

Our Ref: UNEA/GEO7/IMAG/F2F/3

3-5 September 2024

#### **Outcomes Document:**

### **Third Face to Face Meeting of the Intergovernmental and Multi-stakeholder Advisory Group (IMAG) of UNEP's Global Environment Outlook (GEO-7)**

On September 3-5, 2024, the Intergovernmental and Multi-stakeholder Advisory Group (IMAG) met to discuss the following agenda items:

1. Receive a briefing and provide advice on the GEO Budget and staffing.
2. Review and provide advice on the revised approach for the intergovernmental and expert peer review process for the GEO-7 Second Order Draft.
3. Review and provide advice on the steps for the acceptance of the main GEO-7 report and the review and approval of the GEO-7 Summary for Policy Makers.
4. Discuss and agree on the approach for providing a validation opinion from the IMAG for the GEO-7, and how best to coordinate with the MESAG validation opinion.
5. Review and agree on IMAG's work plan up until the launch of GEO-7.
6. Receive briefings from the Indigenous Knowledge and Local Knowledge Task Force, Behavioral, Social and Cultural Task Group and Climate Change Adaptation Task Group working on GEO-7.
7. Receive briefings from the various chapter author teams of GEO-7.
8. Receive a briefing and provide advice on the progress of GEO-7 digitization.
9. Receive a briefing and provide advice on the implementation of the GEO supporting services.

#### **On these agenda items the IMAG decided:**

- Expressed concern about the budget situation, which unless solved threatens the GEO-process and quality of the output;
- Appreciated that solving budget challenges is the responsibility of the ED working with EWAD. IMAG advised to consider the following:
  - ED to send a letter requesting donations to Member States requesting contributions to GEO
  - ED to regularly brief the Committee of Permanent Representatives, on progress but if needed also on budget challenges
  - ED and EWAD to continue discussions with potential host countries for the remaining meetings
  - Consider the option of not having hard copies of the full GEO –report (or hybrid)
  - The GEO-8 scoping meeting should be removed from the budget, since there is likely to be a period of reflection after the launch of GEO-7 and this will delay the start of GEO-8
  - Consider cost saving options for the translation process, using AI
- Discussed with MESAG a different approach to means of implementation for future GEO's, including the option of a trust fund before engaging in GEO-8.
- While agreeing to the proposed approach, IMAG underscored the need for a unidirectional approach to editing the SPM, with changes in the text of the main report leading to changes in the Executive Summaries, which will lead to changes in the SPM draft. IMAG welcomed the offer of the GEO co-chairs to formulate a paragraph on this for the IMAG-report;
- Decided the SOD of the SPM will be sent out on Aug. 15, 2025, and written comments will be requested for 6 weeks later. IMAG agreed that written comments should be included in an updated version in a way that Member States can see the proposals from the co-chairs for addressing the comments at least one week before the Ad Hoc Open Ended Meeting;
- Welcomed the suggestion to having dedicated sections in the SPM for regional findings;
- Noted the composition of the SPM core team and recommended the addition of team members

from the Eastern European, Asia and the Pacific and Africa regions.

- Welcomed the report from the lead review editors, agreed that the review process needs strengthening, along the lines of the recommendations presented;
- Discussed the need to enhance accountability and transparency on why comments have not been accepted, and how comments have been accepted;
- In terms of enhancing the number of reviewers, IMAG recommended that Option 3 (all reviewers accepted) should be used for the SOD peer review, while striving for geographic and gender balance. In addition, it stressed again the importance of regular briefings to the CPR to enhance governments interest and involvement in the review.
- IMAG will produce its own validation opinion of the GEO process using the approach that was used for the mid-stream review; IMAG will review the process of GEO from a policy perspective;
- IMAG intends to produce a mid-term review, based on the current draft document and the advice provided in the in-person Nairobi meeting in an accompanying letter for the ED. Efforts will be made to coordinate with the mid-stream review of MESAG.
- IMAG greatly appreciated the presentation from/ exchange of views with the Coordinating Lead Authors of the GEO-chapters; many issues and challenges were discussed, of which the following may require further attention from IMAG:
  - The timely development of a glossary (and the need to fast-track for certain potentially contentious terms before the SOD review);
  - The granularity of findings and policy options;
  - The consistent use of input from the IK-LK, the BSC and CCA taskforces;
  - Adequate cross chapter coordination;
  - Standardized use of boxes and visualizations and the need for a strong outreach & communications strategy
- IMAG agreed to the reordering of chapter 9 (to become chapter 12) as proposed by the CLA's of part C of GEO and GEO Assessment co-chairs, with a view to improving the narrative.
- IMAG noted the oral report from its co-chairs on the discussion with the UNEP ED and welcomed the invitation to draw lessons learnt and provide advice on the future of the GEO-process.
- IMAG considered a range of elements that stand out already, including:
  - Ensuring adequate means of implementation (dedicated trust fund and adequate staffing) before engaging on a future GEO;
  - Phasing/ sequencing of a future GEO, e.g. first stage the solutions pathways, before doing the modelling;
  - Consider minimization of the status and trends section of a future GEO, through better use of UNEP- WESR;
  - Adequate cross chapter coordination;
  - Further development of the GEO supporting services pillar ('growing the GEO-family')
- IMAG welcomed a discussion with MESAG to see whether a joint advice 'Beyond GEO7' to the ED can be prepared at the end of the GEO-7 process

| Rapporteur               | Signature |
|--------------------------|-----------|
| Ana Julieta Calvo Obando |           |

## ***Summary of the meeting***

### **GEO Budget and Staffing**

IMAG emphasized that immediate action is required to address existing budget gaps, with participants encouraged to utilize their expertise for solutions. It was noted that contributions vary among countries, reflecting uneven participation. The existing challenges are potential opportunities for learning and improving future financial strategies with a focus on innovative financial solutions. The Secretariat referenced the original USD 10.3 million budget approved in October 2022 which has now increased to over USD 13 million, providing context for the strategy for closing the funding gap.

IMAG expressed its concern that current budget issues could jeopardize the GEO process and output quality. They advised the ED to request donations from Member States, regularly update the Committee of Permanent Representatives on budget and progress and continue talks with potential host countries for future GEO meetings. IMAG suggested considering cost-saving measures such as not printing the full GEO report or only printing the SPM, removing the GEO-8 scoping meeting from the budget due to expected delays in starting GEO-8, and using AI for translation. IMAG will also explore with MESAG alternative funding approaches, including a potential trust fund, before starting GEO-8.

IMAG indicated that there should be a focus on finding structural solutions rather than minor budget cuts, with efforts to secure additional funding from governments and donors. Upcoming stakeholder discussions will further address these issues and explore additional financial support.

### **Revised approach for intergovernmental and expert peer review**

The GEO-7 FOD review engaged 312 reviewers from 77 countries, underscoring efforts for transparency and scientific integrity, though some regions were underrepresented. Despite initially considering over 400 reviewers, the final selection applied a geographic and gender balance lens, as required by [Resolution 5/3](#), even though Eastern European reviewers were underrepresented in the nomination process. Variations in the volume of peer review comments and the diversity of feedback were noted, and a systematic process was highlighted as needed to integrate accepted comments and address deferred ones to enhance review transparency and comment tracking. It was noted that there is a call for reviewers in preparation for the Intergovernmental and expert peer review in November. Suggestions from the Review Editors report included improving data analysis and keyword searches. The review process aims for balanced geographic and gender diversity while ensuring expertise coverage, with some flexibility recommended for practical implementation.

Maintaining up-to-date documents was indicated as essential for accurate discussions, with frequent government comments encouraged and a separate response document to clarify feedback integration. The peer review process will address criticisms by ensuring broad involvement from IMAG members and governments, emphasizing transparency and adherence to findings to maintain scientific integrity. Improved geographical representation, especially from Eastern Europe, and clear process for explanations are needed to uphold transparency and avoid criticisms.

IMAG welcomed the report from the lead review editors and agreed on the need to strengthen the review process according to the recommendations presented. IMAG specifically highlighted the need for greater accountability and transparency regarding the acceptance and rejection of comments. IMAG recommended using Option 3 (accepting all reviewers) for the SOD peer review, with a focus on geographic and gender balance. Additionally, they reiterated the importance of regular briefings to

the Committee of Permanent Representatives (CPR) to boost government interest and involvement.

