

## Annex I to decision IPBES-8/1

### Scoping report for a thematic assessment of the interlinkages among biodiversity, water, food, and health

#### I. Scope, timeline and geographic coverage, policy context and methodological approach

##### A. Scope

1. This document was prepared in response to decision IPBES-7/1, in which the Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) approved a scoping process, for consideration at its eighth session, for a thematic assessment of the interlinkages among biodiversity, water, food and health. The assessment addresses the interlinkages among biodiversity, climate change, adaptation and mitigation including relevant aspects of the energy system, water, food, and health and will consider holistic approaches based on different knowledge systems.

2. The assessment will fully take into account the IPBES conceptual framework, as set out in the annex to decision IPBES-2/4, in particular by addressing all of the elements and interactions of the IPBES conceptual framework, and by fully recognizing and considering different world views and different knowledge systems, including science and indigenous and local knowledge systems.

3. The report will assess the state of knowledge, including indigenous and local knowledge, on past, present and possible future trends in these multi-scale interlinkages, with a focus on biodiversity and nature's contributions to people, to inform the development of policies and actions. Strong interlinkages and interdependencies exist among globally agreed goals with regard to the components of the nexus. The complementarity and trade-offs between these agreements and frameworks will be assessed in the context of the nexus approach.

4. The assessment will highlight thresholds, feedback and resilience in nexus linkages, as well as opportunities, synergies and trade-offs between different response options. The assessment will consider the synergies and trade-offs in terms of broadly defined social, economic, and environmental impacts. Emphasis will be placed on response options that consider these nexus elements and their diverse dimensions, including the limits and safeguards needed to implement those options.

5. The assessment, across all nexus elements, will evaluate the role of the most important indirect (i.e., societal values, production and consumption patterns, demography, technology, culture, and governance) and direct drivers of change (i.e., land- and sea-use change, direct exploitation of organisms, climate change, pollution, and invasive species),<sup>1</sup> the role of both formal and informal institutions, and the impacts of the patterns of production, supply and consumption (including telecoupling) on nature, nature's contributions to people and good quality of life.

6. The assessment process and its outputs will be supported by, and contribute to, the four functions of the Platform.<sup>2</sup>

##### B. Timeline and geographic coverage

7. The assessment will be global in scope but highlight and interpret regional and subregional similarities and differences, and will include terrestrial, freshwater and marine systems.

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<sup>1</sup> As identified in: Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), *Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services* (Bonn, Germany, 2019).

<sup>2</sup> UNEP/IPBES.MI/2/9, annex I, appendix I, section I.

8. The time frame of analyses will cover the past (in the last 50 years, from the industrial revolution, from around 1500 or as far back as appropriate, where data or information is available, or as clearly relevant to future response options or to understand current status and trends) and plausible future projections up until 2050, with a focus on various periods up to 2050 that cover key target dates related to the post-2020 global biodiversity framework<sup>3</sup> and the Sustainable Development Goals. Longer future time horizons up to 2100 will be considered where they add relevant knowledge on the long-term consequences of nexus interactions or the long-term resilience of response options.

9. The assessment will be conducted over three years from the initial start of the assessment.

### **C. Policy context**

10. The assessment will contribute to the development of a strengthened knowledge base for policymakers for informed, science-based decision-making, in the context of the 2050 Vision for Biodiversity, the post-2020 global biodiversity framework and its targets, as well as national biodiversity strategies and action plans, and nationally determined contributions and long-term strategies of the Paris Agreement adopted under the United Nations Framework Convention on Climate Change (for matters related to the links between biodiversity and climate change) and the 2030 Agenda for Sustainable Development.

11. Intended users include Governments, relevant multilateral environmental agreements, other multilateral organizations, academic organizations, the private sector and civil society, including indigenous peoples and local communities, and non-governmental organizations. The assessment is also expected to inform other national, regional and global policies on the conservation and sustainable use of biodiversity and ecosystems and their contributions to people. The assessment will also provide guidance on building resilience to pandemics, highlighting the role of biodiversity and restoration of ecosystem functions in the prevention of pandemics.

