among other key groups. These important activities can leave minimal time or capacity remaining for conventional manual review of NBTs. The occurrence of extreme weather events and associated economic losses, especially in Small Island Developing States (SIDS), can further delay efforts, as well as challenges accessing national technical experts due to the emigration of skilled professionals.

Novel approaches are needed to support governments in rapidly aligning biodiversity policies with the GBF to realize global biodiversity ambitions. Artificial Intelligence (AI) holds transformative potential for navigating the complex policy landscapes of biodiversity conservation. Advanced AI models offer capabilities unheard of at the start of this decade, such as analyzing and synthesizing large volumes of policy data and providing actionable written insights that facilitate quick and effective engagement on target alignment and strategic planning. When applied through a human-centered approach that minimizes risk, AI can also democratize access to cutting-edge analytics, empowering a broader range of stakeholders. AI-informed assessments can offer a systematic and standardized foundation for policy discussions and facilitate collaboration among diverse groups. By providing a clear basis for evaluating harmony between national and global policies, AI can help prioritize actions and enhance the overall effectiveness of biodiversity strategies.

For these reasons, UNDP has developed human-centered AI approaches with CBD Parties as a pathway to support policy alignment at the scale needed to achieve the GBF. Through OpenAI's Generative Pre-trained Transformers 3.5 (GPT-3.5) model, we created a methodology to evaluate the similarity between national commitments to nature, expressed as NBTs or other public targets, and the four goals and 23 targets of the GBF. The resulting NBSAP Target Similarity Assessments, produced on-demand with 54 countries, are closing capacity gaps to facilitate progress in policymaking at the scale needed to bring about a transformation in our societies' relationship with biodiversity by 2030, as envisioned by the GBF.

NBSAP Target Similarity Assessments merge artificial and human intelligence to support the alignment of national strategies with the GBF. Parties co-designed the model alongside UNDP and provided the targets they wanted analyzed, whether official NBTs or other publicly available targets, such as those in a national development plan. In addition, Parties were empowered through tools such as technical guidance and checklists to thoroughly review the assessments with national experts and validate them against trusted national information sources. Our work applying human-led AI has led to two key outcomes:

1. **Enhanced capacity for countries to align national biodiversity policies with global commitments:** 54 countries have used NBSAP Target Similarity Assessments to expedite the review of NBTs and other relevant targets towards alignment with the GBF. Developed on an on-demand basis through the Early Action Support Project implemented by UNDP, these assessments offered customized insights on the similarity between each global and national target, and provided recommendations for enhanced alignment. The assessments were not meant to be conclusive or replace the work of decision-makers. Rather, the findings provided governments with a baseline analysis of gaps and similarity between global and national commitments to nature that they then validate with experts and use as a starting point for discussion. Countries have found these assessments useful to foster dynamic, inclusive, and effective national stakeholder engagement, fill capacity gaps, raise political will, and improve sectoral collaboration, resulting in accelerated progress towards CBD commitments.

2. **Proof of concept for using human-centered AI to assess global trends for nature:** In addition to the nationally-focused NBSAP Target Similarity Assessments, an evaluation of NBTs across the GEF-eligible countries that submitted NBSAPs before COP15 was conducted to explore the potential of AI to assess global trends in NBTs. The results, shown in Section 4, indicated that GBF targets on wild species, sustainable use, and benefit sharing were the most represented among previous NBTs.[1] Conversely, the GBF targets on green spaces and urban planning, biosafety and biotechnology, and gender equality appeared to be the least represented in these previous NBTs.[2] The assessment also showed a lack of quantifiable and time-bound information in some NBTs, where only 17% of all pre-COP15 NBTs appeared to have quantifiable elements, such as numeric metrics or percentages. Likewise, only 59% of all NBTs appeared to be time-bound. These findings illustrate the potential utility of AI in conducting broad assessments of similarity between national targets and policies to support action towards the GBF.

1 Target 9 (Manage Wild Species Sustainably To Benefit People), Target 10 (Enhance Biodiversity and Sustainability in Agriculture, Aquaculture, Fisheries, and Forestry), and Target 13 (Increase the Sharing of Benefits From Genetic Resources, Digital Sequence Information and Traditional Knowledge).

2 Target 12 (Enhance Green Spaces and Urban Planning for Human Well-Being and Biodiversity), Target 17 (Strengthen biosafety and distribute the benefits of biotechnology), and Target 23 (Ensure gender equality and a gender-responsive approach for biodiversity action).

This pilot process has affirmed the potential of AI for biodiversity policy-making as well as countries' appetite for additional analysis to accelerate progress towards the GBF. Countries report that NBSAP Target Similarity Assessments have sped up desk reviews and created a useful starting point for stakeholder engagement processes. Some countries have also been able to reallocate resources to essential national steps towards achieving the GBF that cannot be automated, such as awareness building and outreach to new stakeholders to promote a whole-of-society approach. Many are now requesting new applications of human-centered AI that build on the original methodology. For example, Parties have shared interest in assessments on the entire NBSAP, including its enabling conditions, and analyses of coherence with Nationally Determined Contributions to the Climate Change Paris Agreement.

These preliminary applications have also led to several lessons learned and considerations for further improvement. Large Language Models like GPT-3.5 inherently carry risk as the data that the model is trained on is not open source and could contain biases. The team put safeguards in place to minimize risk, such as emphasing the importance of thorough stakeholder review and validation. Given that OpenAI could also reuse input data to train future AI models and analysis outside of the project, the team also restricted the input data to non-personal information from published sources. However, there are additional areas of consideration for future models, including on carbon emissions from running analyses on the server and addressing potential gender-related biases in the training data. Stronger oversight mechanisms are recommended to support marginalized communities to shape how results are applied, especially in cases where decisions on NBTs could affect them. These lessons learned can contribute to more inclusive applications of AI in the future that leave no one behind.

1. Introduction

Biodiversity is inextricably linked with human life, society, and economies. Launched in 2022, the IPBES Assessment Report on the Sustainable Use of Wild Species finds that over two billion people rely on fuel wood for cooking and one in five people globally depend on wild species for food and income. The International Labor Organization also estimates that 28% of employed people work in agriculture and therefore are directly dependent on nature. While nature makes development possible, our unsustainable relationship with it is impinging on its ability to supply critical ecosystem services now and into the future. Human activity is rapidly altering Earth's ecosystems, with 41% of amphibians, 37% of sharks and rays, 36% of reef-building corals, 34% of conifers, 26% of mammals, and 12% of birds now at risk of extinction, according to the International Union for Conservation of Nature's Red List of Threatened Species. The IPBES Global Assessment on Biodiversity and Ecosystem Services reports that land degradation has reduced productivity in 23% of the global terrestrial area, and between $235 billion and $577 billion in annual global crop output is at risk as a result of pollinator loss.

Central to global efforts to bring about a transformation in our societies' relationship with biodiversity is the Convention on Biological Diversity (CBD), established in 1992 to guide the conservation of biodiversity, sustainable use of its components, and equitable sharing of benefits from genetic resources. Despite nearly three decades of global initiatives within the framework of this international convention, biodiversity continues to decline rapidly due to human activities.

After four years of negotiations by delegates on global action to shift this trajectory, 196 Parties adopted the Kunming-Montreal Global Biodiversity Framework (GBF) at the 15th CBD Conference of the Parties (COP15) in 2022 to put nature on a path to recovery. The GBF's heightened ambition and expedited timeline are necessary to counter the magnitude of the threat facing people and the

planet. In comparison to the Strategic Plan for Biodiversity 2011–2020 and the Aichi Biodiversity Targets, the GBF has an expanded focus on equitable, inclusive, effective, and gender-responsive representation and participation in decision-making. It also has increased the ambition of the targets, such as conserving 30% of land, water, and seas, and restoring 30% of all degraded ecosystems.

Within two years of adopting these global agreements, governments have committed to submit to the CBD National Biodiversity Strategies and Action Plans (NBSAPs)—the principal instruments for operationalizing this global commitment at the national level. Towards this commitment, at COP15, Parties adopted the CBD Decision 15/6 "Mechanisms for planning, monitoring, reporting, and review", which requests Parties to revise and update their NBSAPs, aligned with the GBF and its four goals and 23 targets, by COP16. This decision also requests Parties not in a position to submit their revised NBSAPs by COP16 to communicate National Biodiversity Targets (NBTs) reflecting, as applicable, the goals and targets of the GBF within the same time period. Parties are now working to align the NBSAPs and NBTs through an inclusive whole-of-government and whole-of-society approach.

