ENTRY POINTS FOR INTEGRATING CLIMATE CHANGE CONSIDERATIONS INTO NATIONAL ECOSYSTEM ASSESSMENTS

UN environment programme WCMC | NEA NATIONAL ECOSYSTEM ASSESSMENT INITIATIVE

IKI INTERNATIONAL CLIMATE INITIATIVE

The UN Environment Program World Conservation Monitoring Centre (UNEP-WCMC) is a global Centre of excellence on biodiversity. The Centre operates as a collaboration between the UN Environment Program and the UK-registered charity WCMC. Together we are confronting the global crisis facing nature.

Citation

UNEP-WCMC. 2023. *Entry points for integrating climate change considerations into national ecosystem assessments.* **Cambridge, United Kingdom.**

Authors

Charlotte Hicks, Santhuri Naidoo, Ceire Booth and Boipelo Tshwene-Mauchaza, Esther Chinweuba.

Reviewers

Daniela Guaras, Claire Brown, Juanita Chaves

Acknowledgments

This document is a product made possible thanks to the generous support of the International Climate Initiative (IKI) of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of the Federal Republic of Germany. UNEP-WCMC supports countries conducting national ecosystem assessments through its National Ecosystem Assessment Initiative (NEA Initiative). The authors would like to thank all participants involved in the development of this document.

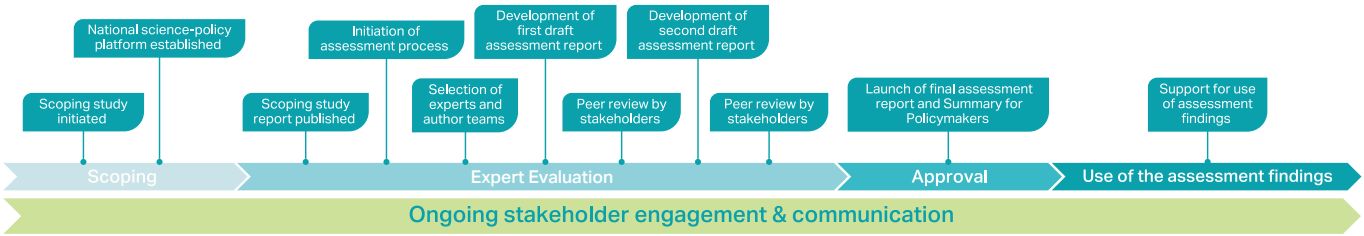
ENTRY POINTS FOR INTEGRATING CLIMATE CHANGE CONSIDERATIONS INTO NATIONAL ECOSYSTEM ASSESSMENTS

The twin crises of climate change and biodiversity loss pose a significant threat to nature and it's contributions to people. Reports from the Intergovernmental Panel on Climate Change (IPCC) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) increasingly illustrate how climate change and biodiversity loss interact, each contributing to the other and exacerbating their harmful effects[1]. Efforts to tackle biodiversity loss and climate change need to take account of this interdependence to increase their effectiveness.

The significant impacts of climate change on the current and future status and trends of biodiversity and ecosystem services have important implications for the crucial role of ecosystem services in continued human well-being. Climate change is one of the main drivers of biodiversity loss, and destruction of ecosystems undermines nature's ability to regulate greenhouse gas (GHG) emissions and protect against extreme weather, thus accelerating climate change and increasing vulnerability to it.

This guidance **incorporates an understanding of the current and potential future impacts of climate change on biodiversity and ecosystem services into scenarios for ecosystems to ensure robust consideration of climate change in national ecosystem assessments and their contributions to policymaking**. National ecosystem assessments are a valuable tool for enabling countries to understand and assess the relationship between the impact of climate change and the status and trends of biodiversity and ecosystem services.

The list below shows a range of entry points for incorporating climate change considerations into a national ecosystem assessment. This list is a summary of the more comprehensive Climate Change checklist, which includes detailed guidance on entry points for climate change considerations in the assessment process. The information below is organised according to the stages of a national ecosystem assessment to highlight strategic points in the assessment timeline for integrating climate change considerations. Since national ecosystem assessments are unique to the country context, it is recommended that assessment teams tailor the suggestions below to the intended aims and scope of their assessment.



[1] chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://ipbes.net/sites/default/files/2021-06/20210609_workshop_report_embargo_3pm_CEST_10_june_0.pdf

SCOPING STAGE

The scoping stage enables the development of priorities and the approach that will guide the national ecosystem assessment. The assessment teams define, in collaboration with stakeholders, the rationale for undertaking the process, the key policy questions that will be addressed, and the potential uses of the assessment. This process informs the need for the evaluation and its relevance to decision-makers. The information gathered is recorded in the scoping report, which is the main output of this stage of the process and the roadmap for authors conducting the assessment.