### **Process for preparing the First Order Draft of the GEO-7 Summary for Policymakers**

The GEO-7 assessment co-chairs explained the process for preparing the Summary for Policymakers (SPM), noting it is being developed in two parts: the first on current conditions and future scenarios, and the second on potential solutions, with a balanced core team managing the writing process. The first part covers environmental crises, their interconnections, and impacts on human well-being and SDGs. The second part focuses on evidence-based solutions and the roles of stakeholders like the private sector and civil society. The co-chairs noted that the SPM emphasizes cohesive integration across sectors, such as energy and water, and prioritizes a data-driven approach for measurable insights. The draft will undergo multiple reviews with a finalized version expected by October in preparation for the Intergovernmental and expert peer review starting in November 2024 continuing into early next year. With a 15,000-word limit, the SPM aims to present concise, evidence-based arguments for transformative policy change and demonstrate that environmental sustainability is achievable through significant shifts.

IMAG showed support for the proposed approach to editing the SPM, emphasizing a unidirectional process where changes in the main report led to updates in the Executive Summaries and the SPM draft. IMAG appreciated the assessment co-chairs' offer to draft a paragraph for the IMAG report on this process. The SPM's Second Order Draft (SOD) will be distributed on August 15, 2025, with written comments requested for six weeks thereafter. IMAG agreed that written comments should be incorporated into an updated version, allowing Member States to review proposals from the assessment co-chairs one week before the Ad Hoc Open-Ended Meeting of the SPM. IMAG also showed support for including dedicated sections for regional findings in the SPM and recommended adding team members from Eastern Europe, Asia, and Africa to the SPM core team.

The Secretariat briefed the IMAG on the peer review process for the Summary for Policymakers (SPM), noting it would start on November 1<sup>st</sup> to January 15. Feedback from governments and experts will be crucial to align the SPM with policy needs.

### **Approach for providing a validation opinion from the IMAG of the GEO-7, and how best to coordinate with the MESAG.**

IMAG and MESAG are responsible for issuing validation reports that focus on adherence to the GEO-7 process rather than the content of the report. IMAG's focus is on policy relevance and MESAG's on scientific integrity. Clear roles for each advisory body is essential to avoid overlap, with the validation opinions being complementary. The validation reports/opinions must follow established procedures and be finalized before the Summary for Policymakers review and approval meeting, to ensure timely acceptance of the main GEO-7 report. Validation opinions should focus on the process that ensures the SPM only includes material from the main report (line of sight) and reflects confidence levels accurately and links back to the sections of the main report. Both IMAG and MESAG should maintain consistency in their validation reports/opinions and consider creating a "lessons learned" document for future improvements to the GEO process.

A consensus approach was indicated as preferred for the acceptance of the IMAG validation opinion, avoiding formal minority opinions as much as possible. The validation opinion should be **prepared and agreed upon before it is agreed**. IMAG should issue a midterm validation letter, confirming the GEO-7 process is proceeding well so far.

IMAG will produce its own validation opinion of the GEO process, focusing on policy relevance, using the same approach from the IMAG mid-stream review. IMAG will use the current draft validation

document and advice from the Nairobi meeting to prepare a validation letter for the Executive Director. IMAG will coordinate with MESAG's mid-stream review to ensure alignment and consistency.

### **Review and agree on IMAG's work plan up until the launch of GEO-7.**

IMAG was briefed on the draft work plan for the period leading up to the GEO-7 report release. A strategy was indicated to be under development for the GEO-7 launch to maximize engagement and visibility, achieve a high-profile and timed around major climate conferences. Key focus areas of the IMAG work plan include ensuring a well-coordinated communication strategy that addresses media attention, incorporates consideration of the GEO's innovative and inclusive approach and uses engaging visuals. Stakeholder input into the IMAG's future work was noted as essential to align with broader goals and the GEO process. Adjustments to the IMAG workplan may be needed to align with the revised GEO-7 timeline.

IMAG suggested that the Secretariat develop a dynamic workplan with regular reviews and updates to adapt to changes in the GEO work.

### **Briefings from various chapter groups, task groups and task forces**

IMAG was briefed on the work of the IK&LK taskforce which has so far held two dialogues to integrate IK&LK into the GEO-7 report, with the summary reports from the dialogues available to authors. IK&LK is now included in most GEO-7 chapters, but some chapters still need more contributions. It was shared that Taskforce members are assigned to different chapters to enhance the inclusion of IK&LK. The taskforce will also provide chapeau texts for each GEO-7 section to offer IK&LK conceptualizations of GEO-7 issues. Challenges identified include: difficulties in fully integrating IK&LK due to the current chapter structure and lack of consideration of IK&LK issues and needs during the scoping stage, as well as variability in how IK&LK messages are presented in current GEO-7 Executive Summaries. The taskforce is working to improve clarity and visibility of IK&LK contributions, ensuring both knowledge systems are represented while maintaining scientific integrity. Ongoing efforts involve the finalization of IK&LK contributions and discussions with chapter authors. Despite significant progress, challenges remain in achieving a comprehensive inclusion of IK&LK.

IMAG was briefed on the work of the Behavioral, Social, and Cultural (BSC) group which was recently formed with experts from various fields and has developed guidelines and questions to integrate BSC perspectives into the GEO-7 report, providing ongoing support to chapter authors. The group focuses on human development drivers, social implications, and complex issues such as the environmental impacts of conflicts. Challenges highlighted include: alignment of the BSC issues with UN regional groupings chosen for GEO-7, time constraints for members who are also chapter authors, and support gaps for some chapters. Proposed solutions included: improved coordination through meetings and webinars and integrating local contextual knowledge to address these challenges. The BSC group indicated that they aim to enhance engagement and ensure effective integration of BSC perspectives while avoiding content duplication and overcoming language barriers. Despite being new, the BSC group has made significant progress in integrating these perspectives into GEO-7.

IMAG was briefed on work of the Climate Change Adaptation (CCA) group, which is focused on developing countries facing challenges in balancing the economic costs of adaptation with the benefits of mitigation policies, especially during transformation processes. It was noted that policymakers must manage these trade-offs to achieve sustainable development. The CCA team has made significant progress in integrating adaptation content through collaboration across various chapters, focusing on drivers, planetary crises, economy, and regional vulnerabilities, with detailed proposals and revisions expected in the next draft. Challenges include: understanding regional groupings, integrating local contexts, and developing a global Monitoring and Evaluation (M&E) methodology to assess

adaptation progress, with other issues on data consistency and framework consistency. Economic considerations are crucial for designing feasible adaptation projects and aligning with sustainable development goals. The CCA team highlighted its focus on identifying regional risks and solutions to ensure adaptation efforts support broader policy goals and financing mechanisms. Despite progress, challenges in the regional context, integration of adaptation considerations and data consistency remain critical for effective local planning and global adaptation monitoring.

IMAG appreciated the presentations and exchanges with Coordinating Lead Authors of all the GEO chapters, highlighting several areas needing further attention:

1. **Glossary Development:** The timely creation of a glossary is crucial, particularly for contentious terms before the Summary of Draft (SOD) review.
2. **Granularity of Findings:** There is a need for more specific regional data to refine findings and policy options.
3. **Consistency in Input from cross-cutting issues:** Ensuring consistent use of input from the Indigenous Knowledge and Local Knowledge (IK&LK) taskforce, Behavioral, Social, and Cultural (BSC), and Climate Change Adaptation (CCA) taskforces.
4. **Cross-Chapter Coordination:** Improved coordination and coherence across chapters is necessary.
5. **Standardization and Communication:** The standardization of boxes and visualizations and the development of a robust outreach and communications strategy is needed.

Additionally, IMAG agreed to reorder chapter 9 to become chapter 12, as proposed by the Coordinating Lead Authors and GEO co-chairs, to enhance the narrative flow. **Annex 1** provides more detailed notes from the chapter discussions.

### Progress on GEO-7 Digitization

IMAG emphasized that digitizing the GEO-7 report is crucial for enhancing accessibility and enabling real-time interaction with environmental data, which supports global collaboration and engagement. However, there are challenges in aligning the ambitious digitalization goals with the schedule for releasing core products, leading to concerns about whether all planned digital features will be fully implemented by the release date.