### **D. Methodological approach**

12. The assessment will be produced by a group of experts in accordance with the procedures for the preparation of Platform deliverables. It will include a summary for policymakers and a set of chapters, submitted to the Plenary for its approval and acceptance, respectively.

13. For the purpose of the assessment, biodiversity is: “The variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are a part. This includes variation in genetic, phenotypic, phylogenetic and functional attributes, as well as changes in abundance and distribution over time and space within and among species, biological communities and ecosystems.”<sup>4</sup> Climate includes the global climate system and its interactions with human activities, comprising climate change, adaptation and mitigation, including relevant aspects of the energy system; water includes all forms of surface and ground water and the biophysical and human processes and systems that regulate its quality, quantity, distribution and use; food includes the full value chain for all cultivated and wild foods, fibre, feed, lumber and industrial feedstocks, from production to consumption and disposal; and health includes human physical and mental health and well-being, how infectious diseases emerge from the wild, including the role of human activity in their spread and the systems related to the prevention, treatment and management of diseases, and is addressed using frameworks such as the One Health and other holistic approaches.

14. The assessment will aim to be credible, legitimate, science-based and build from a multiple evidence base. The summary for policymakers will highlight key policy-relevant findings and non-prescriptive policy options for a wide range of end users, some of whom are mentioned above, and reflect the comprehensive analysis of the current state of scientific knowledge and other knowledge systems (including indigenous and local knowledge) performed in the chapters and summarize knowledge gaps and further research needs.

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<sup>3</sup> Decision 14/34 of the Conference of the Parties to the Convention on Biological Diversity. For more information see [www.cbd.int/conferences/post2020](http://www.cbd.int/conferences/post2020).

<sup>4</sup> IPBES, “Biodiversity”, Glossary. Available at <https://ipbes.net/glossary/biodiversity> (14/07/2021).

15. The assessment will be based on existing evidence: data (including, as appropriate, national data), scientific and grey literature and other forms of knowledge, in different languages (to the extent possible), including indigenous and local knowledge, in line with relevant procedures of the Platform.

16. The assessment will build on and complement previous and ongoing work by IPBES, including IPBES assessments (methodological, thematic, regional and global). The reports from the IPBES workshop on biodiversity and pandemics<sup>5</sup> and the IPBES/Intergovernmental Panel on Climate Change co-sponsored workshop on biodiversity and climate change<sup>6</sup> will be considered as supplementary material in the preparation of the assessment. The assessment will also use existing data and information held by global, regional, subregional and national institutions, including but not limited to relevant multilateral environmental agreements and intergovernmental organizations. The assessment will use existing scenarios and models as well as new scenarios and models whose production may be catalyzed as part of the follow-up to the IPBES Assessment of Scenarios and Models of Biodiversity and Ecosystem Services.<sup>7</sup>

17. The assessment will identify key knowledge gaps and areas of knowledge generation needs in capacity and policies, promote the use of policy support tools and provide options and solutions for addressing them at the appropriate scales.

18. The task force on indigenous and local knowledge will support the implementation of the approach to recognizing and working with indigenous and local knowledge in IPBES for the assessment. The task force on knowledge and data will support work related to data and knowledge, as detailed in section III below. The task force on scenarios and models will support the work of authors, in particular those preparing chapter 4. The task force on policy support will perform work to increase the policy relevance of the assessment and its use in decision-making, once approved. Finally, the task force on capacity-building will oversee the implementation of capacity-building activities, as outlined in section IV below.

19. Given the potentially strong interlinkages between the planned IPBES nexus assessment and transformative change assessment (thematic assessment of the underlying causes of biodiversity loss and the determinants of transformative change and options for achieving the 2050 Vision for Biodiversity), close coordination and facilitation between all relevant assessment processes during their development will be ensured to enable complementarity and synergies and to avoid duplication of scope and work. The two assessments will be complementary, with the transformative change assessment focused on determinants of transformative change, and the nexus assessment focused on options for overcoming trade-offs and for enabling synergies between biodiversity, water, food and health.

## II Chapter outline

20. The assessment will be divided into two parts, with part I focused on framing the nexus and holistic approaches, and part II on pathways to sustainable futures based on different knowledge systems. Part I will include four chapters and part II eight, each containing an executive summary.