Aligning NBSAPs is an early and urgent step in the transformation envisaged by the GBF. These comprehensive documents are crafted by governments, informed by stakeholders using a whole-of-government and whole-of-society approach, and validated by governments. NBSAPs and the NBTs they contain are tailored to each country's unique biodiversity challenges and opportunities, reflecting both global conservation goals and local priorities and capacities. Updating these policy instruments in line with the GBF is imperative towards achieving the call of the GBF *to catalyze, enable, and galvanize urgent and transformative action by governments, and subnational and local authorities, with the involvement of all of society, to halt and reverse biodiversity loss*.

However, in many cases, human and financial capital have not increased to match the ambition of GBF, leading to capacity gaps that can hinder countries from realizing their commitments to the CBD. Bringing the whole society into decision-making towards the GBF often requires building political will for biodiversity across government sectors, including at the regional and local levels, expanding stakeholder processes to reach more groups, assessing coherence across the policy landscape, and connecting new NBTs with funding sources and responsible agencies. All of these processes require capacity and can delay a country's progress towards planning and implementing NBSAPs.

UNDP's commitment to supporting the achievement of the GBF

UNDP is taking bold, imaginative, and ambitious action in support of the GBF through the Nature Pledge, UNDP's commitment to elevated support to over 140 countries to put nature at the heart of development and secure a better, more sustainable, more equitable future. Through enhanced country support, UNDP is committed to advancing three essential transformative shifts to protect biodiversity, improve the resilience of ecosystems, and harness the power of nature toward the achievement of the Sustainable Development Goals (SDGs):

1. **Narrative and behavioral shift:** to accelerate narrative shifts around nature itself, nature and economies, and nature and societies to transform understanding of the true value of nature to all of humanity, leveraging the power of stories, legal and human rights tools, and civic actions, towards massive behavioral change.

2. **Economic and finance shift:** to redirect flows of public and private finance from nature-negative to nature-positive outcomes towards filling the biodiversity finance gap of $700 billion per year.

3. **Policy and practice shift:** to cause bold shifts in policy and practices to tackle the direct drivers of biodiversity loss and ecosystem degradation, and to enable countries to harness the power of nature for solving multidimensional development challenges through inclusive, human rights-based, and gender-responsive approaches.

Among efforts aligned with the Nature Pledge is the Early Action Support (EAS) Project, funded by the Global Environment Facility (GEF). This project provides financial and technical support to 138 developing, small island, and middle-income nations in their work to rapidly align NBTs and NBSAPs with the GBF. Introducing this new global level of environmental ambition into national policies for nature, within a record two years of the GBF's adoption, is central to the behavioral, economic, and policy shifts needed to protect and restore our planet, eradicate poverty, reduce gender and other inequalities, protect human rights, and accelerate overall progress on global goals.

Human-centered AI to support biodiversity decision-making

As part of the EAS Project, UNDP supported countries to pilot the use of AI to enhance alignment of their NBTs with the GBF. The use of AI, particularly OpenAI's Generative Pre-trained Transformer 3.5 (GPT-3.5), offers a groundbreaking approach to accelerating access to the baseline information that policymakers require to make rapid progress in target alignment. OpenAI's GPT-3.5 is one of the leading Large Language Models (LLMs) due to its ability to understand, interpret, and generate human-like text based on learning from an extensive dataset covering a wide array of topics.

After an extensive testing period, explained in the Methodology section, GPT-3.5 was selected due to its ability to rapidly assess NBTs against the goals and targets of the GBF and draft written recommendations to support enhanced alignment. At a national level, these NBSAP Target Similarity Assessments provided a standardized starting point for stakeholders to use to review their current NBTs, assess alignment, and update or revise NBTs on a responsive timeline, in line with CBD Decision 15/6. When applied across multiple countries' NBTs at once, the results validated the potential of AI to assess universal trends in target alignment.

UNDP's Digital Strategy also considers AI to be an empowering force for people and planet and a potential accelerator towards the SDGs. Across the UN, AI is already proving to be a critical tool to understand biodiversity trends, identify drivers of biodiversity loss, and support policy action. For example, the United Nations Environment Programme (UNEP) and United Nations Conference on Trade and Development (UNCTAD) are using AI to develop rapid, quantitative predictions on the impacts that government financing can have on biodiversity, climate, and development policy. The Food and Agriculture Organization (FAO) is applying AI to remote sensing to strengthen access to near real-time data on water and agricultural productivity in Africa. Breakthroughs in the development of LLMs, such as OpenAI's GPT-3.5, open the doors to even more types of AI-driven analysis to accelerate action towards global biodiversity commitments.

The integration of AI in evaluating and aligning national biodiversity policy relates to the broader mandate by the CBD for an inclusive approach to environmental decision-making. By democratizing access to AI models and analysis that usually would be time-consuming and costly, we aimed to empower countries to undertake a collaborative, multi-sectoral effort in tackling biodiversity loss. Feedback from countries validated the utility of this technological approach to provide a robust, standardized basis for discussions among stakeholders that can be produced within hours rather than months, and with limited capacity and resources. In addition, these NBSAP Target Similarity Assessments helped countries identify where they can increase alignment with GBF targets pertaining to gender equality and whole-of-society approaches, thereby supporting increased considerations of human rights and inclusion in NBTs and NBSAPs.

Despite the benefits, the use of AI in biodiversity assessments also presents challenges, including potential biases in models and the risk of unintended harm. AI models, including GPT-3.5, can inherit biases from the data they are trained on, impacting policy insights. AI systems must be designed to support an "AI for good" approach, avoiding negative consequences, especially in sensitive areas such as biodiversity conservation. As the use of AI to examine biodiversity policy expands, it must ensure that no country's unique challenges or needs are overlooked.

Appropriate guardrails were employed to ensure a human-rights-focused design and responsible application (Box 1). For the NBSAP Target Similarity Assessments (see section 3), countries co-designed the model and were also able to further customize the assessments by providing their own NBTs or national targets from other sectors or levels, including regional or local. In addition, only publicly available policy data, found either via the CBD National Target Database, the CBD Online Reporting Tool, or relevant national sources provided by countries, were used to minimize risk. Furthermore, countries were strongly encouraged to validate results with national experts and stakeholders, and cross-check against national data sources. The NBSAP Target Similarity Assessments were shared only directly with countries and were also supplemented with technical support, such as guidance documents, webinars, and 1-1 expert consultations to help countries ensure that their updated NBTs were reflective of national circumstances.

For the proof of concept global analysis (see section 4), the underlying model is the same as the national level, which was shaped by pilot countries. Similarly, input data was only pulled from public sources (i.e., the CBD National Target Database and the GBF itself). However, this global analysis only used NBTs submitted to the CBD ahead of COP15 in 2022, and the results were compiled across 129 countries to provide a broad snapshot of trends rather than disaggregated by country. National-level assessments were not made available publicly in either level.

Box 1: Applying principles of human rights to the application of AI

1. **Puts human rights at the design:** NBSAP Target Similarity Assessments were designed through a human-centered AI approach, where countries co-created the underlying models, shaped their assessments, and validated the results. While analysis of similarity between national and global targets are often done by hand, producing initial assessments through AI provided a starting point that was quick and standardized across countries. Instead of taking months to produce a gap analysis. Each NBSAP Target Similarity Assessment was produced in only a few hours, enabling countries to expedite desk reviews and dedicate more time to stakeholder consultations. In addition, the assessments improved the efficiency of stakeholder engagements by providing a helpful mechanism to convene stakeholders. The standardized results helped to ensure that equal baseline information was available on each GBF goal and target, supporting stakeholders to think critically about national contributions to each of the GBF's aims. This includes Target 22 "Ensure the full, equitable, inclusive, effective and gender-responsive representation and participation in decision-making, and access to justice and information related to biodiversity by indigenous peoples and local communities, respecting their cultures and their rights over lands, territories, resources, and traditional knowledge, as well as by women and girls, children and youth, and persons with disabilities and ensure the full protection of environmental human rights defenders" and Target 23 "Ensure gender equality in the implementation of the framework through a gender-responsive approach where all women and girls have equal opportunity and capacity to contribute to the three objectives of the Convention, including by recognizing their equal rights and access to land and natural resources and their full, equitable, meaningful and informed participation and leadership at all levels of action, engagement, policy and decision-making related to biodiversity."