### Progress on Supporting Services

IMAG noted that the [UNEA 5.2 resolution](#) calls for GEO-7 to enhance its effectiveness by tailoring its findings to national contexts through supporting services. This includes developing scenarios, leveraging scientific expertise, building capacity, and expanding outreach. Key tasks to make the supporting services effective include: securing adequate funding, coordinating with global and regional organizations, using digital tools, and forming innovative partnerships with the private sector and financial institutions. The approved GEO Supporting Services Workplan outlines a comprehensive strategy with anticipatory measures, methodological guidelines, and resource mobilization strategies. It emphasizes increased collaboration, stakeholder engagement, and process refinement based on feedback. To ensure successful implementation, the focus should be on improving funding, coordination across GEO collaborating centers, and using digital infrastructure. Addressing these areas can significantly strengthen the supporting services of GEO.

### Any other business

There was no other business.

## **Annex I: Chapters review (1-21) Discussion, challenges and suggestions from IMAG**

### **Chapter 1: Introduction**

#### **Outcomes of the discussion:**

- **Action-Oriented Focus:** GEO-7 aims to provide policymakers with practical, evidence-based, and participatory solutions for transformative change, rather than just descriptive or prescriptive approaches.
- **Integrated and Inclusive Approach:** The report explores the interconnectedness of planetary crises, land degradation, and their impacts on natural resources and various sectors. It emphasizes incorporating Indigenous and Local Knowledge and highlights behavioral, social, and cultural dimensions as essential for sustainable practices.
- **Challenges and Innovations:** The report faces challenges like adhering to chapter word limits while ensuring comprehensive coverage. Innovations, such as digital transformation, are featured as crucial for sustainable development. There is also controversy around the term "planetary crisis," which is being carefully addressed.
- **Report Structure and Consistency:** Introductions set context without summarizing findings, which are reserved for executive summaries and the summary for policymakers. Efforts are focused on maintaining consistency in terminology, avoiding redundancy, and ensuring policy relevance through effective feedback and solution-oriented content.

### **Chapter 2: Historical, current and projected drivers and pressures of environmental change**

#### **Outcome of discussion:**

- **Regional and Sub-Regional Gaps:** The chapter is facing difficulties in addressing environmental issues at sub-regional levels due to word limits and the complexity of detailed data, making it hard to provide in-depth analysis.
- **Trade-Offs and Drivers:** The chapter will explore trade-offs between competing sustainability goals, such as agriculture, food, and energy. It will address how drivers like technology and lifestyle can both present opportunities and exacerbate challenges.
- **Incorporation of Indigenous and Local Knowledge:** There is a strong emphasis on integrating indigenous and local knowledge systems, despite facing threats from various drivers and pressures.
- **Complex Inter-Linkages and Visual Representation:** The chapter aims to capture complex interconnections between drivers, pressures, and planetary crises and develop clear, visually effective ways to represent this data. It will focus on practical solutions while balancing scientific rigor with policy relevance.

#### **Conclusion of discussion: Chapter 1-2:**

- **Integration of Knowledge Systems:** Emphasis was placed on integrating Indigenous Knowledge (IK) and Local Knowledge (LK) into the chapters to provide a comprehensive understanding of environmental issues.
- **Solution-Oriented Approach:** There is a strong focus on adopting a solution-oriented approach to tackle complex environmental challenges, ensuring that practical solutions are highlighted.
- **Consistency and Dimensions:** The discussion underscored the importance of consistency in terminology and highlighted the critical role of behavioural, social, and cultural dimensions in driving sustainable practices.
- **Addressing Challenges:** Challenges such as regional gaps and effective visual representation of complex interlinkages were noted, with efforts aimed at improving communication of these intricate relationships.

### **Ch 3: Air**

- **Drafting and Key Messages:** Chapter 3 is nearing completion, incorporating feedback to address key issues such as the COVID-19 pandemic's impact on structural changes and the role of climate and land use in exacerbating wildfires.
- **Integration and Policy Relevance:** The chapter integrates Indigenous and local knowledge (IK & LK) with the addition of an Indigenous lead author. It focuses on policy-relevant topics, including air pollution, energy, transport, and extreme weather, aligning with international agreements and guidelines.
- **Complex Interactions and Coordination:** It examines interactions between climate change, biodiversity loss, and land use changes, with efforts to coordinate across chapters, address overlaps, and ensure consistency. The chapter is working to incorporate regional and local data despite challenges.
- **Scientific Rigor and Policy Considerations:** The chapter is progressing with improved citations and narrative refinement. It addresses public health impacts of air pollution, firefighter safety, and tools for fire management, while aiming to resolve gaps in research and references.

### **Chapter 4: Land and Soil**

- **Review and Progress:** Chapter 4 has received 204 reviewer comments, most of which have been addressed. The draft includes 36 figures and over 350 references and is progressing well with integration of Indigenous and Local Knowledge (IKLK) and improved coherence with Chapter 3.
- **Complexity and Policy Focus:** The chapter manages complex environmental issues within a 10,000-word limit, balancing global and local examples. It addresses drivers and pressures like climate change, biodiversity loss, and pollution, and their effects on natural systems including air, land, oceans, and freshwater.
- **Challenges and Gaps:** Key challenges include patchy information, inadequate coverage of Sustainable Development Goals (SDGs), and the impact of social media and disinformation on policy questions. Future work will focus on refining IKLK integration, balancing global and local issues, and addressing information and policy gaps.
- **Forestry and Environmental Solutions:** The chapter highlights significant issues such as migration-induced land conversion, the impact on the forest sector, and the need for innovative forestry solutions like prescribed burning, bio-based materials, and advances such as mass timber and CLT. It also emphasizes addressing drought, water stress, and the impact of invasive species and microplastics.

### **Chapter 5: Oceans and Coasts**

### **Outcome of discussion:**

#### **Current Progress:**

- Completed: Zero Draft (ZOD) and First Order Draft (FOD) are finished.
- **In Progress:** Second Order Draft (SOD) is being reworked, with updates to the biodiversity section, evidence, references, and visual aids.
- **New Integrations:** Incorporating Indigenous Knowledge (IK) and Behavioural, Social, and Cultural (BSC) aspects.
- **Addressing Knowledge Gaps:**
- **Focus Areas:** Polar regions, ocean warming, sea-level rise, and pollution.
- **Emerging Issues:** Transport through oceans, ocean floor exploration, and industrial impacts on marine ecosystems, such as oil drilling in protected areas.
- **Ocean's Influence on Climate:**
- Highlighting the significant role of oceans in global climate, including how ocean conditions affect weather patterns and rainfall, especially in regions like southern Africa.
- Key Issues Raised:
- Marine Policy and Governance: Need for differential policies for large-scale industrial activities like seabed mining and fishing, with a focus on both high seas and territorial waters.
- Human Impact and Cultural Dimensions: Effects of sea-level rise on coastal communities, with a focus on integrating cultural and indigenous perspectives.
- Biodiversity and Ecosystem Shifts: Impact of fishing practices on marine biodiversity and the consequences of removing top predators.
- Structural and Methodological Considerations:
- **Use of Boxes:** Chapters use boxes to highlight gaps and issues not covered in detail in the main text. A standard approach for this is suggested.
- **Final Harmonization:** Ensuring consistency and coherence across chapters during the final editing phase.
- **Additional Considerations:**
- **Transport and Exploration:** Need for further exploration of ocean transport and implications of ocean floor exploration.
- **Feedback Loop:** Ongoing dialogue with chapter leads to ensure coherence and address remaining gaps before the final draft.

### **Chapter 6: Freshwater**

#### **Outcome of discussion:**

##### **Chapter Structure and Content:**

- The chapter follows a refreshed structure for State and Trends (S/T) chapters, focusing on core elements such as water quality, quantity, biodiversity, and human wellbeing.
- It integrates Indigenous Knowledge and Local Knowledge (IKLK) into key messages and addresses various crises.

##### **Progress and Integration:**

- The IKLK section has been drafted and included in two key messages.
- Ongoing work includes incorporating new content and references from the review period and consulting with other chapters to ensure consistency and avoid duplication.