### Part I. Framing the nexus

21. **Chapter 1: Introducing the nexus.** Chapter 1 will outline the general framework for the assessment and the relationship to the transformative change assessment, define the elements of the nexus, including their social, economic and environmental aspects, and portray the interlinkages and interdependencies among the nexus elements across scales, geographic regions and ecosystems. Chapter 1 will explain the policy relevance of the assessment, provide a road map and overarching rationale for the sequence of chapters in the assessment and identify the policy-relevant key questions pertinent to the assessment. The chapter will frame the conceptual basis for the assessment, linked to the IPBES conceptual framework, including links to nature's

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<sup>5</sup> IPBES/8/INF/5.

<sup>6</sup> IPBES/8/INF/20.

<sup>7</sup> IPBES, *The Methodological Assessment Report on Scenarios and Models of Biodiversity and Ecosystem Services* (Bonn, Germany, 2016).

contributions to people and good quality of life. The chapter will also discuss the importance of indicators in the context of the nexus, and the effectiveness of the monitoring frameworks of the post-2020 global biodiversity framework and of the 2030 Agenda at capturing the nexus interactions.

22. **Chapter 2: Status and past trends of basic interactions in the nexus.** Chapter 2 will assess the global and regional trends and current status of key aspects of the two-way interactions between biodiversity and each element of the nexus. The chapter will treat each two-way interaction with a separate section: (a) Biodiversity and climate change, mitigation and adaptation, including relevant aspects of the energy system; (b) biodiversity and water; (c) biodiversity and food; (d) biodiversity and health.

23. Within each section, interactions will be described and assessed, quantitatively when possible, in terms of their environmental, social and economic costs and benefits. Each section will summarize overarching insights that can improve decision-making and assign attribution of past trends in most impactful interactions to drivers (direct and indirect), identifying which past actions, decisions, policies or institutions have or have not advanced elements of the nexus relative to the Sustainable Development Goals at various scales. The analysis and synthesis in each section will describe the roles of formal and informal institutions (e.g., shared rules, values, customs and cultural practices) associated with any of the systems in the nexus. In addition to an in-depth assessment of two-way interactions, each section will also give a brief indication of the most important past and current higher-order (three-way or higher) interactions involving each pair, which will be examined in more detail in chapter 3. Terrestrial, freshwater and marine ecosystems will be considered.

24. **Chapter 3: Status and past trends of complex interactions in the nexus.** Chapter 3 will assess the global and regional trends and current status in interactions and integrated perspectives of higher-order interactions in the nexus. Building on chapter 2, which approaches this nexus through system-specific two-way interactions, this chapter will emphasize the three-way and higher interactions (e.g., biodiversity – food – health, biodiversity – climate – water). Understanding the nexus is complex but essential to managing biodiversity and development issues effectively. The chapter will attribute past trends in important interactions to drivers (direct and indirect), identifying which past actions, decisions, policies, or institutions have affected elements of the nexus relative to the Sustainable Development Goals. The chapter will assess potential synergies and trade-offs among those multiple dimensions of the nexus and identify challenges, opportunities, and methodologies for approaching them holistically instead of through the lens of one system at a time. The chapter will outline how interactions were prioritized for analysis and will not attempt to assess every possible higher-order interaction. Instead, it will identify and focus on a subset of interactions that are likely to be most powerful in shaping the nexus and most relevant to response options. In doing so, it will establish a set of overarching relationships that can be explored in a consistent manner through the scenarios provided in chapter 4.