2. **Promotes inclusive and gender-responsive approaches:** The team behind the assessments was evenly split between men and women, including the country-level focal points from 15 original pilot countries whose input has shaped the analysis and presentation of results. The NBSAP Target Similarity Assessments also provided information that countries could use to enhance action towards global targets on inclusive and gender-responsive approaches, such as Targets 22 and 23. Given that the GBF has a larger emphasis on gender equality and participation than its predecessor, the Aichi Biodiversity Targets, NBSAP Target Similarity Assessments often revealed areas where gender considerations may be lacking in current NBTs. Of the 62 assessments developed for 54 countries, 33 assessments from 31 countries included at least one NBT that was similar to either Targets 22 or 23. These countries all received information about how they could increase the similarity between these existing NBTs and Targets 22 and 23. For the 23 countries that lacked NBTs related to Targets 22 or 23, they also received recommendations to dedicate additional time with stakeholders to develop NBTs that respond to these global targets, as well guidance on gender equality and mainstreaming in NBSAPs. As a result of these assessments, many countries identified gaps and pathways to better promote women and gender equality in their NBTs, either through creating dedicated NBTs on women and gender, or integrating women and gender considerations into existing NBTs. Recommendations on how to further integrate gender equality into future AI applications can be found in section 5.

3. **Contributes to shared global standards and frameworks that protect people's rights:** The NBSAP Target Similarity Assessments supported global standards such as the Universal Declaration of Human Rights and the Principles for Digital Development. The GBF has a clear emphasis on human rights, with four targets (1, 3, 22, and 23) explicitly referring to rights. As a result, NBSAP Target Similarity Assessments contributed to protecting people's rights by indicating areas where the countries can better orient their NBTs to the GBF targets. For example, the assessments often provided recommendations on increasing consideration of the rights of Indigenous Peoples and local communities and their full and effective participation where those themes are missing in NBTs. In addition, the assessments supported the Principles for Digital Development through creating open and transparent practices, establishing people-first data practices, and using evidence to improve outcomes. While the use of non-human data such as NBTs already reduced risk, the team only used publicly available targets and ensured that countries consented to the analysis. In addition, countries were informed of the limitations of AI-driven analysis (Figure 1) and their feedback was used to iteratively update the model and reports.

4. **Applies open digital standards and open data where possible with GPT-3.5:** The input data used in these assessments was all publicly available. NBTs were obtained from the CBD National Target Database, the CBD Online Reporting Tool, or other national policies, at the direction of countries, and the global goals and targets were derived from the GBF itself. As NBTs do not include any personal data, the data privacy risks of using NBTs are comparatively minimal. The team used the commercial version of GPT-3.5 rather than ChatGPT for increased functionality, but countries have access to the underlying code, and users can adapt it to other models, including open-source alternatives, depending on their needs and preferences. OpenAI trained GPT-3.5 on an estimated 570 gigabytes of text data from sources like books, websites, and academic articles, however, this data set is unfortunately not publicly available.

5. **Works to strengthen national capacity:** In addition to strengthening capacity on policy alignment, NBSAP Target Similarity Assessments increased countries' understanding of AI and capacity to use it. For many countries, this was the first time they have included AI as a tool in their NBSAP update processes. The process of co-developing NBSAP Target Similarity Assessments has helped to introduce countries to the possibilities of human-centered AI and opened the door to further explorations. Countries also have access to the underlying code via GitHub and a team to support more customized applications, should they be interested.

6. **Leverages strategic partnerships to catalyze inclusive approaches to digital development:** Various experts across the UN and governments contributed to the development of NBSAP Target Similarity Assessments to ensure that the analysis used best-in-class methods and could meet Party needs. Technical contributors and champions included the governments of Cambodia, Guyana, Morocco, and Paraguay, who spoke at the 2024 Nature for Life Hub about how they applied these assessments. A total of 15 countries volunteered to review preliminary pilot assessments, with their feedback shaping the analysis and presentation of results. In addition, the design of the NBSAP Target Similarity Assessments was modeled after a national-level analysis published by the Costa Rican Ministry of the Environment and Energy (MINAE) and UNDP Costa Rica. A total of 54 countries co-created NBSAP Target Similarity Assessments through the support of UNDP, with a team available to produce additional assessments at the request of Parties.

2. Methodology

This section describes the methodology employed by the EAS Project implemented by UNDP to evaluate the similarity between NBTs and the global goals and targets defined within the GBF. The approach aimed to achieve two outcomes: 1) enhanced support for countries to align their NBTs with the global goals and targets, and 2) proof of concept for using AI to assess global trends in NBTs.

Key activities to achieve these outcomes included:

1. **Data collection and preprocessing:** The assessments leverage two open-source text sources:

    - **NBTs sourced from the CBD National Target Database.** These NBTs often represented pre-COP15 commitments, before the adoption of the GBF in 2022. Some countries also chose to provide other targets for analysis, such as those within relevant national plans or updated targets available through the CBD Online Reporting Tool. Data preprocessing involved cleaning duplicate entries, standardizing target numbering, and translating non-English NBTs to English through DeepL to ensure data uniformity and comparability.

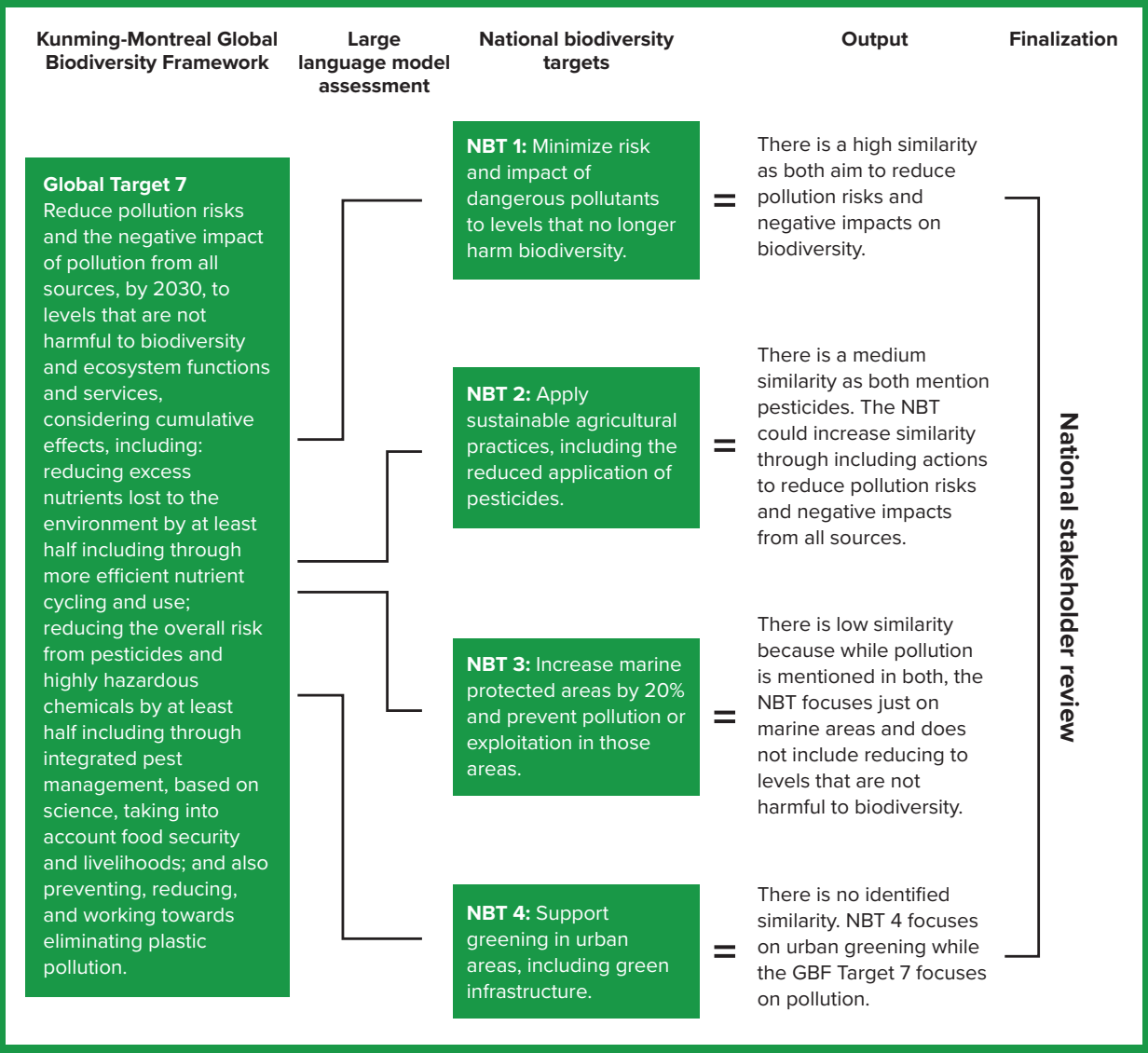
    - **The goals and targets of the GBF, adopted by CBD Parties in 2022.** The model was fed the full text of the four goals and 23 targets of the GBF. Additional keywords and acronyms were identified and included for some GBF goals and targets to enhance the likelihood of correctly identifying text similarities. For example, the "Nagoya Protocol" was included as a synonym under GBF Target 13 (Increase the Sharing of Benefits From Genetic Resources, Digital Sequence Information and Traditional Knowledge), because while the global target does not explicitly mention the Nagoya Protocol, it is deeply related to the target. Acronyms such as "IAS" for Invasive Alien Species and "IPs" for Indigenous Peoples were also added, where appropriate.