- **Identify key national climate change priorities and policies as well as relevant data, knowledge, and stakeholders.** Capturing these elements early in the scoping stage will allow assessment teams to map and assess how climate change is currently reflected in national priorities and policies, what climate change information already exists, which stakeholders are already engaged in addressing climate change concerns, and which knowledge holders may be able to fill gaps in the existing information.
- **Consider to what extent the key policy questions of the assessment should reflect the climate change priorities identified.** The key policy questions of a national ecosystem assessment guide the focus and scope of the assessment report. Referring to climate change related issues in the key policy questions can ensure that the assessment reflects a focus on this topic, if desired. In countries where climate change is a key national concern for ecosystems, livelihoods, economies, and human well-being, addressing climate change in some or all the key policy questions may help to ensure the assessment responds to decision makers' needs.
- **Utilise the conceptual framework as a tool to fully reflect the role of climate change in relation to socio-ecological systems.** Like the key policy questions, the conceptual framework helps to outline the themes, scope and methods of a national ecosystem assessment. By systematically considering how climate change connects to elements of the conceptual framework (e.g., drivers of change, scenarios, aspects of good quality of life, etc.), climate change can be incorporated and addressed more comprehensively in the assessment as a whole.
- **Integrate information about climate change and its links with biodiversity and ecosystem services in a way that is balanced, comprehensive, and reflective of climate change impacts both at the national and local levels.** A national ecosystem assessment is an important tool for synthesizing local and national policy concerns into one comprehensive document that provides decision-makers with a nationally representative summary of information. To ensure accurate and robust assessment findings, it is also important to take a broad and systematic approach to fully capture climate change and ecosystem considerations specific to the national context. This includes capturing both direct and indirect climate change impacts and their significance for biodiversity and ecosystem services, the role of biodiversity and ecosystems in both mitigating and adapting to climate change nationally, and specific opportunities to promote synergies between actions to mitigate and adapt to climate change and biodiversity and ecosystem services.
- **Follow a multiple evidence base approach to capture the full range of information about climate change in the assessment.** Those who directly depend on and interact with the natural environment in their day-to-day lives have first-hand knowledge and experience of the impacts that climate change has on biodiversity and ecosystem services. Hence, the knowledge of Indigenous Peoples and local communities is integral to establishing robust knowledge on the status and trends of biodiversity and ecosystem services, including in relation to climate change. Similarly, the private sector and actors leading climate change responses may hold valuable information and data which could support the assessment findings. The multiple evidence base approach and capacity development for key stakeholders to participate facilitate the integration of diverse forms of knowledge into the assessment.
- **Build the capacity of assessment teams and national stakeholders on potential climate change issues and their interlinkages with biodiversity and ecosystem services.** National ecosystem assessments offer a valuable opportunity to build national capacity and expertise around assessment topics and this is often an important positive outcome of conducting an assessment. Capacity building and exchange of knowledge and information may be needed between the assessment team and government agencies, academic institutions and civil society organisations to build a common understanding of the interlinkages between climate change and biodiversity and ecosystem services in the national context.

EXPERT EVALUATION STAGE

The expert evaluation of the state of knowledge begins by selecting and nominating authors to bring together, analyse, and synthesise data, knowledge, and information on biodiversity and ecosystem services to address the key policy questions identified in the scoping stage. A technical report and a summary for policymakers will be produced during this stage through an iterative process involving the preparation and review of several successive drafts.

- **Building on the conceptual framework, ensure that an appropriate range of climate change impacts on ecosystem services are addressed in the assessment.** Depending on the national context, biodiversity and ecosystem services can interact with climate change in different ways, be subject to a range of climate-related drivers and pressures and contribute to both mitigation and adaptation. Fully capturing the key role of biodiversity and ecosystem services in tackling climate change in the national context may require involving climate change experts or knowledge holders to provide information and analyses; it may also be necessary to highlight information gaps in the assessment as a priority for future research.
- **Consider the inclusion of future climate scenarios, projections, and/or targets as part of scenario development for the assessment.** Climate change projections are available at the global and regional level and are increasingly available at national and sub-national levels. Scenarios and projections are an effective way of communicating a range of possible future conditions, and their implications for biodiversity and ecosystem services, as well as socio-economic development and wellbeing. To develop nationally specific scenarios, consider using key national targets related to climate change (e.g. identified in the scoping stage), such as targets for greenhouse gas emission reductions, the energy sector, and adaptation actions.
- **Consider how current or proposed/future climate change policies could impact biodiversity and ecosystem services.** Existing policies and possible future policies, including climate change policies and action plans, are strongly linked to outcomes regarding the tatus and trends of biodiversity and ecosystem services. A national ecosystem assessment is a key opportunity to communicate how certain policies may impact biodiversity and ecosystem services, highlight opportunities for strengthening policies and actions, or enhancing synergies between them (e.g. between National Biodiversity Strategy and Action Plans (NBSAPs) and Nationally Determine Contributions (NDCs)) and provide recommendations on the mechanisms by which such improvements could be achieved.
- **Use climate change concepts and terminology in a consistent manner across chapters to ensure the main messages are coherent throughout the assessment.** This may require communication and training with assessment authors (see point on capacity building) to agree on a standardized set of terms and definitions. It may also be useful to refer to existing official national documents (e.g., National Adaptation Plan, NDC, etc.) to identify the terms and definitions already in use.
- **Make use of all available climate related data and knowledge to help fill information gaps in the assessment.** Building on the sources of information identified during the scoping stage, ensure these sources of data are made or kept accessible for use in the chapter drafts. If information appears to be lacking on specific climate change aspects, be resourceful in how you fill those gaps, for example referring to data available in global or regional assessments, qualitative information, and indigenous & local knowledge (ILK). Consider whether all potential knowledge holders have been consulted on the relevant topics, to build a more comprehensive assessment.

Photo by Grant Eaton - AdobeStock

Photo by Jiayi - AdobeStock

USE OF ASSESSMENT FINDINGS

The Use of Assessment findings address the impact of national ecosystem assessments and the contributions they can make to national decision-making and to the implementation of multi-lateral environmental agreements.