25. **Chapter 4: Future interactions across the nexus.** Chapter 4 will assess different types of scenarios (exploratory, policy-screening and target-seeking, defined according to the IPBES Assessment of Scenarios and Models), including qualitative scenarios and diverse views of future projections of good quality of life, representing plausible futures for the nexus issues addressed in this assessment. The chapter will focus on scenarios that address, in an integrated way, multiple interactions among these issues and their response to major drivers of change (e.g., population and economic growth), as identified in chapter 3 as being the most powerful and relevant to response options. While the chapter will cover a range of exploratory scenarios that are likely to show positive and negative future impacts on biodiversity, a greater focus of the chapter will be on the analysis and comparison of scenarios representing sustainable futures, which better integrate the elements of the nexus, paving the way for chapters 5 to 11. The timeframe of the analysis will focus on scenarios covering the period from current year to 2050 (linking to relevant policy targets such as the Sustainable Development Goals and the 2050 Vision for Biodiversity), although longer time horizons to 2100 will be considered where they add relevant knowledge on the long-term consequences of nexus interactions or the long-term resilience of response options. Global- to national-scale (and subnational-scale, where relevant) scenario studies that are quantitative and/or qualitative will be considered.

26. The chapter will cover a wide range of direct and indirect drivers of biodiversity change (see paragraph 5) that are addressed within scenarios that affect or shape the nexus,

including how these drivers evolve through time into the future. The chapter will also account for alternative worldviews and visions of the future, including those embedded within indigenous and local knowledge. The chapter will include analyses of which nexus interactions are most influential in determining how multiple internationally agreed goals can be achieved, while minimizing trade-offs. It will show which pathways lead to outcomes that are closest to and furthest from these policy goals. Finally, it will discuss uncertainties and limitations embedded in currently available scenarios and models, focusing on their treatment of nexus interactions.

## Part II. Pathways to sustainable futures

27. Part II of the assessment will address the possible pathways to realizing a range of sustainable futures.<sup>8</sup>

28. Chapter 5 will assess policy and sociopolitical options to implement changes for sustainable futures. Drawing from the analyses in part I, chapters 6 to 11 will take a holistic multisectoral and multidimensional view to assess the potential for different sets of actors to create the changes identified in chapter 5. The chapters, in line with the nexus approach, will assess options for action which are in synergy with each other, by actors focused on water (chapter 6), food (chapter 8), health (chapter 9), finance (chapter 10), biodiversity (chapter 11), and focused on delivering sustainable biodiversity-related approaches to climate change, adaptation and mitigation, including relevant aspects of the energy system (chapter 7).

29. Each chapter will consider:

(a) Response options that include individual and collective action (e.g., from local to national governments, international organizations, the private sector, youth, faith-based organizations, indigenous peoples and local communities, financial institutions, non-profit organizations, and research organizations) to modify or change policies and regulations, financial instruments, governance structures, technologies, business practices, and behaviours, and enabling conditions to advance the changes identified in chapter 5;

(b) Response options that require joint action by multiple sectors, emphasizing how each sector would contribute to those joint actions;

(c) The potential of nature-based solutions,<sup>9</sup> ecosystem-based approaches and other response options;

(d) The environmental (e.g., biodiversity, climate, ecosystem services and nature's contributions to people in terrestrial, freshwater, and marine ecosystems), social (e.g., gender equity, cultural values, disease burden, food security, water security and disaster risk) and economic (e.g., employment, livelihood options, income and access to capital) costs and benefits (positive and negative impacts) of response options that can advance the changes highlighted in chapter 5. These assessments will be quantitative when possible, outline ways in which actions can be prioritized and include consideration of the environmental, social and economic impacts of inaction or delayed action considering multiple value systems;

(e) Which indicators are used to track progress toward goals and targets, including as part of the monitoring framework of the post-2020 global biodiversity framework and the 2030 Agenda, how efficient are they at capturing nexus interactions and holistic integration, what progress has been made against these indicators, and what options exist to improve or complement them?

(f) Knowledge gaps related to response options for the given sector, including limitations to using process-based and numerical simulation models for nexus explorations;

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<sup>8</sup> The assessment will acknowledge that there is a range of sustainable futures depending on one's world view and a number of other factors.

<sup>9</sup> "Actions to protect, sustainably manage and restore natural and modified ecosystems in ways that address societal challenges effectively and adaptively, to provide both human well-being and biodiversity benefits". International Union for Conservation of Nature, *Global Standard for Nature-based Solutions* (Gland, Switzerland, 2020).

(g) As relevant, case studies of successes and failures at different scales.