##### **Challenges and Gaps:**

- Data Availability: Limited and unevenly distributed global datasets for state, trends, and linkages with crises.
- Coherence and Consistency: Ensuring a consistent narrative across chapters and integrating freshwater systems with other sectors like food, energy, and economics.
- Integration of Freshwater Pressures: Challenges in including non-crisis-related pressures in the chapter.
- Graphics Complexity: Some graphics need simplification to balance policy relevance and data integrity.
- Policy Questions and Responses:
- The chapter addresses policy questions by referencing drivers and pressures from Chapter 2 and including specific freshwater pressures like pollution and species exploitation.
- It organizes subsections to reflect bidirectional relationships between water aspects and crises.
- Word Count and Editing:
- The chapter's word count exceeds 10,000 due to additional content requested by reviewers. Significant editing is required to fit within the word limit while maintaining information quality.
- Water Footprint Data: The chapter lacks updated global datasets on water footprint, crucial for assessing environmental impacts. Efforts are being made to update and include this data.
- Behavioural and Social Aspects:
- New themes related to behavioural and social contexts are being integrated, focusing on the impact of social and cultural factors on water management.
- Climate Change and Freshwater: Highlights the relationship between climate change and freshwater systems, focusing on adaptation strategies and regional water management under changing climatic conditions.
- Transboundary Issues:

- Addresses transboundary water management challenges, emphasizing the integration of local knowledge and cross-border water issues.
- Governance and SDGs:
- Water governance related to SDG 6.5 is not extensively covered in this chapter but is addressed in Chapter 7, focusing on water management and policy effectiveness.
- Pesticides and Pollution:
- Captures the impact of pollutants, including pesticides, on water quality, with solutions discussed in other sections.
- Data Gaps:
- Insufficient recent data on water footprints and environmental metrics affects the comprehensive overview of trends and impacts.
- Integration of Social Context: Incorporating behavioural and social contexts requires further refinement based on expert feedback.
- Climate Change Adaptation: Ongoing efforts to accurately represent how different regions adapt to climate change-related water issues.
- Management Solutions:
- Integrates various management solutions, including traditional and local knowledge, to enhance water resource management.

#### **Conclusions for ch 3-6:**

- **Progress on Chapters 3-6:** Updates focused on regionalization, integration of Indigenous Knowledge (IK) and Local Knowledge (LK), and policy relevance.
- **Key Impacts:** Discussed the effects of climate change, pollution, and land use on air quality, land, oceans, and freshwater systems.
- **Cross-Chapter Coordination:** Emphasized the importance of coordinating across chapters to address data gaps and ensure consistent integration of behavioural, social, and cultural dimensions.
- **Policy Effectiveness:** Highlighted the need to incorporate these dimensions to enhance environmental management and policy impact.

#### **Chapter 7: Implications of environmental change on the SDGs, and internationally agreed environmental goals**

Main Messages: The primary messages about planetary crises and their impacts on human health, well-being, and the SDGs have been incorporated into the Summary for Policymakers (SPM).

- **Storyline Development:** The overall storyline, focusing on how planetary crises worsen socio-economic inequalities and impact vulnerable populations, is well-developed.
- **Section Development:** The chapter is strengthening common themes and polishing individual SDG sections. It needs to reduce its word count by 50%, with some tables to be converted into figures for clarity.

#### **Key Messages**

- **Impact of Planetary Crises:** These crises cross Earth system boundaries, damaging human health and undermining SDGs.
- **Inequality:** The crises disproportionately affect socioeconomically disadvantaged groups, worsening existing inequalities.
- **Crises Interrelationships:** Explores the interconnectedness of crises and their effects on systems like energy, food, and materials/waste.

#### **Addressing GEO-7 Policy Questions**

- **System Impacts:** Examines how planetary crises negatively impact energy, food, materials/waste, water, and ecosystems.
- **Economic Models:** Highlights broader economic costs of crises, affecting SDGs 8, 9, 10, 11, 12, and 17.
- **Human Security and Health:** Focuses on how crises affect human security and health, with attention to SDGs 1, 2, 3, 4, 5, 8, 10, 11, and 16.

#### **Challenges for Chapter 7**

- **Innovative Perspective:** Adopts a new analytical approach by focusing on socio-economic impacts rather than just SDG achievement.
- **SDG Complexity:** Covers a wide range of SDG targets, making it challenging to stay focused and concise.
- **Overlap with Other Chapters:** Some policy questions overlap with other chapters, complicating the focus.

#### **Specific Considerations**

- **Reducing Word Count:** Must cut the word count by 50%, including converting tables into figures.
- **Health and Human Security Focus:** Emphasizes the negative impacts on health and human security through relevant SDGs.

#### **Questions and Observations**

- **Integration with International Agreements:** Needs to align with global environmental policies and enhance international agreements.
- **Terminology Consistency:** Ensuring consistent terminology across chapters for clarity.
- **SDG Targets:** May need to summarize or drop less significant SDG targets to maintain focus.

#### **Responses to Panel Inquiries**

- **Relation to Multilateral Agreements:** The chapter acknowledges that SDGs are a sustainable development framework with environmental elements but should address any backsliding on environmental commitments.
- **Terminology Harmonization:** Efforts are underway to harmonize terminology across chapters to ensure coherence.

#### **Chapter 8: Interlinkages across environmental changes, scales and geographic regions and sub-regions**

##### **Progress**

- **Regional Structure:** A revised structure has been established for regional analysis, ensuring consistency across chapters.
- **Sub-Regional Coverage:** Enhanced coverage provides more effective sub-regional perspectives.
- **Data Improvement:** Better regional data on planetary crises and land degradation is now included.
- **Alignment:** Efforts have been made to align the chapter with Chapters 3 to 6.

- Quantitative Data: The chapter now features improved quantitative data and effective visual aids.

#### **Challenges**

- Narrative Flow: Ensuring a smooth flow between regional narratives in Chapters 8 to 20 is challenging.
- Integration of Indigenous and Local Knowledge (IK & LK): Difficulty in effectively incorporating IK and LK perspectives.
- Overwording: Some regional sections are too detailed and need refinement.

#### **GEO-7 Policy Questions**

- Drivers of Environmental Change: The chapter addresses current and projected drivers impacting climate, biodiversity, pollution, and land degradation at multiple levels.
- Regional Impact Assessment: Focuses on how crises affect environmental priorities and interlinked systems at the regional level.

#### **Specific Challenges**

- Space Constraints: Limited space affects coverage of policy questions.
- Diverse Priorities: Capturing diverse sub-regional priorities is challenging.
- Data Gaps: Lack of comprehensive data on crisis interlinkages.
- Framing for Chapter 20: Ongoing discussions on integrating regional data into Chapter 20.

#### **Regional Specificities**

- Vague Guidance: Scoping document guidance is often unclear, complicating regional specificity.
- Chapter Alignment: Mismatch between chapter titles/descriptions and policy questions.
- Linking to Policy Solutions: Unclear how to connect regional information with policy solutions.

#### **Integration of IK & LK**

- Local Context: Emphasis on integrating IK & LK for accurate local-level impact assessment.
- Challenges: Difficulties in incorporating perspectives from Indigenous Peoples and Local Communities (IPLC).

#### **Regionalization and Data**

- Regionalization Goals: Targeted detailed analysis of 18 sub-regions.
- Data Challenges: Reconciling sub-regional data with regional clusters, particularly in Africa.
- Data-Driven Analysis: Focus on using available data rather than speculation.

#### **Selection and Validation of Priorities**

- Process: Priorities selected through rigorous feedback and validation from the International Advisory Group (IAG).
- Alignment: Shared with Chapter 20 authors for consistency.
- Clarification: The introduction will explain the selection process and rationale.

#### **Business and Regional Specificities**

- Guidance: Provides guidance for businesses and policymakers on regional priorities.
- Expectations Management: Managing expectations about the level of sub-regional detail due to data limitations.

#### **Cross-Cutting Group**

- Planetary Crises Definitions: Clear definitions of key planetary crises and their interconnections.
- Impact on Natural Systems: Analysis of how crises affect natural systems and exacerbate each other.
- Regional and Systemic Impacts: Examination of crisis impacts on regional priorities and interconnected systems.
- Policy Implications: Emphasis on framing planetary crises clearly and integrating with sustainable development goals (SDGs).
- Visualizing Relationships: Use of visuals to show how different pressures contribute to crises.
- Balanced Methodology: Ensures transparency in biodiversity assessments and policy formulation.