- **Engage with climate change related stakeholders on the findings and recommendations of the assessment.** This could be achieved by involving climate change decision-makers stakeholders in validation workshops, and/or including them as key audiences in the assessment communications strategy. Engaging with stakeholders who are directly affected by the impacts of climate change, as well as by climate change policies or actions, can empower them to participate in decision-making processes. It can also contribute to a sense of shared national ownership of the assessment and its findings and raise public awareness around climate change and biodiversity linkages and opportunities.
- **Use the Summary for Policymakers to communicate the interconnectedness of climate change, biodiversity, and ecosystem services.** This can be achieved by explicitly linking the key messages and recommendations of the assessment to specific policy processes, discussions or other entry points, with a view to helping to strengthen and harmonize national policies related to biodiversity, ecosystem services and climate change. At this stage, it is important to remain aware of opportunities in the policy landscape (e.g., key events, influential individuals, international commitments) to highlight and promote these policy entry points.

Photo by homocosmicos

THE CLIMATE CHANGE CHECKLIST

This checklist has been developed to help national ecosystem assessment (NEA) teams to systematically consider opportunities to integrate climate change priorities, information, policy options, and stakeholders in an NEA. Team members who may be interested in applying this checklist and considering climate change in an NEA include overall coordinators/project managers, as well as co-chairs, lead authors, and other authors and contributors.

The checklist is divided into three key stages for an NEA: planning and scoping; evaluation or preparation; and use of NEA findings and communication. It provides a series of questions related to potential actions/steps for integration of climate change, as well as key considerations and background related to these questions. Please note that the questions and considerations for the evaluation/preparation stage are structured according to a generic or commonly used chapter structure (e.g., status and trends, scenarios, policy impacts, etc.), though it is recognised that different NEAs can use different structures.

Each NEA team is also different, but one option for applying the checklist would be to review the questions at various stages of the NEA in a meeting of co-chairs and lead authors.

Stage	Questions: potential action/steps	Considerations

Planning and scoping a NEA	**Identify key climate change priorities, policies, data, and stakeholders for the country as part of the scoping process**
	- Have any assessments on climate change impacts on biodiversity and ecosystems and human communities already been conducted? What data is available on climate trends, future climate scenarios, climate change impacts and vulnerabilities of ecosystems and people, etc.?
	- Do existing assessments consider the following aspects (see also box 1 for a list of potentially relevant topics), or are there gaps? For example:
	  - Direct and indirect impacts of climate change on ecosystems and their services. indirect impacts here refer to impacts resulting from human responses to climate change, which can be planned (e.g., planned measures such as construction of dykes, or unplanned responses, like spontaneous adaptation of agriculture practices in response to drought)
	  - Impacts on human communities resulting from changes in ecosystem services because of climate change
	  - Current and potential future role of ecosystem services in climate change mitigation and adaptation
	- Considering all the available information, what kind of climate change impacts and vulnerabilities are of concern for ecosystems and communities in the country?
	- Have any goals in terms of climate change mitigation and/or adaptation been put forward by the national government, local authorities, or other key actors?
	- What are the key climate change-related policies, strategies and regulations in the country? (e.g., National Adaptation Plan, Nationally Determined Contribution, specific initiatives on ecosystem-based adaptation; REDD+[1]), etc.
	- Are there any policies or initiatives that integrate climate change with biodiversity and ecosystems? (e.g., actions or targets related to ecosystems in climate change policies and strategies; or any of the national biodiversity targets or measures included in the national biodiversity strategies and action Plans (NBSAPs).
	- Who are the key national government and non-government stakeholders in the area of climate change research, policy and action? Are they included in any stakeholder mapping exercises and outreach about the NEA and scoping process?
		The scoping stage of the NEA provides an opportunity to review what climate change priorities are relevant for the country. Climate change affects different countries, ecosystems, and communities in different ways. Climate change priorities will differ between and within countries, and thus the relevant aspects to include in an NEA will need to be determined nationally.
		The scoping process should allow you to identify whether there are relevant policies, data, and stakeholders in the area of climate change in your country, to ensure that nationally relevant priorities and information are captured from an early stage and can be reflected in the design of your NEA.
		Communicating with relevant climate change policy makers and other stakeholders (e.g. national focal points to the UNFCCC, offices or departments for climate change, which are sometimes in the treasury or industry ministries) is an important and useful step in this process (see also the section on communications below).

[1] REDD+': Reducing Emissions from Deforestation and forest Degradation in developing countries, plus the role of conservation of forest carbon stocks, sustainable management of forests, and enhancement of forest carbon stocks