30. **Chapter 5: Policy and sociopolitical options across the nexus that could facilitate and accelerate the transition to a range of sustainable futures.** Chapter 5 will define what change means in the context of the present nexus and will assess the utility of different theoretical and practical frameworks for implementing sustainable management approaches, either through transformative change based on different knowledge systems, or through identifying other approaches to management (policy and sociopolitical options). Changes that could facilitate sustainability within the context of the interacting nexus elements, and in the broader context of the 2050 Vision for Biodiversity, the post-2020 global biodiversity framework and its targets, as well as national biodiversity strategies and action plans, and nationally determined contributions and long-term strategies of the Paris Agreement adopted under the United Nations Framework Convention on Climate Change, will be explored. This chapter will assess the factors, including economic and financial, technical and technological, social, institutional, cultural and behavioural, that could facilitate or obstruct changes to achieve a sustainable future and avoid actions which could be maladaptive in the longer term. Specifically, chapter 5 will identify and assess cross-cutting and high-level issues, including integrative tools that are relevant for all nexus elements, e.g., social issues such as poverty, employment, gender, cohesion, education, food security, equity and justice, and demography; economic and financing issues such as inclusive wealth, subsidies, externalities, income, growth and cost-effectiveness; and political issues such as polycentric governance and inclusiveness. The chapter will assess how economic, financing and governance systems can evolve, as well as evaluate the potential of cross-sectoral planning and management in creating sustainable approaches to management of nexus elements. This chapter will also examine the roles of technology, and indigenous and local knowledge, and different perceptions of a good quality of life and the values and structural conditions that influence individual and collective behaviour in relationship to the nexus. The potential effectiveness of a variety of governance interventions and leverage points will be assessed. The chapter will discuss and assess the types of actions that represent transformative change and other sustainable approaches to decision-making, e.g., what actions are not in themselves transformative but lead to transformation, and briefly identify the types of sector-specific actions that are incremental, but still very important, while understanding synergies and trade-offs with all nexus elements. Finally, chapter 5 will include a section on holistic perspectives of the nexus elements, including different world views, such as those held by indigenous peoples and local communities, and various conceptualizations of the world, as appropriate. The intrinsic values of nature and mechanisms to support holistic indigenous approaches should be considered.

31. **Chapter 6: Options for delivering sustainable approaches to water.** Chapter 6 will address the response options that can be implemented by actors in the freshwater and marine sectors to create the changes outlined in chapter 5. Response options such as water policies or demand management that provides safe, adequate and equitable supply for various users and uses will be identified and assessed at the watershed and at other appropriate scales. The chapter will also assess policy options available to public and private water managers such as participatory management, adaptive uses of water systems, water and land tenure and access, integrated watershed management, water reuse, mitigation measures for water infrastructure development and nature-based, ecosystem-based and other solutions that contribute to biodiversity and ecosystem protection and management. This chapter will take a holistic integrated approach, while also seeking to address challenges to implementation of policy response options, including at the transboundary level. It will consider interactions between freshwater, terrestrial and marine ecosystems. It will incorporate biodiversity and nature's contributions to people into considerations in current policy responses, commitments, incentives and finance channels along with water management for climate change, adaptation and mitigation, and prevention and management of invasive alien species. It will also explore the utility of relevant transdisciplinary concepts, which can be used to identify innovative policy interventions.

32. **Chapter 7: Options for delivering sustainable biodiversity-related approaches to climate change, adaptation and mitigation, including relevant aspects of the energy system.** Chapter 7 will address biodiversity-related response options for climate change, adaptation and mitigation, including relevant aspects of energy production, distribution and consumption, including those that can be implemented in terrestrial, freshwater, and marine ecosystems, to create the changes outlined in chapter 5. Options considered may focus on mainstreaming

biodiversity considerations into the relevant aspects of the energy system. The chapter will examine biodiversity-related policies and procedures related to the governance of climate change, adaptation and mitigation strategies, including relevant aspects of the energy system. Further, the chapter will examine financing options and incentives to mitigate and adapt to climate change, while conserving, restoring and sustainably using biodiversity, and meeting relevant global objectives for food, water, and health.