2. **Methodological framework and model selection:** The team explored multiple models to identify those that could best meet the needs of the assessment. First, Natural Language Processing techniques, such as Term Frequency–Inverse Document Frequency (TF-IDF) and Bidirectional Encoder Representations from Transformers (BERT) were tested. However, given the complex and country-specific nature of NBTs, the team transitioned to OpenAI's GPT-3.5 for its superior contextual comprehension. In addition to processing vast amounts of text, identifying key themes, and detecting nuanced similarities and differences, the model was chosen given its ability to generate written human-intelligible outputs that can provide steps to improve target similarity and alignment. Box 2 illustrates the methological framework underpinning the NBSAP Target Similarity Assessments.

> "In Paraguay, the evaluation of similarity between our national targets and the global targets has been fundamental. Thanks to this, we have been able to update our targets in a way that is efficient and innovative, quickly identifying areas for improvement from a constructive dialogue between different actors. This has allowed us to ensure effective alignment with the targets of the GBF."
>
> — Dario Mandelburger, Director General of Protection and Conservation of Biodiversity at the Ministry of Environment and Sustainable Development of Paraguay, and the CBD focal point

Box 2: Simplified methodological framework

The diagram uses Target 7 and four example NBTs to illustrate the analysis underpinning NBSAP Target Similarity Assessments. The text under "output" is meant to show the type of results that can come from the model, however actual results are significantly more detailed (see Figure 6).



3. **Analysis and validation process:** The methodological validation involved comparing model outputs and fine-tuning parameters for optimal accuracy. The GPT-3.5 model was calibrated against benchmarks set by earlier Natural Language Processing tools and refined through testing of model prompts, incorporating feedback from domain experts. This collaborative, iterative approach ensured the model captured both the lexical and thematic similarities between NBTs and global targets. Included in the validation process was the manual assessment between over 1,000 pairs of NBTs and the GBF global goals and targets,[3] approximately 1% of the more than 82,000 total pairs. An equal number of each category of target pairs (low, medium, high, and no similarity) was selected. The results can be seen in the confusion matrix below:

			Predicted	
			Positive	Negative
			693 (PP)	**350 (PN)**
Actual	Positive	**782 (P)**	684 (TP)	98 (FN)
	Negative	**261 (N)**	9 (FP	252 (TN)

Through the confusion matrix, the team calculated the accuracy of the model to be 0.897. However, given the unbalanced nature of the dataset, where 93% of target pairs contained no similarity, 4% contained low similarity, 1.5% contained medium similarity, and 0.5% contained high similarity, and given our higher concern regarding the cost of false positives, the team opted to focus on Precision, which was calculated at 0.987.[4]

Beyond the general similarity of NBTs, other elements of interest were analyzed at a global level, namely:

- The inclusion of dates to bound NBTs within certain timeframes. Annual references, ranging from 1973 to 2030, were identified by scanning for four consecutive digits; and
- The use of quantifiable metrics terminology, such as "% increase" and "X hectares" to assess mensurability and the ease of conducting monitoring and evaluation. Because there are many ways in which metrics can be presented beyond time-bound metrics, the analysis was restricted to identifying numbers, both in numeric and alphabetic forms, excluding the aforementioned case of four consecutive digits.

3 The number is slightly higher than what had been estimated when running Cohen's W test, 785 cases

4 For reference, the Sensitivity was calculated at 0.875; the F-1 score at 0.927

4. **Pilot country testing and peer review process:** National-level results were then packaged and shared with the original set of 15 self-selected pilot countries for review and feedback. These countries received NBSAP Target Similarity Assessments packaged in two formats:

   - **Policy summary:** A high-level overview of the similarity between a country's NBTs and the goals and targets of the GBF. The summary aimed to help decision-makers quickly understand key trends in target similarity and easily communicate them to others.

   - **In-depth analysis:** A comprehensive analysis of the similarity between NBTs and the goals and targets of the GBF. Detailed recommendations to enhance alignment during the update and review of NBSAPs were also provided.

   Feedback from pilot countries, submitted through an online form and via email, confirmed the utility of the analysis for facilitating NBT alignment discussions, cross-verifying national analyses, demonstrating resource needs, and aiding CBD reporting ahead of COP16. Pilot country feedback also informed further methodological refinements and adjustments in the framing and packaging.

5. **Scale-up of national analysis:** After final tweaks to the model and the packaging of the results, the team developed updated NBSAP Target Similarity Assessments for a new round of countries as well as the original pilot countries. In response to queries from interested countries, the team also created assessments on similarity between the global goals and other publicly available targets, such as those in national strategies. This was especially beneficial for countries that did not have NBTs or were orienting national efforts around non-NBT targets. A total of 62 assessments have now been developed with 54 countries.

6. **Release of methodology:** The underlying prompt and code behind these analyses are now available via Github. The team welcomes Parties, international and national non-governmental organizations, and experts in biodiversity policy and AI to view and adapt the code based on their interests. A team is also available to support more customized applications, at country request.

> "The AI-driven Similarity Assessment for Guyana has helped us establish a clear baseline between the NBSAP and the GBF. We have integrated this into our work for component one of the Early Action Support Project on target alignment as a foundation for reviewing plans, policies, and programs not covered by the AI tool."
>
> — Lauren Benita M. Sampson, Senior Environmental Officer, MEAs, Policy and Planning Department, Environmental Protection Agency (EPA),Guyana

3. National NBSAP Target Similarity Assessments

UNDP has developed customized NBSAP Target Similarity Assessments for over 50 GEF-supported countries. These assessments were created on an on-demand basis and shared directly with country focal points for their review and use at their discretion. By examining the level of similarity between NBTs and the GBF goals and targets, identifying gaps, and highlighting recommendations for enhancement, the assessments have offered valuable insights for improving the country's biodiversity strategies. Feedback from countries has validated the utility of these assessments to:

- Accelerate national analyses on target alignment and gaps;
- Support national progress on the GBF during periods of gaps in capacity or expertise;
- Set a common starting place for advanced stakeholder consultations on NBSAP target alignment;
- Provide useful information to validate towards CBD reporting requirements in advance of the COP16, such as those to be reported in Annex I of in Decision 15/6;

- Provide context for biodiversity policy alignment across other Multilateral Environmental Agreements (MEAs); and,

- Demonstrate the need for additional resources for NBSAP alignment to potential donors.

Framing of results

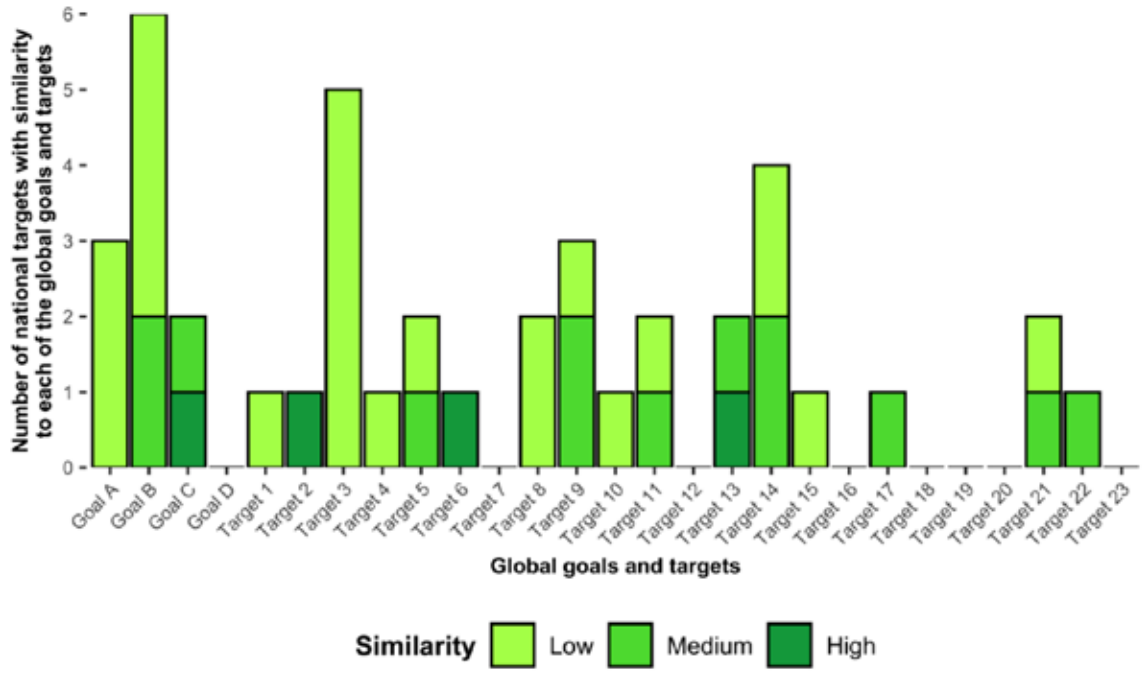
After running the model for a particular country, results were packaged into two documents: a policy summary and an in-depth analysis.