Stage	Questions: potential action/steps	Considerations
Planning and scoping a NEA	**Select and present climate change impacts, vulnerabilities, objectives, and actions in a way appropriate to the country, including in the scoping report** - Have the key climate change impacts, vulnerabilities, objectives, and actions relevant to the NEA been identified and reflected in the scoping report? - Does the selection of climate change aspects to address within the NEA capture the priority trends, impacts and opportunities for both ecosystems and human communities, and how these may interact? - Has due consideration been given to both climate change mitigation and adaptation, including the role of different ecosystem services in both aspects? - Is the selection of climate change issues in the scoping report and for consideration in the NEA reflective of key policy documents, as well as the concerns of stakeholders?	Based on information collected on key climate change objectives, policies, data and stakeholders, and conversations with stakeholders, the NEA team should integrate climate change issues into the framework for analysis in the NEA (e.g., Driver-Pressure-State-Impact-Response (DPISR) framework or any other framework being used). This framing or selection of climate change issues should be: - balanced (e.g., capture mitigation, adaptation, and other relevant climate change issues, such as loss & damage, climate justice, etc.) - Comprehensive, i.e. cover the main climate related ecosystem services, climate change drivers, impacts and policy options across all key ecosystem types/ services of interest for the country - reflect both key government goals and policies, as well as information and perspectives from other key stakeholders A broad and systematic approach that captures all the nationally relevant direct and indirect climate change impacts, policies and options is essential to really reflect the effects of climate change on biodiversity and ecosystem services. This can also better inform discussions on the full range of options to address these impacts and highlight opportunities for ecosystem services to contribute to climate change mitigation and adaptation.
	Consider whether the guiding policy/research questions for the NEA need to reflect the climate change issues identified - Does the significance of climate change impacts, vulnerabilities, policies and/or actions for biodiversity and ecosystem services in the country mean that climate change should be explicitly addressed by the policy/research questions? - If so, should climate change issues be reflected in all or only some of the questions? What is the most appropriate way to reflect climate change issues in the questions? - What feedback can be obtained from stakeholders about including climate change in the policy/research questions? - What implications are there for the design of the NEA and for chapters if climate change is included in some of the policy/ research questions?	A set of guiding policy/research questions are often developed during the scoping stage of the NEA. In some countries, the significance of climate change for the NEA will be high (e.g., as a driver of change in biodiversity and ecosystem services, or due to the importance of ecosystems for mitigating climate change and/or reducing the vulnerability of communities, or because of climate change actions included in biodiversity-relevant policies, etc.). This means that climate change may feature in the policy/research questions of the NEA. Where climate change is a significant concern, featuring it in the policy/research questions may help to maintain focus on this issue throughout the assessment. However, there are implications of including this emphasis in the questions for the design of the NEA, such as the expected content of chapters, data needs and expertise requirements, and so these implications should be fully considered.

Stage	Questions: potential action/steps	Considerations
Planning and scoping a NEA	**Ensure that the conceptual framework and structure being used for the NEA aligns with the way climate change issues are framed in the country context** - How does the conceptual framework that is guiding the NEA include or cover climate change issues? For example, as a driver, pressure, and/or impact? Under regulating services? In scenarios? By itself or together with other drivers? - Will this approach allow the NEA team to capture fully the key climate change impacts, vulnerabilities, objectives, and actions for the country? - Do any adjustments need to be made to ensure that the identified climate change issues can be more fully captured or covered by the planned NEA? For instance, to ensure that relevant or priority climate change pressures and impacts are reflected. - Are there any specific methods, tools or approaches that should be brought into the NEA to ensure that climate change issues are well captured? (e.g., climate change scenarios, modelling, impact assessment, etc.)	The conceptual framework being used to guide your NEA should be capable of capturing all the important knowledge on trends, drivers and impacts, scenarios and policy options related to biodiversity and ecosystem services in your country, including those related to climate change. Depending on what the key climate change concerns and priorities are in your country, this framework may need to be adjusted or designed to make sure that these issues are being assessed in a balanced, comprehensive, and participatory way. For example, in a country where existing climate change policies or programmes are likely to have or are already having significant impacts on biodiversity (e.g., biofuels, irrigation, hydropower development), the NEA may need to ensure that the framework used can properly capture these kinds of indirect climate change impacts. While there is often a focus on *direct* climate change impacts on biodiversity and ecosystem services (such as changes in precipitation affecting particular habitats), NEAs should also consider key *indirect* climate change impacts (such as pressures from renewable energy policies, like biofuel production or solar farms). These indirect impacts are sometimes overlooked.
	Apply the multiple evidence-based approach to examining climate change, in line with other parts of the NEA - Can authors and contributors be identified and engaged who can provide expertise and guidance on climate change issues in the preparation of relevant chapters? - Can climate change policy makers from different sectors be involved, not just in the scoping process, but also in the development of the NEA? - What opportunities are there to work with indigenous and local community knowledge holders on climate change aspects of the NEA? (e.g., drawing on traditional knowledge, local case studies, etc.) - Is the private sector a relevant and influential stakeholder in climate change and biodiversity trends and outcomes, and how could they be engaged? (e.g., as investors in climate & biodiversity friendly or unfriendly practices)	National ecosystem assessments aim to consider a range of knowledge types including indigenous and local knowledge, and to engage a wide array of stakeholders. In many countries, climate change research and policy development already bring together different types of knowledge sources, sectors and actors, and climate change may be a priority across numerous sectors. The priority given to climate change in different sectors can offer a valuable entry point for the NEA team, in terms of promoting stakeholder engagement, expanding data collection, developing case studies, and seeking synergies across sectors. Including authors or contributors with expertise in climate change and climate-change relevant networks (e.g., advocacy campaigns, climate change research projects, etc.) will help to integrate climate-change into the assessment as well as facilitate wider engagement of climate change stakeholders. In addition, looking forward, the information synthesized by the NEA will likely be useful to climate change decision makers and stakeholders (e.g., regarding the potential contribution of biodiversity to mitigation and adaptation, or on key vulnerabilities in ecosystems, and their potential impacts on people's vulnerability). As part of the multiple evidence-based approach, the knowledge and engagement of Indigenous Peoples and local communities, also known as Indigenous and Local Knowledge (ILK), is an essential element in developing NEAs. Although circumstances vary across countries, there is often a diverse range of research, case studies, and ILK available on climate change impacts and strategies to address them.