33. **Chapter 8: Options for delivering sustainable food systems.** Chapter 8 will address the response options that can be implemented by actors in the food system to create the changes outlined in chapter 5. Response options considered may include policies and procedures at any scale related to food systems (e.g., entire value chains of wild harvested terrestrial, freshwater or marine resources, crops, feedstocks, fibre, livestock, aquaculture, agroforestry and forestry). Response options may include governance, finance, regulatory regimes, trade, and management systems and practices. The chapter will also examine the use of effective agricultural practices, including agroecological practices, organic farming, integrated pest management and biotechnology, that incorporate innovative solutions as possible pathways to sustainability, including trade-offs. Further, the chapter will examine how to achieve food and nutrition security and food safety, and how to reduce food loss and waste. Other components of the food system such as altering food processing, packaging, distribution, trade and marketing will be considered as part of the analysis. The chapter will consider indigenous and local knowledge relevant to food systems; examine how to alter food demand and consumption and how to increase diversity in food consumption to ensure equitable access to healthy diets. Response options could also include those that contribute to water security and thriving freshwater systems; reducing greenhouse gas emissions; increased efficiency (e.g., land requirements, water and chemical inputs, soil health) in existing production or harvest systems; and improved health (e.g., undernutrition and overnutrition, air quality, and pandemic prevention) in order to facilitate improvements across all elements of the nexus.

34. **Chapter 9: Options for delivering sustainable approaches to health.** Chapter 9 will address the response options that can be implemented by health actors to create the changes outlined in chapter 5. Response options considered may include policies and procedures related to valuing the human health-related contributions from biodiversity (including medicinal plants, contributions to nutrition and to mental health). The chapter will examine progress towards equity in accessibility to health-related benefits (including for indigenous peoples and local communities, community groups, women and girls), governance of intellectual property rights, management of environmental determinants of diseases, or health system impacts on biodiversity. Response options may include health-oriented actions that benefit health and biodiversity, as well as other elements of the nexus, and may require cross-sector collaboration (e.g., sanitation and wastewater treatment; diet diversification that maintains crop genetic diversity and improves nutrition; reproductive health options that aid maternal and child health, lower demands for environmental resources and maximize cross-sectoral benefits and governance; addressing a One Health approach in an environment shared by people, animals and plants; coronavirus disease (COVID-19) pandemic recovery actions that reduce future pandemic risk and mitigate climate change and/or enhance food security).<sup>10</sup> There may be considerations of policies and procedures that adopt frameworks that allow exploration of approaches to a healthy planet, maximizing cross-sectoral benefits and governance. Response options will include those that manage the linkages among biodiversity and disease prevention, including links to anthropogenic drivers of the emergence and spread of infectious diseases, including those with pandemic potential, such as COVID-19, SARS, Nipah virus infection, HIV/AIDS and Ebola virus disease, as well as land-use change, climate change, wildlife consumption and trade, and livestock intensification.<sup>11</sup>

35. **Chapter 10: Options for delivering sustainable approaches to public and private finance for biodiversity-related elements of the nexus.** Chapter 10 will address the response options that can be implemented by actors in the financial sector to create the changes outlined in chapter 5. The chapter will examine the role of international and national public and private financiers in funding progress towards the options identified in previous chapters. The chapter will consider response options related to domestic budgets, philanthropic foundations,

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<sup>10</sup> For specific potential options see IPBES, *Workshop Report on Biodiversity and Pandemics of the Intergovernmental Platform on Biodiversity and Ecosystem Services* (Bonn, Germany, 2020).

<sup>11</sup> Ibid.

international cooperation, private investors and lenders, and multilateral organizations and development cooperation agencies. Further, the chapter will assess progress in the context of international conventions' commitments to providing the financing required to achieve the changes highlighted in chapter 5, including those that have the potential to achieve the Sustainable Development Goals. The chapter may consider different mechanisms, approaches, and market and non-market economic instruments to enhance nexus and holistic approaches within the context of the evolving economic paradigms explored in chapter 5.