### **Chapter 9: What are the elements and levers of transformative change?**

#### **Current Progress and Updates**

- Chapter Structure: The chapter now employs targeted questions to improve clarity and guide readers through system transformation concepts.
- Principles Refinement: The principles of transformation have been streamlined and are being aligned with both theoretical and practical frameworks.
- System Transformation Rationales: The rationale behind the three system transformation approaches has been clarified, emphasizing their scientific foundations.
- Detailed Levers: Levers for system transformation are now described in detail, outlining their role as intentional domains of action.
- Policy Challenges: The chapter addresses the conflict between political feasibility and the need for radical change, advocating for new policy designs.
- Terminology Adjustments: The term "principles" is being reconsidered in favour of "requirements for transformation" to better resonate with policymakers.

#### **Integration and Application**

- Theory and Practice: The chapter bridges theoretical concepts with practical applications, focusing on actionable solutions while meeting the 2024 deadlines.
- Future-Oriented Policy Design: It concludes with a forward-looking section that addresses current and future policy challenges,

emphasizing transformative approaches.

#### Focus Areas

- **Governmental and Institutional Impact:** Reflects on the implications of system transformation for governments, organizations, and institutions, emphasizing the need for clear direction and capacity building.
- **Power Dynamics:** Explores how policy changes may create winners and losers and addresses these power dynamics to avoid one-size-fits-all solutions.
- **Legitimizing Processes:** Discusses the importance of legitimizing transformative processes and fostering democratic dialogue while being mindful of sensitivities.

#### Additional Considerations

- **IMAG Guidance:** Seeks guidance from the IMAG to strengthen messages related to democratic processes in system transformation.
- **Visualization:** Focuses on clearly visualizing the six principles and levers of transformation to enhance accessibility.
- **Essential Boxes:** Incorporates summary boxes to make complex information more digestible.
- **Inclusivity:** Stresses the importance of including diverse perspectives and actors in the transformation process.
- **Government Involvement:** Suggests improving government involvement to enhance the report's impact and clarity.
- **Acknowledgment of Challenges:** The team is working to balance clarity with detail and refine information presentation.

#### Chapter 8-9 Conclusion:

- **Planetary Crises and Inequality:** The chapters highlight how planetary crises impact socioeconomically disadvantaged groups more severely, worsening inequalities and undermining Sustainable Development Goals (SDGs) related to health, human security, and economic stability.
- **Innovative Approach:** They introduce a novel perspective by focusing on the socio-economic impacts of these crises.
- **Need for Alignment:** There is a call for improved synthesis of information and better alignment with global environmental policies and international agreements.

#### Chapter 10: Approaches, methodology and philosophy

- **Purpose:** To evaluate the environmental and socioeconomic impacts of current pathways, identify sustainable futures, and assess the feasibility of achieving international environmental goals.
- **Scenario Types:** Two different scenarios have been established to explore various future pathways.
- **Methodology and Implementation:**
  - **Goals and Narratives:** Internationally agreed goals were selected, and transformation pathways were developed in collaboration with GEO-authors.
  - **Model Framework:** A model framework was created to run simulations for the scenarios, with data stored in a shared database.
- **Challenges and Limitations:**
  - **Comprehensiveness:** Difficulty in covering all relevant issues comprehensively.
  - **Messaging and Consistency:** Need for consistent and clear messaging across the report.
- **Scientific Contributions:**
  - **Paper on Methodology:** Drafting a scientific paper to detail the methodology used.
  - **Data Sharing:** Data has been shared with other chapters for integrated analysis.
- **Unresolved Issues:**
  - **Environmental Changes:** Uncertainty about how changes like climate adaptation needs and disaster impacts will affect transformational approaches in key systems.
- **Future Outlook and Next Steps:**
  - **Methodology Update:** Chapter 10 will detail the scenario methodology, with updates before the GEO report release.
  - **Focus Areas:** Emphasis on global results, with regional and socioeconomic interpretations to follow.
  - **Ongoing Issues:** Addressing gaps in sub-regional details, air pollution, and other specific challenges within the current framework

#### Chapter 11: Staying on the path we are on – global implications

- **Modelling:** The "Current-Trend" scenario has been implemented following the methodology outlined in Chapter 10.
- **Results:** Focus is on global impacts related to energy, food, materials, emissions, and land-use.
- **Drivers and Modelling:**
  - **Inputs:** Factors such as population growth, GDP, technological progress, and preferences are incorporated into the models.
  - **Outputs:** The models analyze the implications for planetary crises, including climate change, biodiversity loss, air pollution, and land degradation.
- **Implications for Planetary Crises:**
  - **Environmental Impacts:** Rising global consumption and production worsen planetary crises, impeding progress toward environmental goals.
  - **Socioeconomic Costs:** Inaction on these crises leads to significant and increasing economic costs, negatively affecting human well-being.
- **Challenges and Gaps:**

- o Model Limitations: Current models inadequately represent some socioeconomic and environmental aspects; efforts are underway to improve this by consulting existing literature.
  - o Cross-Chapter Consistency: Ensuring consistency across chapters, particularly those focusing on regional results (Chapters 19 and 20), is crucial.
- Future Directions:
  - o Balanced Messaging: The aim is to develop balanced messages addressing human well-being, uneven development, and the impacts of planetary crises.
  - o Collaboration: Continued collaboration with other chapters to ensure comprehensive and consistent representation of both regional and global results.
- Outlook and Strategy:
  - o Scenario Analysis: Ongoing use of scenario analysis to project future trends and impacts.
  - o Methodology Review: Regular review and refinement of methodology to address gaps and enhance model accuracy.

**The conclusion** of the discussion on System Transformation and Outlooks (Part C) underscores the urgent need for comprehensive, coordinated changes across energy, food, waste, and economic systems to achieve international environmental goals. It highlights the importance of balancing socio-economic and environmental impacts, addressing power dynamics, and promoting inclusive, democratic processes to ensure legitimate and effective transformation.

### **Chapters 12: Transformation Pathways – global implications**

#### **Archetypal Narratives and Scenarios:**

- Development: New narratives for GEO-7 scenarios have been created through literature and expert workshops, focusing on system and regional chapters. These help in quantifying scenarios to assess socioeconomic and environmental impacts.
- Framework: A modelling framework evaluates alternative pathways, including synergies and trade-offs between systems such as energy, food, and waste.
- Feasibility: Meeting international environmental goals is possible but requires significant, coordinated transformations across multiple systems. Success depends on addressing social and technical assumptions and minimizing trade-offs.

#### **Modelling Framework and Challenges:**

- Strengths: The framework effectively represents energy, food, and environmental systems.
- Gaps: It is less effective in representing economic aspects and circularity, and there is an imbalance in addressing environmental and socioeconomic implications.
- Communication: Efforts are underway to clearly communicate uncertainties and ensure cross-chapter consistency.

#### **Policy and Behavioural Strategies:**

- Pathways: Different strategies, including technology and market-based solutions, and changes in societal behaviour are identified. Emphasis is placed on changing values and relationships with nature.

### **Summary of Ch 10-11-12**

#### **Current Trends vs. Sustainability Pathways:**

- Comparison: Discussion contrasts "business as usual" with sustainability pathways, highlighting the need to understand different scenarios' implications.
- Quantification: Development of target-seeking scenarios, including behaviour-based and programmatic options, to meet international environmental goals.

#### **Integration and Future Work:**

- Coordination: Efforts are made to integrate findings with other chapters and address constraints in models.
- Future Directions: Ongoing work includes improving communication of scenarios, balancing environmental and socioeconomic implications, and incorporating feedback from other chapters.

#### **Modelling and Solution Development:**

- Limitations: Current models often focus on single aspects and may not capture all possible scenarios.
- Alternatives: Emphasis on exploring alternative scenarios and presenting findings transparently.
- Consistency: Streamlining data across chapters and integrating qualitative and quantitative assessments for coherent messaging.

#### **Coordination:**

- Cross-Chapter Alignment: Ensuring consistency and addressing unresolved issues by referencing other chapters and integrating qualitative and quantitative assessments.