Stage	Questions: potential action/steps	Considerations
Planning and scoping a NEA	**Build the capacity of the NEA team, authors and relevant stakeholders on climate change issues and interlinkages with biodiversity and ecosystems** - What level of understanding and expertise on climate change issues and the different types of direct and indirect links with biodiversity and ecosystems already exists within the team, including authors? - Does this knowledge/expertise also cover socio-economic aspects of climate change, and climate change policy? - What kind of capacity building is needed to ensure that climate change issues can be considered at the scoping stage and then covered in the relevant chapters/sections of the NEA, to the extent planned? - Is additional support or engagement with climate change stakeholders needed to help address gaps in capacity? - How well do wider NEA stakeholders – i.e., key policy makers or the wider public - understand how climate change is interlinked with biodiversity and ecosystems? - Is appropriate background material and information on these topics available and how could it be used in future workshops and outreach about the NEA?	The NEA process usually includes training and capacity building for the core NEA team, as well as authors and experts contributing to the various chapters, and stakeholders engaged in the process. Capacity building on climate change issues in the country and their relation to biodiversity and ecosystem services is essential and should be planned for at an early stage of the NEA process (e.g., included in stakeholder engagement plans, and/or capacity section of the scoping report). Capacity building could be achieved in several ways, including: - Utilizing freely available resources and online courses - Bringing climate change expertise into the core team as needed, and consulting with relevant policy makers and researchers to provide guidance - Engaging with climate change stakeholders at various levels to learn from their knowledge and experience - Including key climate change issues in the communications and stakeholder engagement plans and materials being developed for the NEA
Expert evaluation of the state of knowledge:	**Ensure that an appropriate range of ecosystem services, or nature's contributions to people, are covered in the NEA** - Do the ecosystem services assessed in the NEA relate to the key topics selected, including both climate change adaptation (or disaster risk reduction, such as coastal protection) and climate change mitigation (such as carbon storage)? - Have the climate change related services provided by different ecosystem types been considered, especially for significant or threatened ecosystem types in the country (e.g., including peatlands, inland wetlands, coral reefs, forests, grasslands, etc.)? - Have the socio-economic and indirect linkages between ecosystem services and climate change impacts also been considered? (e.g., managing ecosystems in ways to increase their adaptive capacity without consideration of their adaptation opportunities will contribute minimally to ecosystems resilience to CC. Adaptation opportunity describes factors that physically hinder or facilitate species/ ecosystems adaptive capability	Ecosystem services include a range of contributions related to climate change mitigation and adaptation, from carbon storage to disaster risk reduction, to providing a basis for resilient livelihoods, and the importance of these may differ across countries. NEAs provide an opportunity to synthesize and present information on the main climate-related contributions or services provided by a country's ecosystems. It may be the case that national priorities or data availability led to. A focus on ecosystem services (e.g., linked to water, agriculture, or cities), or that key NEA contributors and policy makers are focused on services provided by certain species and habitats, or policy issues. However, the NEA should synthesize the available information on all relevant ecosystem services linked to climate change.

Stage	Questions: potential action/steps	Considerations
Expert evaluation of the state of knowledge:	**Ensure that all key climate change related pressures and impacts are adequately discussed in the NEA** - Have the key direct climate change related pressures and impacts for the country been identified and included? (e.g., impacts resulting from changes in temperature, precipitation, frequency and severity of natural disasters, sea level rise, and slow onset disasters like drought) - Have *indirect* pressures from climate change also been identified and included where relevant? Is there interaction between climate change and other drivers? (e.g., climate change impacts on crops leading to changes in land use, impacts from spontaneous adaptation as above) - Does the NEA consider the impacts on all the key ecosystems of concern particularly, those that may be especially vulnerable to climate change? (e.g., does it consider inland ecosystems as well as coastal ecosystems, man-made/ modified ecosystems, peatlands as well as forests, etc.) - Does the NEA consider any key climate change impacts on people, the economy, and communities, including impacts on people and vulnerabilities resulting from climate change effects on biodiversity and ecosystem services? (e.g. reduced water availability for crops, disaster impacts, migration as a response to climate change, improved opportunities for agriculture, etc.) - Are there any potential risks to biodiversity and ecosystems posed by climate change policies themselves? (e.g., expansion of renewable energy/biofuels, increased production of electric vehicles, relocation of communities or infrastructure, poorly planned REDD+ activities) - Are there potential (co)benefits for biodiversity and ecosystem services that could be achieved through well-designed climate change policies?	The inclusion of climate change as a driver of impacts is a common feature of many ecosystem assessments (See Scoping Stage above). They can include both positive and negative consequences for biodiversity, ecosystem services and the communities/sectors that depend on them. Climate change impacts on ecosystems may reduce the delivery of ecosystem services that people depend on, thus increasing their vulnerability to climate change and disasters. Climate change can also interact with other drivers and pressures, for example with land-use change, demographic change, and socio-economic change, including from planned or spontaneous adaptation (e.g., people moving to avoid climate change impacts).
	Consider the inclusion of climate change scenarios, projections and/or targets in scenarios developed/used for the NEA - To what extent should climate change projections be included in any future scenarios for biodiversity and ecosystems being developed/used for the NEA? - Does the country have available climate change projections nationally or sub nationally that could help assess potential pathways for biodiversity and ecosystems? (e.g., downscaled climate modelling highlighting projected changes in temperature, precipitation, sea level, etc.) - Have any scenarios been developed for the country that already integrate climate change? Can they be adapted or used in the NEA as well? (e.g., agricultural production scenarios, socio-economic development scenarios, etc.) - Does the country have any climate change goals or targets that may influence pathways for biodiversity and ecosystems (e.g., REDD+, emission reductions targets, energy targets), and should these be reflected in the scenarios for the NEA? - Are there any policies already combining climate change and biodiversity or other environmental objectives that could inform the development of a policy-based scenario that integrates climate change and biodiversity/ecosystem services? (e.g., targets within the NBSAP, an ecosystems-based adaptation policy/strategy, etc.)	Climate change projections and scenarios have been developed at the global and regional levels and are increasingly available at national and local scales. These can form a useful input to the development and/or use of scenarios for biodiversity and ecosystem services in an NEA. As well as existing climate change scenarios in the country, climate change policies and targets may also provide a useful input; for example, targets within a country's NDC on green-house gas emissions reductions, forest cover and renewable energy, among others, could have significant implications for the biophysical and socio-economic scenarios analyzed for biodiversity and ecosystem services.