NBSAP Target Similarity Assessment: Policy summary

This high-level document provided an overview of the similarity detected between a country's NBTs, or related biodiversity targets, and the goals and targets of the GBF. The summary aimed to help decision-makers quickly review potential trends in target similarity and easily communicate them to others. Contents included a short description of the methodology, recommendations on using the assessments, and a summary of the results. Figures 1-4 provide examples of the types of analysis that are included in the policy summaries, using sample data.

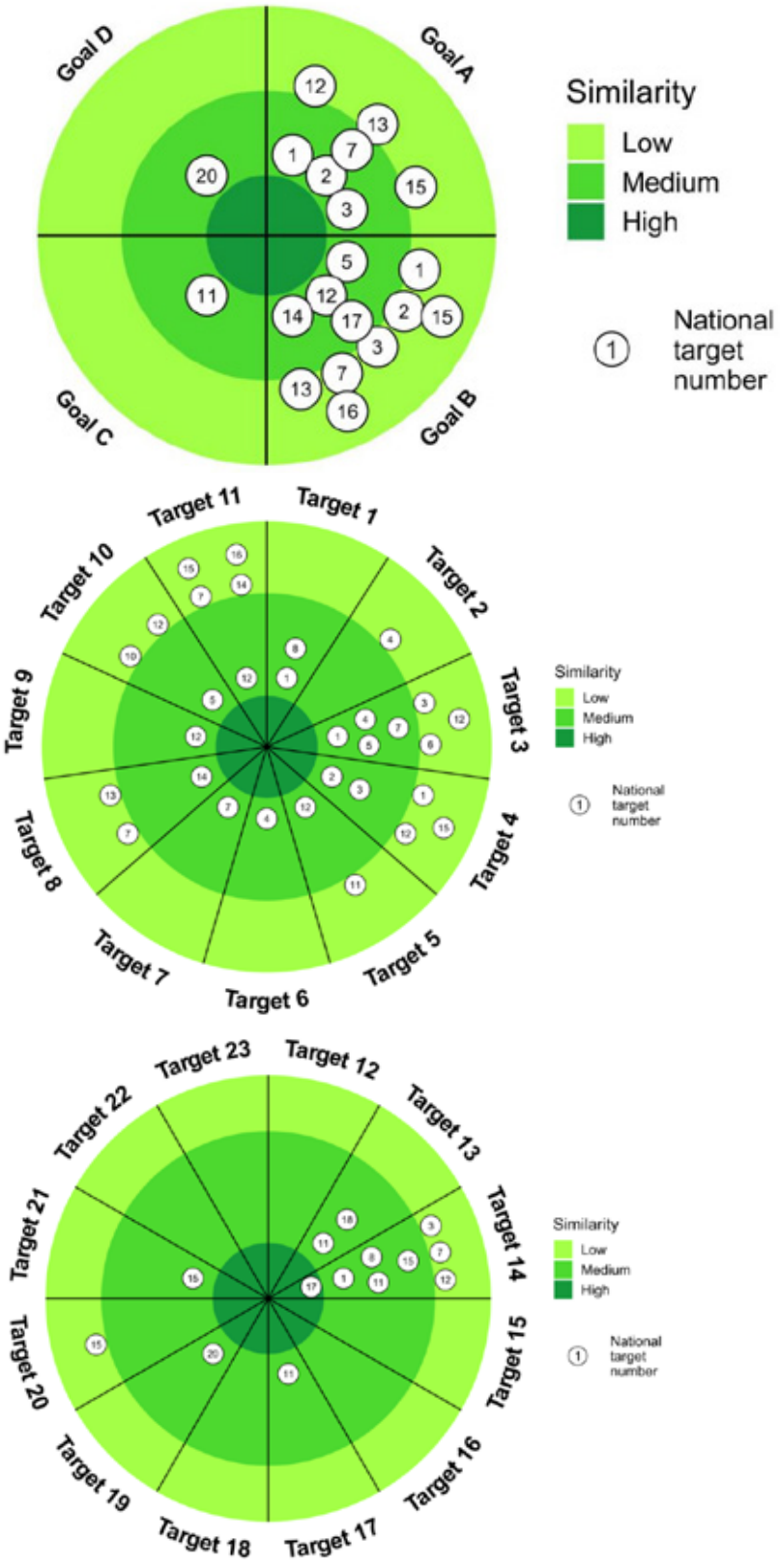
Figure 1: Sample data of NBTs with low, medium, and high similarity

This graphic identifies the number of NBTs that show any level of similarity with each of the GBF goals and targets. With the sample data, the GBF goal or target with the highest number of similar targets detected is Goal B, and the goals and targets that do not appear to have any similar NBTs are Goal D, Target 7, Target 12, Target 16, Target 18, Target 19, Target 20, and Target 23. A country could use this type of graphic to identify which GBF goals and targets may require more planning or discussion during stakeholder engagement consultations.



Figures 2, 3, and 4: Sample breakdown of similarity between NBTs and the global goals and targets

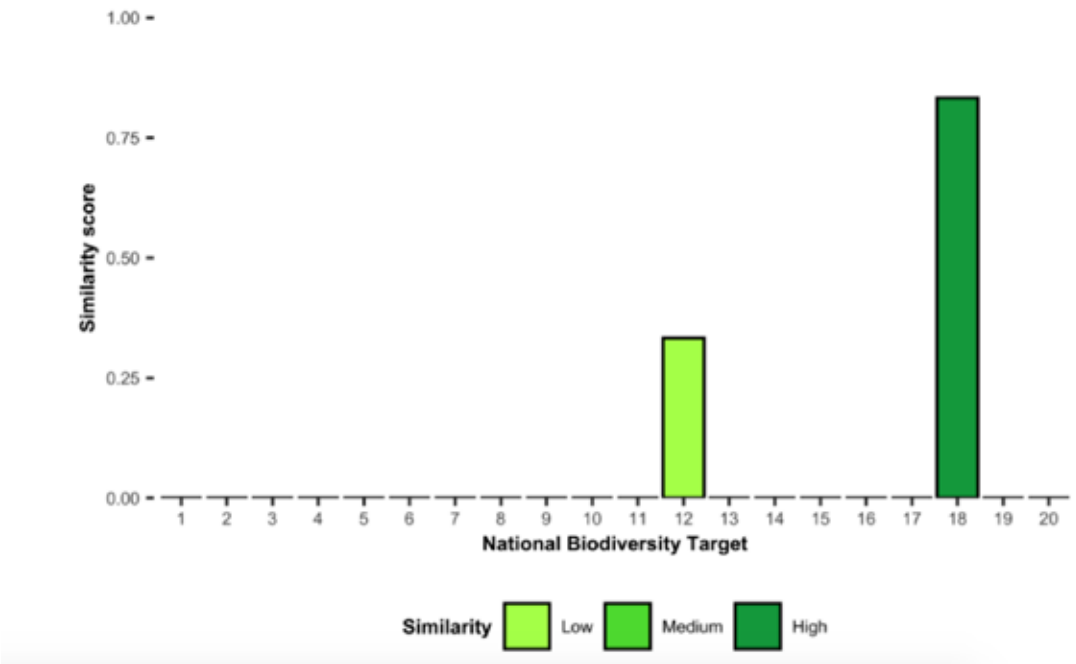
These figures elaborate the data presented in Figure 1, where the white circles correspond to national biodiversity targets and are placed on the graph according to their level of similarity with the respective goal or target of the GBF.



NBSAP Target Similarity Assessment: In-depth analysis

In addition to the policy summary, countries also received a comprehensive analysis of the similarity between NBTs and the goals and targets of the GBF and recommendations for greater similarity, as demonstrated in Figures 5 and 6.