### **Chapter 13: Methodological approach to solutions-focused pathways**

#### **Integration and Alignment**

- The relationship between Chapter 9 and Chapter 13 is clarified to ensure effective implementation.
- A matrix linking various frameworks and a checklist for evaluation are being finalized.

#### **Progress and Improvements**

- Coherence throughout the chapter is being enhanced.
- Initial feedback is positive, and key messages and visuals are being refined.

#### **Policy Questions Integration**

- A seven-step framework supports policymakers with systemic, holistic planning.
- The methodology is designed to be flexible and adaptive to environmental crises.

#### **Challenges and Gaps**

- The methodology provides a framework but does not offer specific policy solutions.
- Adoption varies across chapters, and simplifying complex messages remains challenging.

#### **Collaboration and Future Steps**

- Efforts are being made to improve cross-chapter collaboration and address visualization challenges.
- Continuous refinement of the methodology and communication is ongoing.

#### **Role in Solution Pathways**

- The chapter provides frameworks to guide policymakers but does not prescribe specific solutions.

#### **Operational Space for Interventions**

- Creating operational frameworks and empowering local decision-makers with tailored tools and guidance are key focuses.

#### **Scenario Development and Options**

- Supports the creation of scenarios to aid decision-making and aligns scenario development with broader goals through collaboration.

#### **Tools and Guidance**

- Provides various tools for solution development and emphasizes adapting solutions to local contexts.

#### **Feedback and Adaptation**

- Ongoing efforts to incorporate stakeholder feedback and continuously improve the methodology and tools.

#### **Chapter 14: Solution pathways for transformation of economic systems**

##### **Refinement and Balance**

- Executive Summary and SPM: Both documents have been improved for balanced communication of key messages.
- Core Draft and Messaging: Significant advancements in drafting and clarifying core messages.

##### **Continuous Improvement**

- Sequencing of Solution Pathways: Revisions ongoing to enhance coherence and effectiveness.
- Framing and Communication: Continuous updates to framing and communication across GEO-7.

##### **Inclusion of Indigenous and Local Knowledge**

- Development of Discussions: Work continues to integrate indigenous and local perspectives.
- Policy Questions and Objectives
- Cross-System Questions: Focus on overcoming barriers and leveraging synergies for sustainability.
- Novel Instruments and Approaches: Introduction of four innovative pathways and tools.

##### **Policy Instruments and Effectiveness**

- Evaluation: Analysis of policy instruments, their effectiveness, and costs.
- Coherent Policy Packages: Creating integrated policy packages for implementation by various stakeholders.

##### **Challenges and Gaps**

- Quantitative Modelling: Issues with incomplete or problematic modelling outputs.
- Strategic Framing: Finalizing considerations including behavioural, social aspects, and indigenous knowledge.
- System Transformation: Ongoing development of system transformation approaches in collaboration with other chapters.

##### **Practical Examples and Case Studies**

- Supporting Case Studies: Need for compelling examples demonstrating practical solutions and transferable lessons.

##### **Methodological and Technical Coordination**

- Coordination with Modelling Teams: Essential for aligning methods and technical approaches.

##### **Granularity of Solution Pathways**

- Detailed Solutions: Focus on specific, actionable solutions rather than broad recommendations.
- Realistic Change: Proposing practical changes to ensure feasibility.

##### **Focus on Barriers and Effectiveness**

- Addressing Barriers: Understanding and overcoming obstacles to implementation.
- Commitment and Effectiveness: Identifying factors impacting successful solution adoption.

##### **Challenges in Conveying Messages**

- Complexity of Communication: Effectively communicating complex issues and uncertainties, emphasizing progress.
- Transparency in Valuation
- Valuation Approaches: Need for transparent valuation of non-market goods, considering regional contexts and equity issues.

##### **System Change and Financial Mechanisms**

- System Change Focus: Emphasizing systemic change and financial mechanisms, with guiding principles rather than detailed solutions.

##### **Evaluation of Failed Initiatives**

- Learning from Failures: Focus on deriving lessons from past failures to ensure recommendations are practical and achievable.

#### **Chapter 15: Solution pathways for transformation towards circularity**

##### **Solution Pathways:**

- Five Pathways: Focuses on climate stabilization, positive biodiversity, waste elimination, and equitable development.
- Pathway Actions: Includes designing circular systems, creating fair markets, reforming financial systems, promoting transparent trade, and fostering a circular society.

##### **Detailed Pathways:**

- Pathway 1: Design out waste and incorporate circularity.
- Pathway 2: Establish fair markets for circular goods.
- Pathway 3: Shift investments towards circular and regenerative models.
- Pathway 4: Promote transparent global trade for circular goods.
- Pathway 5: Make circular economy an aspirational societal goal.

##### **Policy Packages:**

- Pathway 1: Extended producer responsibility and international standards.
- Pathway 2: Tax reforms and formalizing informal waste systems.
- Pathway 3: Revise financial risk frameworks and taxonomies.
- Pathway 4: Combat illegal waste trade and strengthen trade agreements.
- Pathway 5: Incentivize consumers with user charges and standards.

##### **Challenges and Gaps:**

- Quantified Targets: Lack of specific targets and resources in national plans.
- Coordination Issues: Difficulties in implementing cross-sectoral actions.
- Short vs. Long-Term Goals: Balancing immediate policies with long-term transitions.
- Vested Interests: Resistance from industries with linear models and public acceptance issues.

##### **Key Issues:**

- National Plans: Highlighting the need for effective implementation of numerous national plans.
- Stakeholder Coordination: Importance of managing coordination among various stakeholders.
- Green and Blue Economy: Chapter may lack specific references to these economies, though it addresses biodiversity and regeneration.

##### **Design and Transparency:**

- Product Design: Focus on longevity and ease of disassembly.
- Transparency: Emphasis on digital product passports and capacity building.

##### **Resource Management:**

- Critical Materials: Managing extraction and ensuring an inclusive transition to a circular economy.

#### **Chapter 16: Solution pathways for transformation of energy systems**

##### **Structure and Progress:**

- Alignment: Structure meets requirements with ongoing discussions on GSL (Goal, Solution, Lever) format.
- Review Progress: 90% of comments addressed; further coordination planned.
- Coordination: Meetings with related chapters and progress on the Executive Summary.

##### **Policy Questions and Objectives:**

- Transformation Pathways: Focus on energy system transformation to meet Paris Agreement goals.
- Barriers and Opportunities: Examines various factors and proposes bundling market instruments for effectiveness.

##### **Challenges and Gaps:**

- Focus Imbalance: More emphasis on climate change than biodiversity; efforts to address this imbalance.
- Coordination: Challenges in managing interrelated task groups.

##### **Policy Instruments and Economic Factors:**

- Energy Solutions: Proposes efficiency enhancements and decarbonization.
- Economic and Social Challenges: Identifies issues related to energy and economic systems.

##### **Terminology and Clarity:**

- Jargon Avoidance: Focus on clear language without overused terms.
- Design for Longevity: Emphasizes practical design for longer utility and recyclability.

##### **Energy System Transformation:**

- Displacement Concerns: Addresses potential community displacement and economic impacts.
- Private Sector: Discusses challenges and support mechanisms for businesses in energy transition.

##### **Small and Medium-Scale Solutions:**

- Distributed Solutions: Focus on community-based and small-scale energy solutions.

**Policy Instruments and Actions:**

- External Pricing: Proposal to repurpose subsidies and consider impacts on communities.
- Diverse Actors: Roles of various actors in driving energy transformation.

**Innovative Technologies:**

- Nuclear Energy: Includes considerations for nuclear energy and innovative technologies.

**Holistic Approach:**

- Inclusive Solutions: Emphasis on integrating both large and small-scale strategies for effective transformation.

**Chapter 17: Solution pathways for transformation of food systems**

**Smart Agriculture:**

- Inclusion: Emphasizes the role of technology in enhancing food productivity and sustainability through efficient land use.

**Cross-Impact Considerations:**

- Atmospheric and Fire Impacts: Addresses how changes in the atmosphere and fire events affect agriculture, focusing on market-based solutions.

**Food Productivity and Land Use:**

- Efficiency: Highlights the potential for increased food production with less land using advanced agricultural practices.
- Healthy Soils: Stresses the importance of maintaining soil health for sustainable agriculture.