Stage	Questions: potential action/steps	Considerations
Expert evaluation of the state of knowledge:	**Ensure that relevant climate change policy options which influence biodiversity and ecosystems are examined in the NEA** - What policies have been developed or are under development to respond to climate change, including both mitigation and adaptation? Which of these can or already do influence biodiversity and ecosystem services? including policies inside and outside of the environment sector - What are the impacts, or likely future impacts, of these policies on biodiversity and ecosystem services and human communities in the country? - Are there any negative impacts or risks from climate change related policies on biodiversity and ecosystem services that need to be addressed? Are there any positive impacts that could be enhanced? - What opportunities are there to strengthen the synergies between policies on climate change and on biodiversity and ecosystem services? (e.g., nature-based solutions see *Annex 2*, information sharing across sectors, synergies among MEAs) - What mechanisms or incentives could be put in place to take advantage of such opportunities? (e. g., financial mechanisms, legal mechanisms, safeguards) - Do the recommendations developed under the NEA (including in the SPM) capture the main findings on climate change related policy impacts and options?	Climate change is an important part of the policy landscape for the governance of biodiversity and ecosystem services. Policies developed to respond to climate change – for both mitigation and adaptation, as well as other aspects (e.g. loss & damage) – can have positive and negative impacts on biodiversity and ecosystem services. Policy measures and options are increasingly drawing upon ecosystem-based approaches and contributions from biodiversity and ecosystem services as solutions to the climate crisis. NEAs can: - review the impact and suitability of these climate-change related policies and strategies - consider opportunities for synergies between climate change and biodiversity policies and strategies and - draw on the data underpinning these policies (e.g., estimates of the contribution of forests for carbon storage in REDD+ strategies, or vulnerability assessments in national adaptation plans)
	Use climate change concepts, terms, and methodologies consistently across all sections of the NEA - What are the preferred definitions and terminology for climate change issues in the country? Are there any policies or official documents setting out these terms? (e.g., in a climate policy, law or document like the NDC) - Are all members of the NEA team, especially lead authors, aware of a) priority aspects of the interaction between climate change and biodiversity that are to be considered in the NEA, and b) the preferred terminology? - Do all key team members have a good understanding of the climate change issues to be addressed in the assessment? - Has the coordination between chapters on climate change aspects been considered? In which chapters will climate change aspects appear, and how can these chapters be coordinated to ensure a consistent use of the agreed concepts, terms, and methodologies? - Have reviewers identified any gaps or possible improvements related to climate change, and have these been communicated to all relevant team members, e.g., authors of other chapters that have climate change content?	Different sectors and groups of people within a country may have different understandings of key terms and concepts used in the field of climate change, such as vulnerability, risk, resilience, mitigation, nature-based solutions and so on. To ensure a consistent understanding and approach across the NEA chapters, concepts and terms should be agreed at an early stage, potentially making use of terminology in official national documents (e.g., NDC, climate change strategy) or existing glossaries. It is also important that there is strong coordination across all the chapters of an NEA, to ensure consistency and reduce duplication, and this applies to climate change aspects as well. For example, if ecosystem services related to climate change adaptation are identified as important in a chapter on nature's contributions to people, then policies and options related to these ecosystem services should also be included in the policy chapter.