36. **Chapter 11: Options for delivering sustainable approaches to biodiversity conservation, restoration and sustainable use.** Chapter 11 will address the response options that can be implemented by environmental or conservation actors to create the changes outlined in chapter 5. Response options considered may include the potential of nature-based solutions, ecosystem-based approaches and other response options such as Mother Earth rights-based approaches, green and blue urban spaces, terrestrial, freshwater and marine spatial planning, the creation and effective and sustainable management of protected area networks and ecological corridors, other effective area-based conservation measures to maximize conservation and enhance ecological connectivity, environmental restoration of degraded ecosystems, and environmental rehabilitation. Response options may include environmental regulations (e.g., infrastructure development, water management, aquaculture and fisheries management, agricultural chemical use, and pollution), and voluntary norms or formal governance agreements related to natural resource access and management. Options will include consideration of necessary research, monitoring and environmental public awareness and education to support the changes identified in chapter 5.

37. **Chapter 12: Summary and synthesis of options, knowledge and technology gaps and capacity development.** Chapter 12 will summarize the opportunities for action for a range of policymakers, decision-makers and actors at all levels, including relevant parts of the United Nations system, the governing bodies of nexus-related biodiversity, climate (including relevant aspects of the energy system), food, water or health agreements and other relevant agreements, as appropriate, and, in accordance with their respective mandates, policymakers, legislators, private sector actors, financial planners, civil society, academic and research institutions, indigenous peoples and local communities, youth, women, and other stakeholders related to any systems within the nexus. Holistic perspectives of the nexus elements, including those held by indigenous peoples and local communities, would also be brought forward in this chapter. This summary will also include a synthesis of the costs of action and inaction identified in chapters 6 to 11, providing a conclusion on how they relate to each other. Emphasis will be given to summarizing which opportunities for transformation can be driven most efficiently by actors within a sector, and which opportunities will require collaborative action across multiple sectors and civil actors. Attention will also be given to which trade-offs within the nexus are likely to persist, and what can be done to mitigate these and support social groups most likely to be impacted.

38. The chapter will summarize the findings on the strengths and weaknesses of the monitoring frameworks of the post 2020 global biodiversity framework and of the 2030 Agenda for Sustainable Development in the context of the nexus and suggest options to complement them. Finally, the chapter will synthesize knowledge gaps, including governance gaps and future research needs, as identified throughout the assessment. Attention will be given to opportunities for synergies in filling knowledge and capacity gaps across elements of the nexus.

### III. Data and information

39. The nexus assessment will draw on data and information from diverse knowledge systems and languages, including scientific literature and indigenous and local knowledge, addressing all the components of the IPBES conceptual framework in order to explore the interrelationships between nature, nature's contributions to people, drivers, institutions and governance and good quality of life.

40. Attention will be given, in accordance with the Platform's data management policy, to ensuring access to metadata and, whenever possible, the corresponding underlying data, through a findable, accessible, interoperable and reusable (FAIR) process to ensure comparability between assessments. Furthermore, the task force on knowledge and data will

work towards ensuring that the outcomes (i.e., knowledge and metadata products) of the nexus assessment are widely available for future Platform assessments and other uses.

41. The assessment will also identify and seek access to globally and regionally relevant data and information sources that may exist or emerge. Potential data sources include, but are not limited to, global, regional and national institutions and organizations, scientific literature, grey literature and indigenous and local knowledge. The needs of the assessment process will be communicated widely in order to identify and encourage the sharing of relevant data and information.

42. The task force on knowledge and data will support work on data and information quality, confidence, essential biodiversity variables and indicators, baselines and representativeness, as necessary. It will also support experts in their identification of knowledge gaps and, subsequently, promote knowledge generation to address the gaps identified.

43. Addressing and working with indigenous and local knowledge in the assessment will be in line with the IPBES approach adopted by the Plenary in decision IPBES-5/1 and relevant guidance regarding its implementation prepared by the task force on indigenous and local knowledge.

#### **IV. Capacity-building and development**

44. Capacity-building activities will help support the development and uptake of the assessment. The activities will be designed in accordance with objective 2 on building capacity of the IPBES work programme up to 2030 and the capacity-building rolling plan, under the guidance of the task force on capacity-building. Activities will, subject to the availability of resources, include: the IPBES fellowship programme; the training and familiarization programme; science-policy dialogues; and support to activities organized by other organizations in support of the uptake and use of the assessment findings across sectors and the strengthening of the science-policy interface at (sub)regional and national levels.