Figure 5: Sample target-based assessments available in the in-depth analyses



This figure shows the similarity identified when comparing a sample country's 20 NBTs with Target 6 on invasive alien species.[5] For this country, only NBT 18 shows high similarity with GBF Target 6, while there are zero NBTs with a medium similarity, and one NBT with low similarity (NBT 12).

5 Target 6: Eliminate, minimize, reduce and or mitigate the impacts of invasive alien species on biodiversity and ecosystem services by identifying and managing pathways of the introduction of alien species, preventing the introduction and establishment of priority invasive alien species, reducing the rates of introduction and establishment of other known or potential invasive alien species by at least 50 percent, by 2030, eradicating or controlling invasive alien species especially in priority sites, such as islands.

Figure 6: Recommendations for higher similarity

In addition to identifying those NBTs with low, medium, and high similarity toa given GBF goal or target, GPT-3.5 also provides a written description of gaps between the targets and recommendations for higher similarity. An example is provided below for GBF Target 6, using the same sample NBTs in Figure 5.

NBT	Assessment of similarities with Target 6 and recommendations for higher similarity
High similarity	
NBT 18: By 2022, major invasive alien species (IAS) and their pathways have been identified, prioritized, and controlled.	Similarities: Both the NBT and GBF Target 6 aim to identify and prioritize invasive alien species and pathways, and control or mitigate their impacts on biodiversity and ecosystem services. Recommendations: The NBT could increase similarity with GBF Target 6 by including language on eradicating or controlling invasive alien species in priority sites, such as islands and pest infestations, and reducing the rates of introduction and establishment of other known or potential invasive alien species by at least 50 percent by 2030.
Low similarity	
NBT 12: By 2020, the rate of endangered species is reduced by 30%, and the introduction of invasive alien species and their impacts are significantly reduced.	Similarities: Both the NBT and GBF Target 6 mention the reduction of impacts of invasive alien species. Recommendations: The NBT could increase similarity with GBF Target 6 by including specific actions to identify and manage pathways of introduction of alien species, prevent the introduction and establishment of priority invasive alien species, and eradicating or controlling invasive alien species especially in priority sites.

Emphasis on national expert review

The NBSAP Target Similarity Assessments can support target alignment processes, but should be considered alongside other information, including national expertise. Given that the assessments are developed through AI and focus just on target text, UNDP emphasized that countries cross-check the results alongside national exercises and consider them as potential input for stakeholder engagement exercises rather than as stand-alone decision-making tools. CBD Decision 15/6 states that NBSAP and target alignment processes "should consider, according to national circumstances, elements such as implementation gaps, existing goals, targets and indicators, the effectiveness of past actions, monitoring systems (including any data and/or knowledge systems and gaps), sectoral and cross-sectoral policies, finance and other means of implementation, and an assessment of how stakeholders, indigenous peoples and local communities, women and youth were involved in the revision and implementation." The in-depth analyses also provide countries with questions to take into consideration as they review, such as:

- Which NBT appears to be the most aligned to each global goal or target? Where do multiple NBTs support national action towards a global goal or target?
- What elements of the GBF, if any, are missing from the NBT(s)?
- How could the NBT(s) be updated or revised to better align with the global goals and targets? Are new NBTs necessary?
- What mechanisms should be in place to achieve the NBTs and how should they be represented in the NBSAP? This could include stakeholder engagement, finance, implementation, capacity building and development plans, and monitoring systems.

These questions helped countries think critically about the results and begin to select which NBTs they want to consider for update with stakeholders. While countries are able to submit more than one updated NBT in line with each of the GBF goals and targets, it was important for countries to consider if there are NBTs they would like to prioritize over others to reduce overlap. Countries were also provided with information on the limitations of these analyses, as shown in Figure 7.

Figure 7. Description of limitations and potential of NBSAP Target Similarity Assessments, as found in the in-depth analyses

What the assessment can do	What the assessment cannot do
Assess similarity between national and global targets based on their text	Provide definitive scores on target alignment that take into account national circumstances, baselines, or capabilities
Identify national biodiversity targets that have high, medium, low, and no similarity with global goals and targets	Make judgements on a country's alignment with the Kunming-Montreal Global Biodiversity Framework and determine which national biodiversity targets should be revised or updated and how
Inform country-led process to align national bidoviersity targets with the Framework and support subsequent NBSAP revision or update	Replace national target alignment with the processes, including those outlined in the document 'Technical Guidance to support alignment of national biodiversity targets with Kunming-Montreal Global Biodiversity Framework'
Serve as resource that Parties can elect to consider based on need and capacity	Replace or quality COP15 Decisions or related target alignment information that is or will be provided by the CBD

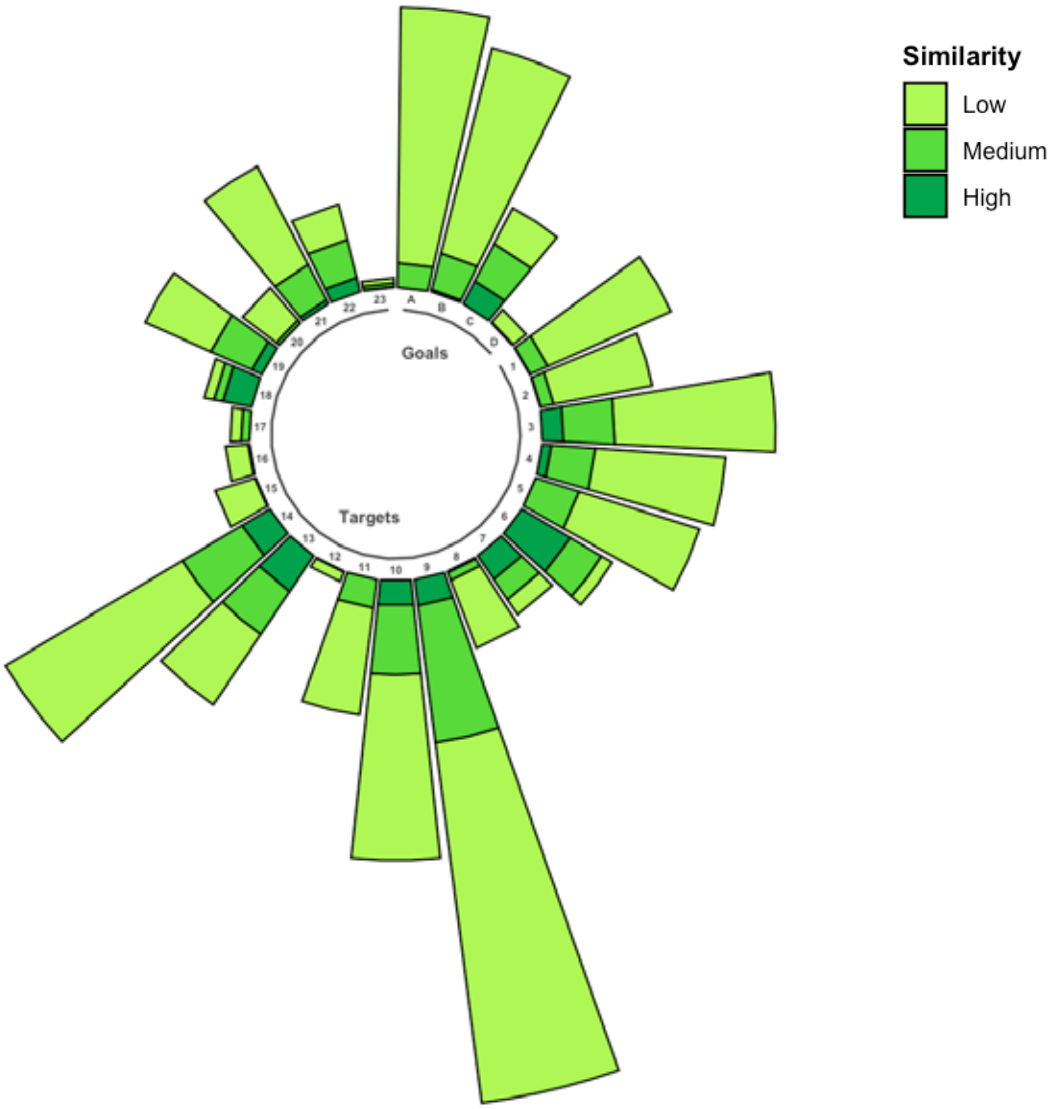
4. Proof of concept for using AI to assess global trends in NBTs

In parallel with developing national NBSAP Target Similarity Assessments, UNDP analyzed 3,065 public pre-COP15 NBTs across 129 GEF-supported countries to develop a proof of concept for the potential of AI-supported national policy analyses at a global level. This preliminary application of GPT-3.5 at the global level can help nations and the international community better understand the gaps between pre-COP15 NBTs and the GBF goals and targets. It also demonstrates the power that AI could have at analyzing the updated NBTs that are submitted this year to the CBD.