Stage	Questions: potential action/steps	Considerations
Expert evaluation of the state of knowledge:	**Ensure access to and use of relevant climate change data, research, reports, and case studies** - Has relevant climate change data identified during the scoping stage been accessed and collected? Have alternative sources of data been consulted in case there are gaps in national data? (e.g., global/regional climate change data) - Have the relevant chapters fully utilized the available climate change policy documents, research, and reports, and have relevant climate change stakeholders been consulted? (e.g., climate change impact and vulnerability assessments, climate change policies and reports, climate change scenarios and projections, monitoring of climate change policies/actions, etc.) - Have studies on specific aspects of climate change been identified and included where relevant? (e.g., case studies on particular climate change related ecosystem services, like coastal protection, or on particular policy options, or impacts on a certain habitat/species or community) - Has climate change related information and expertise from indigenous and local community knowledge holders been considered and reflected in the NEA? - Have any significant gaps that exist in data or coverage (e.g., certain geographic areas, ecosystem types) been openly acknowledged in the NEA, and recommendations made where relevant?	Many countries now have a range of climate change research, data, case studies, and policies and strategies. Where these documents may be lacking, there are also regional and global datasets and resources that may help to fill some gaps. Accessing and utilizing the various types of information and knowledge on climate change can contribute to an NEA, for example: - using existing climate change projections to inform understanding of the likely impacts on biodiversity and ecosystem services; - integrating national climate change targets or existing climate change scenarios into NEA scenarios; - using climate change case studies in particular ecosystems or communities to bring local perspectives into the assessment.
Use of NEA findings	**Engage with climate change stakeholders on findings and recommendations** - Are there key findings and recommendations in the NEA that will be of interest to climate change policy makers and other stakeholders? - What are the best channels and mechanisms for communicating these findings and recommendations (or key messages) on climate change? (e.g. summaries of key messages, SPM, briefing meetings, events) - Have climate change stakeholders been included in plans for validating, launching and/or disseminating the NEA? - What needs or demand for information can communication with climate change stakeholders be structured around? (e.g., upcoming development of new policy mechanisms, gaps in knowledge identified in NEA, climate sector events, etc.)	Your scoping and preparation processes should already have identified and integrated relevant climate change policies, data and stakeholders in your country. Communicating with relevant climate change policymakers and other stakeholders is important in the final stages of the NEA as well, so that key findings and recommendations related to climate change can be shared. This will also help to identify policy entry points to increase the synergies across climate change and biodiversity agendas. Communication can also include the level of uncertainty in climate change predictions. Clarity and communication on what is known (and the caveats of the methods used in climate prediction) should be considered for effective and robust policy responses (see below). In addition, NEAs should aim to communicate key messages to the climate change audience, including decision makers, researchers, practitioners and indigenous peoples and local communities among others. Some consideration may be needed of the best channels or formats for communicating with climate change decision makers and stakeholders, e.g. via climate sector events, tailored summary/briefing documents, the SPM or other means.

Stage	Questions: potential action/steps	Considerations
Use of NEA findings	**Identify and utilise policy entry points to bring together climate change, ecosystem services and biodiversity agendas** - Based on the NEA findings and recommendations, are there revisions or reforms to national policies and strategies that should be promoted to better bring together climate change and biodiversity agendas? - Are there any new policy options or mechanisms recommended in the NEA that are relevant to climate change? - What kind of support or champions are needed in the field of climate change and biodiversity to act on these policy recommendations? - What policy entry points could be utilised to increase synergies between climate change and biodiversity agendas and implement NEA recommendations? (e.g., reporting to the CBD under the new Kunming-Montreal Global Biodiversity Framework, upcoming reviews of key policies or regulations; new funding mechanisms or programs; upcoming revision of the NDC; reporting to UNFCCC, etc.)	The scoping and preparation of your NEA should have highlighted the relevant policies, strategies and regulations in your country that affect both climate change responses and the governance of biodiversity and ecosystem services. The NEA may include useful climate change related information, case studies and policy recommendations. In the final stages of an NEA, or post-NEA the information and policy options in the NEA related to climate change and biodiversity should be linked as far as possible to concrete, specific policy entry points. These may include: - Integrating NEA findings and recommendations into ongoing policy processes (such as review of key climate change policies, strategies or regulations) - Promoting to policy makers any new policy options or mechanisms on climate change and biodiversity that have been put forward in the NEA - Integrating NEA findings and recommendations into reporting on climate change and/or biodiversity (e.g. national report to CBD, revision of NDC, reporting on policy implementation domestically) - Informing the development of funding mechanisms to implement relevant NEA recommendations on biodiversity and climate change
	Seek opportunities to promote synergies across the climate change and biodiversity conventions - Among the NEA findings and recommendations, are there any that specifically relate to your country's commitments to international climate change and biodiversity conventions? - Have you considered briefing/sharing your NEA findings and recommendations with the teams in your country responsible for these conventions? What tailored materials would be needed for such briefing/communication? - Are there any upcoming reporting or planning processes related to these conventions where synergies between the climate change and biodiversity agendas, and relevant NEA information, could be promoted? (e.g. revision of NDC, NBSAP or other plan; preparation of national reports to conventions; preparation of submissions to conventions) - Could the NEA team feed into any workshops or side events linked to Conferences of the Parties for relevant conventions (e.g. UNFCCC, CBD, UNCCD)?	NEAs are considered a valuable process contributing to a country's efforts under the various multilateral environmental agreements such as the (CBD as seen in the NEA Support to the CBD guidance documenCBD guidance document. The entry points or opportunities to promote these synergies will differ from country to country, depending on factors like the structure of relevant government departments, the existing levels of interactions between the teams responsible for conventions, and the extent/type of policy commitments under the various conventions.

ANNEX 2: Key climate change topics and keywords for consideration in an NEA

Some key terms:

Climate change - means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Mitigation of climate change - a human intervention to reduce the sources or enhance the sinks of greenhouse gases. Examples include using fossil fuels more efficiently for industrial processes or electricity generation, switching to solar energy or wind power, improving the insulation of buildings, and expanding forests and other "sinks" to remove greater amounts of carbon dioxide from the atmosphere.

Adaptation to climate change - Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Loss & damage - At COP 16 in Cancun in 2010, Governments established a work programme in order to consider approaches to address loss and damage associated with climate change impacts in developing countries that are particularly vulnerable to the adverse effects of climate change as part of the Cancun Adaptation Framework.

Nature-based solutions - Nature-based solutions are actions to protect natural ecosystems that benefit people whilst contributing to tackling climate change and protecting biodiversity. For example, protecting or planting mangroves in coastal areas reduces the impact of storms on human lives, absorbs carbon and at the same time provides a habitat for fish, birds and other plants.