**Collaboration:**

- Cross-Chapter Work: Ongoing collaboration with land and soil chapters to integrate agricultural and land management strategies.

**Future Directions:**

- Sustainability Commitment: Continual effort to balance food production with land and soil health, aligning with broader environmental goals.

**Chapter 18: Solution pathways for transformation of environmental systemsChapter Differentiation:**

- Unique Focus: Distinct in style and substance, aiming to define objectives and solutions for a resilient environmental system covering Nature, Food, Energy, and Circularity.

**Goals:**

- Transforming Environment: Implement known solutions to enhance ecosystem services by 2050.
- Economic and Policy Solutions: Address various factors through five solution pathways with specific actions.
- Sustainability: Focus on achieving environmental resilience and sustainability.

**Solution Pathways:**

- Nature-Based Solutions (NbS): Conservation, restoration, and adaptation strategies.
- Enhanced Ecosystem Services: Focus on regenerative systems and biodiversity.
- Locally Led Adaptation: Resilience through socio-ecological approaches.
- Circular Economy: Innovations in bio-resources and infrastructure.
- Polycentric Governance: Effective governance across multiple levels.

**Key Actions and Instruments:**

- Actions: Over twenty actions and policy instruments to support pathways, including bioenergy and circularity strategies.

**Challenges:**

- Refinement Needed: Further development required for actionable steps and levers.
- Modelling Integration: Aligning modelling outcomes with chapter goals.
- Quantitative Goals: Need for evidence-based goals.
- Narrative Flow: Enhancing coherence and graphical representation.

**Focus Areas for Improvement:**

- Smart Agriculture: Incorporating its impact on food systems.
- Nexus Impacts: Evaluating connections between environmental impacts and agricultural productivity.
- Integration: Better alignment with land use, soil health, and climate risk chapters.

**Integrated Polycentric Governance:**

- Concept: Scaling up environmental activities through multi-level governance.
- Political Sensitivities: Addressing concerns about governance models and considering alternatives.

**Scope and Granularity:**

- High-Level Focus: Emphasis on broad strategies, with detailed solutions and case studies in supplementary materials.

**Cross-Cutting Issues:**

- Water and Soil: Impacts on these resources are considered.
- Land Use and Renewable Energy: Integration of renewable energy impacts on land use.

**Nature-Based Solutions (NbS):**

- Balancing Needs: Addressing potential conflicts and embedding NbS in multifunctional landscapes.

**Adaptation and Climate Risks:**

- Cross-Cutting Adaptation: Aligning with broader adaptation strategies.

**Future Directions:**

- Action Refinement: Ongoing refinement and capacity building for effective implementation and long-term sustainability.

**Summary of Solutions Pathways Towards Transformation (Part D) Chapters (13 to 18)**

**Overview:** The update covers the progress and integration of Chapters 13 to 18, which focus on solutions pathways for transformative change across different systems, including economic, circular, energy, food, and environmental systems.

**Key Highlights:**

- Methodological Refinement: Improved approaches to methodology have been applied.
- Cross-Chapter Alignment: Enhanced alignment of frameworks across chapters.
- Actionable Solutions: Focus on practical and actionable solutions.

**Challenges:**

- Policy Cycle Balancing: Difficulties in reconciling short-term policy needs with long-term goals.

**Cross-Cutting Issues:** Addressing issues such as biodiversity and circularity across various pathways.

- Communication Coherence: Ensuring consistent and coherent communication across diverse pathways and stakeholders.

**Proposal for Chapter Reordering:**

- Chapter Reordering: The proposal to move Chapter 9 (transformation processes) before Chapter 13 (transition from theory to practice) was accepted without objection, following a successful 4-hour silence procedure. This change aims to improve the narrative flow of the report.

| CHAPTERS ORDER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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LK chapeau (conceptualization) for each part of the assessment.</p> <p><b>Chapter 19:</b> Implications for different economic development context<br/><b>Chapter 20:</b> Regional similarities and differences<br/><b>Chapter 21:</b> Driving the transformations</p> | <p>Part A: Overview and Context</p> <p>(3) a broad scientific chapeau of the part of the assessment,<br/>(4) ILK chapeau (conceptualization) for each part of the assessment.</p> <p><b>Chapter 1:</b> Introduction<br/><b>Chapter 2:</b> Historical, current and projected drivers and pressures of environmental change<br/><b>A short chapeau at the beginning of Part B (State and Trends of the Environment, chapters 3-6) which explains the rationale for GEO-7's focus on the triple planetary crisis together with land degradation.</b></p> <p>Part B: State and Trends of the Environment</p> <p>(3) a broad scientific chapeau of the part of the assessment,<br/>(4) IL &amp; LK chapeau (conceptualization) for each part of the assessment.</p> <p><b>Chapter 3:</b> Air<br/><b>Chapter 4:</b> Land and Soils<br/><b>Chapter 5:</b> Oceans and Coasts<br/><b>Chapter 6:</b> Freshwater<br/><b>A concluding chapeau after those chapters which summarizes the implications of the analysis in these chapters on the triple planetary crisis together with land degradation.</b></p> <p><b>Chapter 7:</b> Implications of environmental change on the SDGs, and internationally agreed environmental goals<br/><b>Chapter 8:</b> Interlinkages across environmental changes, scales and geographic regions and sub-regions</p> <p>Part C: System Transformation and Outlooks</p> <p>(3) a broad scientific chapeau of the part of the assessment,<br/>(4) IK &amp; 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### Glossary Construction Process

- **Digital Tool:** A new digital tool, based on the IPCC framework, is being used for submitting, debating, and refining terms and definitions to ensure clarity and consistency across the report.
- **Term Review:** Over 900 terms have been submitted and are under review by a consultant to ensure accurate definitions, with final versions to be agreed upon by the end of the peer review process.
- **Integration and Debate:** The tool facilitates collaborative debate among authors to choose the most appropriate definitions, ensuring consistent and accurate use of terms.
- **Complex Terms:** Special focus is on complex terms, such as "planetary crisis," to ensure they are clearly defined and integrated.
- **Avoiding Pitfalls:** Efforts are made to clarify definitions and address potential issues before the review process to prevent contentious feedback.
- **Clear Framing:** Clear and precise definitions, especially for complex terms, are crucial to avoid misunderstandings.
- **Contextualization:** A disclaimer might be included to clarify that terms are defined specifically for the GEO-7 assessment to prevent

misuse.

- Reducing Redundancy: Streamlining the glossary by removing redundant definitions to improve clarity and manage the text's length.
- Synonyms and Clarifications: Adding synonyms or alternative phrases to glossary entries to provide additional context and aid understanding.
- Early Integration: Integrating the glossary early to manage the length of the text and avoid unnecessary definitions.
- Government and Expert Input: Government and experts play a key role in defining terms to ensure they are accurate and relevant.
- Prioritizing Terms: Focus on defining the top 10 politically sensitive or critical terms due to time constraints.
- Interim Solutions: Providing preliminary definitions for critical terms to streamline the review process and reduce confusion.
- Feasibility and Feedback: Adapting the approach based on feedback and managing the glossary efficiently.
- Streamlined Meetings: Shortening meetings with joint groups to focus on essential updates and outcomes for efficiency.
- Progress Communication: Sending updates to stakeholders to keep them informed and aligned with key decisions.
- Collaborative Approach: Encouraging joint discussions to ensure all perspectives are considered and the definition process is cohesive.

#### **Chapter 19: Implications for different economic development context**

- Context and Interaction: Authors clarified that Chapter 19 interacts with Chapter 14, using other models to guide pathways rather than relying solely on financial models. The chapter leverages best practices and combines various models to inform its process.
- IMAG Member Inquiry: A member asked how Chapter 19 relates to Chapters 14 and 15.
- **Authors' Response:** The authors confirmed that Chapter 19 is connected to Chapter 14 and emphasized that they use relevant models to shape their pathways.

#### **Chapter 20: Regional similarities and differences**

- IMAG Member Feedback: A member thanked the author, appreciated the regional and sub-regional modelling, and acknowledged the challenges presented. The feedback encouraged the author to clearly present conclusions.
- **Authors' Conclusion:** The authors suggested that system transformation is achievable through regional coordination, knowledge exchange, and data linkages among UN partners. They stressed the importance of indigenous engagement and collaboration with other chapters, relying on SDG indicators and literature reviews to shape insights for the next GEO.