#### **V. Communication and outreach**

45. The nexus assessment report and its summary for policymakers will be published in electronic format, made available on the Platform website and promoted through social media channels of the Platform. The summary for policymakers will be available in all official languages of the United Nations and will be printed on demand, resources permitting. Outreach to a broad set of stakeholders, including the wider audience of decision makers, will be based on the Platform’s communications and outreach strategy and budget.

46. Communication and outreach will be undertaken from the outset and during the development of the assessment in order to build engagement with the wider scientific community, other knowledge holders and the end users of the assessment. Engagement with users, across sectors, will help to define the type and range of communication products and policy support tools in multiple languages (as appropriate and subject to the availability of resources), that will be developed as part of the assessment.

#### **VI. Technical support**

47. Technical support for the nexus assessment will be provided by a technical support unit, composed of several full-time professional and administrative staff members. This unit will work in close collaboration with the groups of experts producing other IPBES assessments and with the IPBES task forces and their respective technical support units.

#### **VII. Process and timetable**

<i>Date</i>	<i>Actions and institutional arrangements</i>
<b>2021</b>	
Second quarter	The Plenary, at its eighth session, approved the undertaking of the nexus assessment and requested the secretariat to establish the institutional arrangements necessary to operationalize the technical support required for the assessment

<i>Date</i>	<i>Actions and institutional arrangements</i>
	The Multidisciplinary Expert Panel, through the secretariat, requests nominations of experts from Governments and other stakeholders
Third quarter	The Multidisciplinary Expert Panel selects the assessment co-chairs, coordinating lead authors, lead authors and review editors in line with the procedures for the preparation of IPBES deliverables, including by implementing the procedure for filling gaps in expertise
Fourth quarter	Selection decision communicated to nominees
	Meeting of the management committee (co-chairs, members of the Bureau and Multidisciplinary Expert Panel assigned by these bodies to the assessment) to plan first author meeting
<b>2022</b>	
First quarter	First author meeting with co-chairs, coordinating lead authors, lead authors, review editors and members of the Bureau and Multidisciplinary Expert Panel that are part of the management committee of the assessment
First to third quarter	Preparation of zero-order drafts and first-order drafts of chapters
Early fourth quarter	First external review (six weeks) – draft chapters made available for review by experts
Fourth quarter	Second author meeting with co-chairs, coordinating lead authors, lead authors, review editors and members of the Bureau and Multidisciplinary Expert Panel that are part of the management committee of the assessment Back to back with the second author meeting: meeting to advance the preparation of the summary for policymakers with co-chairs, coordinating lead authors and members of the Bureau and Multidisciplinary Expert Panel that are part of the management committee of the assessment
<b>2023</b>	
First to third quarter	Preparation of the second-order drafts of chapters and first-order draft of summary for policymakers
Second quarter	Writing workshop to advance the preparation of the summary for policymakers with co-chairs, coordinating lead authors and members of the Bureau and Multidisciplinary Expert Panel that are part of the management committee of the assessment
Third quarter	Second external review (eight weeks) – draft chapters and draft of the summary for policymakers made available for review by Governments and experts
Fourth quarter	Third author meeting with co-chairs, coordinating lead authors, lead authors, review editors and members of the Bureau and Multidisciplinary Expert Panel that are part of the management committee of the assessment Back-to-back with the third author meeting: Meeting to advance the preparation of the summary for policymakers with co-chairs, coordinating lead authors and members of the Bureau and Multidisciplinary Expert Panel that are part of the management committee of the assessment
<b>2024</b>	
First quarter	Online writing workshop to advance the preparation of the summary for policymakers with co-chairs, coordinating lead authors and members of the Bureau and Multidisciplinary Expert Panel that are part of the management committee of the assessment
Third quarter	Final review (six weeks) – final draft chapters and draft of the summary for policymakers made available for review by Governments
Early fourth quarter	Consideration by the Plenary, at its eleventh session, of the summary for policymakers for approval and of the chapters for acceptance
Fourth quarter	Communication activities in relation to the assessment