Direct climate change impacts on biodiversity and ecosystem services:

Is information available about the following aspects of the potential direct impacts of climate change:

- Impacts on climate envelopes/potential distribution of particular species (currently occurring or likely to immigrate in future)
- Impacts on population sizes/reproductive success
- Impacts on species interactions (e.g., possible occurrence of phenological mismatches or spatial mismatches between predators and prey or symbiotic species; changes in habitat structure affecting aspects of a species' life cycle; arising of new predator-prey relationships, changes in interspecies competition)
- Impacts on occurrence/success of invasive species
- Impacts on availability/quality of water and other natural resources

Do available studies on climate change impacts consider the following:

- Changes in temperature and precipitation regimes
- Changes in frequency and intensity of extreme and slow onset events (e.g., drought, flooding, wildfires, storms)
- Sea level rise and ocean acidification

Indirect climate change impacts on biodiversity and ecosystem services:

- How do the direct impacts identified above lead to impacts and pressures on key ecosystem services and/or species?
- Are any of the human responses to climate change (planned or spontaneous) likely to have significant impacts on biodiversity? These could include:

Mitigation

- Expansion of renewable energy (wind power, hydropower, solar power, biofuel cultivation, increased use of wood as a fuel)
- Nature-based solutions for climate change mitigation (e.g., REDD+, peatland protection and restoration, protection and restoration of coastal ecosystems, soil conservation and agroforestry)

Adaptation

- Changes in agricultural practices (shifting to new crops, expansion of irrigation infrastructure, introduction of climate-smart agriculture approaches)
- Changes in demographic patterns/population movement/migration
- Changes in extent/quality of livelihoods and incomes
- Risks of maladaptation

Ecosystem services that are relevant in the context of climate change mitigation and adaptation

Are any of the following ecosystem services likely to be relevant to mitigation and adaptation efforts in your country:

- Carbon storage in vegetation and soils
- Flood protection (coastal and riverine)
- Erosion control
- Delta building
- Protection against/mitigation of saline intrusion
- Mitigation of storm surge and other impacts from natural disasters
- Temperature regulation (e.g., in cities, crop protection)
- Water source protection
- Mitigation of fire risk
- Mitigation of climate change health risks (e.g., vector-borne diseases)
- Provision of livelihoods (e.g. natural resources / ecosystem dependent livelihoods either vulnerable to/resilient to climate change)


Photo by Andras - AdobeStock

Review of climate-related policies

Are any of the following available in your country:

- Nationally Determined Contribution (NDC) to the Paris Agreement
- National Adaptation Plan
- Sectoral adaptation plans or strategies (e.g., agriculture, infrastructure, health etc)
- National REDD+ Strategy or Action Plan
- National disaster management plan/disaster-risk reduction strategy
- National energy strategy (e.g., including renewable energy, energy efficiency, biofuels, etc.)
- Carbon trading/emissions trading scheme, and/or Payments for Ecosystem Services that include climate change
- National or sectoral ecosystem-based adaptation strategies
- Natural capital accounting policies or schemes that include climate change ecosystem services
- Initiatives/programs for climate-resilient development
- Low carbon development/green growth strategies
- Climate change communications/advocacy programs

Review of climate-related assessments and studies

Have any of the following been carried out:

- Vulnerability and impact assessment at national, regional, or sectoral scale
- Assessment of forest/ecosystem carbon stocks (e.g., Forest Reference Emissions Level (FREL))
- Assessment of drivers of deforestation/ecosystem degradation
- Projections of deforestation/ecosystem change
- Projections of climate change impacts at national/regional scale (e.g., temperature, precipitation, extreme events, etc.)
- Assessments/feasibility studies for nature-based solutions/NbS programs
- Assessments/modelling of ecosystem restoration potential (linked to carbon/climate change)
- Development and application of scenarios that include climate change

REFERENCES

- IPBES-IPCC (2021) co-sponsored workshop report on biodiversity and climate change; IPBES and IPCC. DOI:10.5281/zenodo.4782538.
- IPBES (2018): IPBES Guide on the production of assessments. Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany. 44 pages.


Photo by Alexander - AdobeStock

NATIONAL ECOSYSTEM ASSESSMENT INITIATIVE

The NEA Initiative hosted by UNEP-WCMC contributes to a world where countries are able to assess the status and drivers of change to biodiversity and are empowered to transform policies to account for people and nature. The NEA Initiative builds capacity, provides support, and fosters knowledge exchange through a highly qualified, multi-cultural and interdisciplinary team of practitioners and partners. Our approach is tailored to country needs, building a community of practice across 5 continents.

Since 2017, the NEA Initiative has worked with 14 countries to conduct or scope their national ecosystem assessments. Our support is delivered in collaboration with the United Nations Development Program (UNDP) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) through the Biodiversity and Ecosystem Services Network (BES-Net). Through this work, the NEA Initiative supports the rolling work program up to 2030 of the Intergovernmental Science-Policy Platform on Biodiversity & Ecosystem Services (IPBES) and the IPBES Capacity-building Rolling Plan.

Financial support for the NEA Initiative is provided by the International Climate Initiative (IKI) of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of the Federal Republic of Germany. Additional support is provided by the Japan Biodiversity Fund, the Norwegian Environment Agency and SwedBio at the Stockholm Resilience Centre.

Supported by:

Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection

IKI INTERNATIONAL CLIMATE INITIATIVE

based on a decision of the German Bundestag

In partnership with:

UN environment programme WCMC

NATIONAL ECOSYSTEM ASSESSMENT INITIATIVE

UNDP

BESNet Biodiversity and Ecosystem Services Network

unesco