#### **Chapter 21: Driving the transformations**

- IMAG Member Inquiry: Members inquired about how Chapter 21 integrates regional and sub-regional data and how efficiency is being addressed.
- **Authors' Response:** The authors noted that Chapter 21 links with Chapters 9 and 13, using references rather than direct data. They mentioned delays due to data receipt but affirmed that they are on track and working towards innovation.
- **Focus of Chapter 21:** The chapter aims to explore acceleration rather than transformation, identifying potential actors and processes for moving forward.
- The briefing on Part E (Chapters 19-21) covered the tailored economic pathways for sustainable transformation (Ch. 19), emphasizing regional disparities and economic models' limitations, regional similarities and differences (Ch. 20), highlighting the need for inclusive policies, integrated sector approaches, and the role of finance in transformation, and driving global transformations (Ch. 21), focusing on empowering agents of change, overcoming systemic barriers, and ensuring regional and cross-chapter collaboration to accelerate implementation of the SDGs.

## List of Participants

| Names                         | Affiliation                                                                                                                                                | Nationality         | Region(s) of Representation        |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------------|
| Dr. Leila Bendifallah         | Professor, M'hamed Bougara University, Algeria                                                                                                             | Algeria             | African Group                      |
| Ms. Anna Mampye               | Director: State of Environment Information in the Branch, Ministry of Forestry, Fisheries and Environment                                                  | South Africa        | African Group                      |
| Mr. Takashi Otsuka            | Director of Knowledge and Communications, Strategic Management Office, Institute for Global Environmental Strategies (IGES), Hayama, Japan                 | Japan               | Asia and the Pacific Group         |
| Ms. Christina Komorski        | Director, Information & Indicators Division, Sustainability Directorate, Environment and Climate Change Canada                                             | Canada              | Western European Group             |
| Dr. Marek Haliniak            | General Counsellor in the Ministry of Climate and Environment, Department of Strategy and Analysis, Poland                                                 | Poland              | Eastern European Group             |
| Ms. Claudia Kabel             | German Environment Agency (UBA), academic staff member, International Sustainability Strategies, Policy and Knowledge Transfer                             | Germany             | Western European Group             |
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| Dr. Thuraya AL Sariri         | Assistance Director General of Nature Conservation at MECA- Oman                                                                                           | Oman                | Asia and the Pacific Group         |
| Mr. Arthur EIJS               | Policy coordinator Natural Resource Management & Sustainable Land Use - Ministry of Infrastructure & water management, department of International Affairs | Netherlands         | Western European Group             |
| Mr. Miroslav Havránek         | Director of the Czech Environmental Information Agency                                                                                                     | Czechia             | Eastern European Group             |
| Ms. Gillian Stanislaus        | Environmental Programme Officer, Environmental Management Authority (EMA)                                                                                  | Trinidad & Tobago   | Latin American and Caribbean Group |
| Dr. Toral Patel-Weyand        | Director of the Southern Research Station at the U.S. Department of Agriculture Forest Service                                                             | United States       | Western European Group             |
| Ms. Neyra Herrera             | Chief of Environmental Statistics; ministry of environment- Panama                                                                                         | Panama              | Latin American and Caribbean Group |
| Ms. Yi Huang                  | Professor, School of Environmental Sciences and Engineering, Peking University, China                                                                      | China               | Asia and the Pacific Group         |
| Dr. Lisa Eriksson (Alternate) | Senior Advisor, Transport Analysis, and the Department for Outlook and Policy                                                                              | Sweden              | Western European Group             |
|                               |                                                                                                                                                            |                     |                                    |
| Ms. Meri Harutyunyan          | Chief specialist of Strategic Policy Department, Ministry of Environment, Armenia                                                                          | Armenia             | Eastern European Group             |
| Mr. Prem Singh Tharu          | Regional Programme Officer, Asia Indigenous Peoples Pact (AIPP) under Environment Programme                                                                | Thailand            | Indigenous peoples                 |
| Ms. Zahra Abu Taha            | Recycling officer at ZATARI refugees camp, Oxfam                                                                                                           | Jordan              | Children and youth                 |
| Ms. Ingrid Coetzee            | Director, Nature & Health; ICLEI Africa                                                                                                                    | South Africa        | Local authorities                  |
| Ms. Djatougbe Aziaka          | President and founder of welfare Togo; co-facilitator of UNEP NGO major group                                                                              | Togo                | Non-governmental organization      |
| Names                         | Affiliation                                                                                                                                                | Nationality         | Major Group                        |
| Ms. Ruth Viola Spencer        | Chair, Marine Ecosystems Protected Areas (MEPA) Trust                                                                                                      | Antigua and Barbuda | Women                              |
| Ms. Merylene Chitharai        | Lan Manager at UKZN Howard College                                                                                                                         | South Africa        | Faith-based groups                 |
| Dr. Mohamed Abdelraouf        | Sustainability Research Program Director at Gulf Research Center (GRC)                                                                                     | Egypt               | Science and Technology             |
| Dr. Fabian Wagner             | Dean, Capacity Development and Academic Training, IIASA, Austria                                                                                           | Germany             | Science and Technology             |

## Apologies

| Names                                             | Affiliation                                                                                                                                                | Nationality   | Region(s) of Representation        |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------------------|
| Dr. Modibo sacko                                  | Vice President of the Permanent Interstate Committee for Drought Control in the Sahel (CONACILSS), Mali                                                    | Mali          | African Group                      |
| Dr. Keri Holland (Alternate)                      | Senior Policy Advisor in the Office of Environmental Quality in the Bureau of Oceans, International and Scientific Affairs at the U.S. Department of State | United States | Western European Group             |
| Mrs. Rolenas Baereleo                             | Principal Officer, Biodiversity and Conservation; Department of Environmental protection and Conservation (DEPC), Vanuatu                                  | Vanuatu       | Asia and the Pacific Group         |
| Mr. Silvio Albuquerque e Silva                    | Ambassador, Permanent Representative of Brazil to UNEP; Embassy of Brazil in Kenya                                                                         | Brazil        | Latin American and Caribbean Group |
| Ms. Alexandra Gurgel Valente da Costa (Alternate) | Environment Analyst, Ministry of Environment and Climate Change                                                                                            | Brazil        | Latin American and Caribbean Group |
| Mrs. Maha Maayta                                  | Director of the Policy and International Cooperation, Ministry of Environment, The Hashemite Kingdom of Jordan                                             | Jordan        | Asia and the Pacific Group         |

|                                     |                                                                                                                               |                      |                                    |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------------------|
| Mr. Toghrul Feyziyev                | Advisor, International cooperation division of the Ministry of Ecology and Natural Resources of the Republic of Azerbaijan    | Azerbaijan           | Eastern European Group             |
| Mr. Thomas Chali                    | Senior Policy Advisor on Environmental Conservation and Natural Resources Management in Tanzania                              | Tanzania             | African Group                      |
| Mr. Kenset Amaury Rosales Riveiro   | Coordinator, Information Unit, Environment and Climate Change; Ministry of Environment and Resources Natural Resources (MARN) | Guatemala            | Latin American and Caribbean Group |
| Mr. Carlos Cordero Vega (Alternate) | Director of the Planning Secretariat of the Environment and Energy Sector, Ministry of Environment and Energy, Costa Rica     | Costa Rica           | Latin American and Caribbean Group |
| <b>Names</b>                        | <b>Affiliation</b>                                                                                                            | <b>Nationality</b>   | <b>Major Group</b>                 |
| Mr. Jan-Gustav Strandenaes          | Advisory board member of sustainability/environment governance project at the University of Stockholm                         | Norway               | Non-governmental organization      |
| Mr. Dominic Kailash Nath Waughray   | Senior Advisor to the CEO World Business Council for Sustainable Development                                                  | India                | Business and industry              |
| Mrs. Dušica Pešević                 | Associate Professor, University of Banja Luka, Faculty of Natural Sciences and Mathematics, Bosnia and Herzegovina            | Bosnia & Herzegovina | Eastern European Group             |