The analysis assessed 3,060 NBTs against the 23 targets and four goals of the GBF, for a total of 82,775 target pairs. Only 5,144 pairs (6%) had some degree of similarity, and of these, only 9% had a high similarity score, while slightly over two-thirds (69%) had a medium similarity score, and slightly less than a quarter (23%) had a low similarity score.

Of the high similarity scores, Target 6 (Reduce the Introduction of Invasive Alien Species by 50% and Minimize Their Impact) was the most represented, with 17% of all NBTs showing high similarity with it. Of the medium similarity scores, Target 9 (Manage Wild Species Sustainably To Benefit People) had the largest number of similar targets, with 16% of all NBTs with medium similarity relating to it; and of the low similarity scores, Target 9 was the most common, with 14% of low similarity NBTs pertaining to this global target. Figures 8 and 9 illustrate the similarity between all pre-COP15 NBTs from GEF-supported countries and the GBF's four goals and 23 targets, excluding those the target pairs with no similarity.

Figure 8: Similarity between pre-COP15 NBTs of GEF-eligible countries and the GBF goals and targets

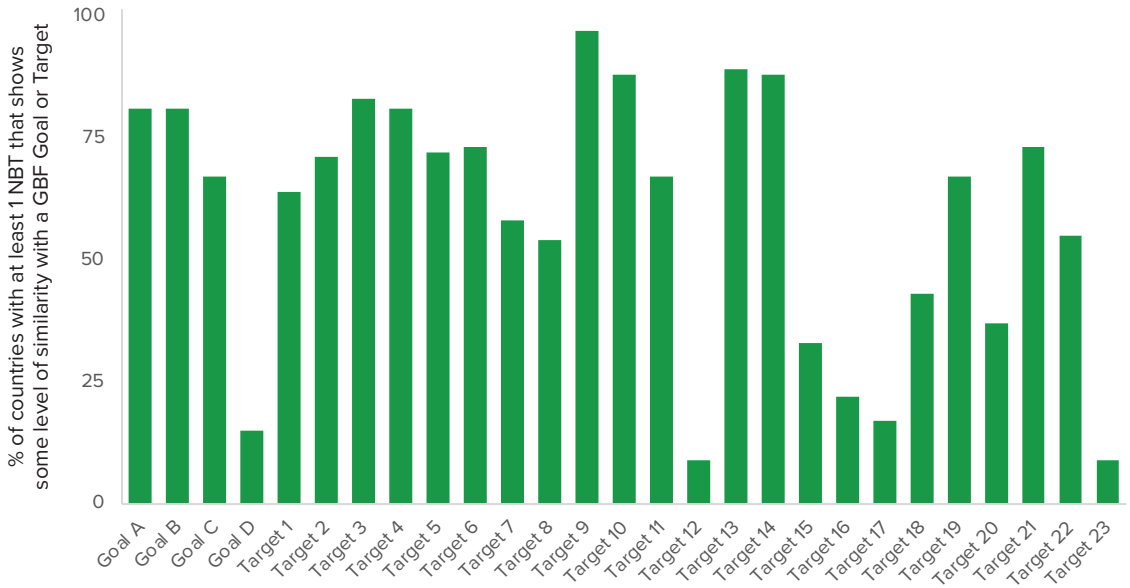


The height of each bar represents the number of NBTs with either high, medium, or low similarity with each of the GBF goals and targets. The NBTs that appeared to have no similarity with the GBF goals and targets were excluded from the figure.

Some of the GBF's goals and targets appeared to have universally higher representation across countries' NBTs. According to the analysis, GBF Target 9 (Manage Wild Species Sustainably To Benefit People) was the most well-represented in pre-COP15 NBTs among GEF-supported countries, with 97% of countries having at least one NBT that displays some level of alignment with Target 9. The second most well-represented global goal or target was Target 13 (Increase the Sharing of Benefits From Genetic Resources, Digital Sequence Information and Traditional Knowledge), for which 89% of countries appeared to have at least one similar NBT. Finally, the third most well-represented global goal or target was Target 10 (Enhance Biodiversity and Sustainability in Agriculture, Aquaculture, Fisheries, and Forestry), with which 88% of countries appeared to have at least one NBT that shows some similarity. The prominence of these goals and targets in NBTs is likely because these topics were also well-represented in the Strategic Plan for Biodiversity 2011–2020, the framework that pre-COP15 NBTs were meant to orient towards. Another potential reason is that Targets 9, 10, and 13 cover more general aims, like the conservation and sustainable management of biodiversity, which countries are already familiar with and could have longer-standing mechanisms to support.

Conversely, Target 23 (Ensure Gender Equality and a Gender-Responsive Approach for Biodiversity Action) appeared to be the least-represented across NBTs, with only 9% of countries having at least one similar NBT. The second least-represented global goal or target was Target 12 (Enhance Green Spaces and Urban Planning for Human Well-Being and Biodiversity), and the third least-represented global goal or target was Goal D (Invest and Collaborate), with only 15% of countries appearing to have at least one similar NBT to this goal. The lack of similar NBTs for these global goals and targets is likely because their underlying themes are either missing or not highlighted in the Aichi Biodiversity Targets.

Figure 9: Percentage of GEF-supported countries whose pre-COP NBSAPs have at least one NBT with some similarity to each global goal and target



The team also conducted analyses using the R statistical software[6] on the integration of quantifiable measures within the set of pre-COP NBTs. Defining explicit numerical targets, such as safeguarding a specific percentage or number of terrestrial or marine ecosystems, is pivotal for establishing and monitoring progress toward clear conservation benchmarks. Equally, assigning specific timelines for achieving these targets ensures a structured and time-sensitive approach, fostering a sense of urgency and facilitating systematic progress monitoring.

Analyses of pre-COP15 NBTs from GEF-eligible countries reveal that 74% of countries had incorporated measurable objectives into at least one of their NBTs, such as "% increase" or "X hectares of land". Moreover, 18% of NBTs have been articulated with quantifiable parameters, reflecting an effort towards actionable and precise biodiversity goal-setting. Note that many countries may have included this type of information in NBSAP indicators instead, which were not assessed in this analysis. Concerning the aspect of temporal specificity, the data indicated that 74% of countries had at least one NBT that was time-bound to a specific year—in most cases, that date was 2020. Likewise, 59% of all assessed NBTs were bound to a specific year.

As CBD Parties currently are updating their pre-COP15 NBTs in line with the GBF, the team anticipates that this analysis will quickly become out of date, with new NBTs hopefully displaying more alignment with the GBF and quantitative aspects. However, this proof of concept analysis validates the possibility of using AI to assess global trends in NBTs and could be replicated with updated NBTs after COP16, alongside other analyses.

> "During the exercise of national biodiversity target alignment with the GBF, Cambodia deployed a mixture of approaches. Among these, we found that the AI in-depth analysis was very useful. We started with making a table of similarity between the national biodiversity targets and the GBF targets. With this initial input from AI, our team started to verify and produce the report accordingly. So, it saved us a lot of time in this process."
>
> — Mrs. Ken Bopreang, Director of the Department of Biodiversity, General Directorate of Policy and Strategy, Ministry of Environment, Cambodia

6 "quanteda" and "spacyr" packages to analyse text data

5. Limitations, risk mitigation, and lessons learned

Bias in AI is a major concern, particularly in biodiversity policy analysis where global goals must be reconciled with diverse national contexts. AI models can be susceptible to biases originating from training data or algorithmic assumptions. Addressing these biases requires a deliberate focus on fairness, stakeholder engagement, and transparency in AI design, ensuring that no country's unique challenges are overlooked in the NBT alignment process. These risks require a multi-faceted approach involving transparency and human oversight. Incorporating knowledge from experts and communities can further ensure that AI-driven recommendations are grounded in real-world biodiversity challenges, are contextually appropriate, and do no harm.

Several lessons learned and considerations for further improvement on the use of AI include:

- The cost and potential environmental impact of using LLMs can be reduced through the design of the analysis. While the actual computing involved in these assessments was approximately 58 million tokens, the potential environmental impact of LLMs and AI in general are not yet quantified or studied enough. To minimize environmental impact, input data was carefully selected and cleaned to the smallest unit possible to reduce unnecessary computation. For example, rather than assess an entire policy document, the team focused on NBTs. In addition, customized analyses were only run on an on-demand basis to reduce waste. For the future, other options such as small language models could be considered to reduce the potential footprint, as well as to identify means of quantification of impact.

- The assessments were built on GPT-3.5 due to the urgency of the exercise and after careful consideration of different options, including open-source and commercial solutions. This comes with several risks, including the potential data leaks or inheriting biases from OpenAI's training data. The team assessed the overall risks as low, given that the used data was publicly available data with no personal information. The assessments were also conducted on a secure, contracted UNDP server space (Azure Synapse). The assessment methodology and code is available on Github for any country or researcher to use and potentially apply on open source models. However, in the future, the team may take additional steps to ensure that countries fully understand the risks associated with GPT-3.5 and its limitations, such as through a terms of use.

- While NBTs themselves are assessed against gender-related targets and provide information to guide gender-responsive planning, there may be additional opportunities to ensure that the outputs do not replicate gender-related biases that could be present in OpenAI's training data. Literature on mitigating gender biases in LLMs is still quite meager, especially in regards to analyses that do not focus on human traits or data. However, it is important that the team invests time in exploring this issue further. Consultation with experts at the intersection of gender and LLMs is recommended for future applications. This is especially important given the findings that the GBF Target 23 (Ensure Gender Equality and a Gender-Responsive Approach for Biodiversity Action) was the least represented target in the proof of concept global analysis (section 4). Future models could also include an assessment of similarity with the GBF Gender Plan of Action, thereby assessing gender mainstreaming across NBTs more broadly.

- Similarly, there may be opportunities to better integrate consideration of the rights of Indigenous Peoples and local communities into the assessments and reduce potential biases. As the GBF targets include a focus on Indigenous Peoples and local communities, this is also reflected across the assessments, where many NBSAP Target Similarity

Assessments indicated areas where recognition of the rights and knowledge of Indigenous Peoples and local communities could be increased in NBTs. For example, because GBF Target 22 emphasizes "access to justice and information related to biodiversity by indigenous peoples and local communities, respecting their cultures and their rights over lands, territories, resources, and traditional knowledge", the assessments identified where NBTs may be missing these themes. However, there may be ways to integrate a larger focus on Indigenous Peoples and local communities in the assessments, and minimize the effects of potential biases in the training data. Consultations with a dedicated expert on the intersection between AI and Indigenous Peoples and local communities is recommended. It could also be beneficial to assess coherence between NBTs and the UN Declaration on the Rights of Indigenous Peoples (UNDRIP).

- NBSAP Target Similarity Assessments only consider text similarity between national and global goals and targets. While the analysis does not yet incorporate other considerations important to the NBT alignment process listed in Decision 15/6, future iterations have the potential to cover implementation gaps, indicators, the effectiveness of past actions, monitoring systems (including any data and/or knowledge systems and gaps), sectoral and cross-sectoral policies, finance and other means of implementation, and an assessment of how stakeholders, Indigenous Peoples and local communities, women and youth were involved in the revision and implementation. The assessments also do not prescribe how a country's NBT and NBSAP are updated, as these are nationally-determined processes. Additional expert support and resources to support the integration of important considerations are recommended, as well as increased human oversight mechanisms to support marginalized communities to shape how results are applied, especially in cases where decisions on NBTs could affect them

- The current model produces assessments that indicate the many potential ways that NBTs could be updated in line with the GBF, but does not show if multiple NBTs could be combined to respond to a given GBF goal or target However, if countries follow the recommendations across the entire NBSAP Target Similarity Assessment, they could end up with multiple NBTs that overlap with a singular GBF goal or target. In addition, countries could adopt the GBF goals and targets word-for-word without customizing them to national circumstances. These chances are low given that NBTs pass through multiple levels of national approval before they are adopted. In addition, this risk is minimized by clear communication about what the assessments can and cannot do (see Figure 7), as well as strong recommendations for expert validation and review. However, future iterations may address this potential concern further through adjusting the model or providing increased clarity to countries on how to review and apply the assessments. Complimentary analysis, such as keyword identification, could also be employed to add an extra levels of information regarding specific themes.

6. Conclusion

NBSAP Target Similarity Assessments represent an exploration of the potential of AI to fast track biodiversity policy alignment processes at the national level and assess gaps and opportunities at the global level. National-level analysis have jumpstarted target alignment processes in over 50 countries around the world, helping them achieve their commitments to the CBD. The results from the global assessment, presented for the first time in this publication, also provide a proof of concept for the potential of AI to identify trends across biodiversity targets and illuminate the gaps between them and the GBF. Moreover, these results also validate the utility of AI for national and global level analysis and point to areas where AI could be applied in the future to advance biodiversity policy and planning.

Extending beyond NBTs, further analyses could focus on the integration of biodiversity considerations across various sectors, including climate change, disaster risk reduction, agriculture, health, and urban development, into newly submitted NBSAPs. A particularly compelling research direction is the examination of synergies between NBSAPs and Nationally Determined Contributions (NDCs) under the Paris Agreement, which may provide valuable insights into the alignment of biodiversity and climate action strategies, highlighting the need for an integrated approach to environmental governance.

The underlying code from the NBSAP Target Similarity Assessments could also be repurposed to assess adherence with the "Considerations for the implementation of the GBF", found in Section C of the GBF. This includes contributions and rights of Indigenous Peoples and local communities, whole-of-government and whole-of-society approach, gender, and the human-rights based approach. Employing AI for financial strategies and performance indicators within NBSAPs could also reveal innovative financing mechanisms and improve the management of biodiversity investments. This approach could integrate conservation efforts and funding with local needs and global objectives, facilitating a more coordinated and supportive approach to biodiversity conservation.

Finally, lessons learned from the initial methodology should be applied in the future to ensure that the inherent limitations of LLMs like GPT-3.5 are well-understood by countries and minimized where possible. Using NBTs as input for GPT-3.5 significantly reduces risk in data leaks, given that no personal information is included. However, the current models do not yet fully address the potential of biases in OpenAI's training data. This could be mitigated by providing complementary analysis on broad themes like gender equality and the rights of Indigenous Peoples and local communities, or assessments between NBTs and UNDRIP or the GBF Gender Plan of Action. It would be important to engage subject matter experts on AI and human rights to ensure that UNDP can contribute to global best practices on this important issue. Furthermore, strengthened human oversight mechanisms supported by Indigenous Peoples, local communities, women, girls, youth, people with disabilities, human rights defenders, and other groups are recommended to ensure that any application of NBSAP Target Similarity Assessments contributes to greater efforts to mitigate harm and promote human rights.

In many ways, the GBF goes further than the 2011–2020 Strategic Plan for Biological Diversity and its Aichi Biodiversity Targets in emphasizing a whole-of-government approach and full, equitable, inclusive, effective, and gender-responsive representation and participation in decision-making. The GBF also provides concrete objectives for mobilizing the finance community, closing the biodiversity finance gap, and reducing harmful subsidies. To revise and implement NBSAPs and their targets,

in line with the ambitious goals and targets of the GBF, innovative solutions are needed to break down the barriers that limit policy action. Applying AI to NBTs, with appropriate safeguards, is one of many solutions that can help us take early actions for biodiversity and find unique ways to work together.

This publication introduces methodological advancements leveraging AI to enhance biodiversity policy analysis. By utilizing AI to assess the alignment of NBTs with the GBF goals and targets, countries have improved the efficiency and scalability of their policy analysis exercises. This represented a shift from conventional methods and has helped policymakers to navigate biodiversity policy challenges more effectively. Achieving the ambitious objectives of the GBF extends beyond technological advancements, requiring comprehensive engagement and international cooperation to ensure equitable access to AI. A collaborative effort involving a wide array of stakeholders is vital, blending traditional knowledge with modern technology to effectively tackle biodiversity loss.

Using AI to define and analyze biodiversity conservation strategies represents a significant advancement in aligning national and global biodiversity efforts, promoting accelerated progress towards the shared goal of coexisting harmoniously with nature as outlined in the GBF. This publication supports the safe adoption of human-centered AI in biodiversity planning. Continuous refinement of AI technologies is essential to address the evolving challenges in biodiversity conservation, emphasizing the need for collaborative and innovative multi-sectoral engagement. The convergence between innovative technologies and collective action holds substantial promise in advancing towards the GBF, securing a resilient and biodiverse future.

> “For Morocco, alignment of national targets with the GBF was greatly improved using Artificial Intelligence to assess target similarities. The review of coherence between the NBSAP targets and the GBF allowed us to identify the needs for updating the national targets. Moreover, using similarity assessments significantly reduced the time needded to process a large volume of data, enabling us to quickly detect alignment and the matching levels between national ambitions and the GBF targets.”
>
> — Mr. Benhima Reda, Project Manager, Biodiversity Portfolio, UNDP Country Office; Formerly Responsible at the Ministry of Environment, Morocco