



First In-person and hybrid Modelling and Scenario Workshop for the Seventh Edition of UNEP's Global Environment Outlook (GEO-7)

Location: United Nations Conference Centre (UNCC)
Meeting Room G&F
Rajdamnern Nok Avenue
Bangkok 10200
Thailand
www.unescap.org/uncc

8-10 March 2023

Final Agenda attached as Annex A.

Participants list attached as Annex B.

Distribution of available models attached as Annex C.

Possible Model framework attached as Annex D.

The Modelling and Scenario group for the Seventh Edition of UNEP's Global Environment Outlook (GEO-7) met at its first in-person and hybrid workshop to get to know each other and discuss the following agenda items:

1. Develop a shared understanding of the objectives of the modelling and scenarios work
2. Agree on a methodology for the modelling and scenarios work
3. Discussion the roles and responsibilities of the different teams/authors in the modelling and scenarios work
4. Develop a costed work plan for the modelling and scenarios work
5. Establish a collaboration approach with the solutions pathways group
6. Discuss potential gaps in expertise to be filled and additional experts to be invited

On these agenda items the Modelling and Scenario group decided to:

- Start developing a proposal for the target solution space as soon as possible.
- Work to develop storylines and scenario protocols with systems and levers immediately after the workshop and the first authors meeting.
- Developed a draft model framework and agreed to further develop and refine the model

linking several model frameworks together.

- Further discuss uncertainties and agree on how to address them.
- Develop a detailed workplan with the experts in the outlook regional chapters.
- Start drafting outlines for the respective Modelling and Scenario chapters and identifying synergies across other chapters or sections in GEO-7

Summary of the meeting

The meeting was chaired by Coordinating Lead Authors (CLA) of the Modelling and Scenario related chapters of GEO-7 with support from the GEO-7 Co-chairs and the Secretariat.

Day 1

Welcoming remarks from Secretariat and introductions of the participants

The workshop started with a joint session where the Modelling and Scenarios experts joined the Solutions Pathways experts selected for the GEO-7 report. In this joint session a round table of introductions was carried out with each participant taking the floor to introduce themselves and their affiliation. The four GEO-7 Co-chairs were then introduced together with the Secretariat representatives present in the workshop.

In its welcoming remarks, the Secretariat highlighted the diversity of the groups invited for the workshop reiterating that this edition of GEO aims to be different from previous GEOs by focusing on providing practical options to solve the already known challenges facing both the natural systems and the human system already identified in GEO-6 and other global assessments. This was followed by a brief statement from each of the GEO-7 Co-chairs stating their respective objectives desired for GEO-7 and in turn the three days workshops. The GEO-7 Co-chairs want to produce a solution's focused GEO. Although presenting the status and trends of the environment is crucial in GEO-7, Co-chairs would like to produce a GEO that explains how the world can be transformed to be more sustainable. The ambition is to provide guidance to not only the environment policy makers but also to the finance and other sectoral policy makers. Therefore, assessment of the integration and synergies of these sectors will be crucial. The focus on human health and lessons learned from the recent global health pandemic is also needed. Regional perspectives will also be crucial in ensuring impact and utility of the report. Finally, Co-chairs highlighted the importance of assessing how to accelerate transformation as well as linking land degradation to human health and wellbeing. It was also stated that a digital GEO would be crucial aiming to produce a short and direct-to-the-point product that can be understood by policy makers and other targeted stakeholders. Highlighting disasters and conflicts was also emphasised by the Co-chairs as a way of ensuring not only high ambition of the solutions pathways but also a practical means of implementation.

On these issues, the Secretariat congratulated workshop experts on their selection and thanked them for participating in this first workshop. It was noted that although the formation of the author teams was still ongoing, the diversity of the group in the workshop and the extensive expertise therein was already suitable for a successful workshop and production of the most impactful GEO report.

Stage setting and presentation of the workshops' objectives.

The Secretariat presented in detail the history of GEO and main findings of GEO-6. The overview of the solutions-focused approach to GEO-7 was also made highlighting key intended outcomes. In its presentation the secretariat highlighted how the human systems interacted with the main planetary crisis. It was emphasized that the GEO-7 assessment seeks to explore how the world can be transformed, how barrier to achieving this transformation can be navigated and how synergies can be leveraged to avoid unintended consequences. It was further stated that to achieve such an outcome associated changes i.e., those in policy, behavior and technology will have to be considered. On the timescale of the assessment, it was emphasized that the focus should be on immediate actions to 2030 and the 2030 to 2050 and beyond. In all these assessments work, it was emphasized to tailor make the writing to different audiences. The Secretariat then presented a detailed timeline of the GEO-7 process highlighting key milestones and dates needed for drafting, peer and intergovernmental reviews and final production processes.

Participants then got an opportunity to discuss and seek clarifications on any of the presentations made and the plan for GEO-7. The agendas of the two workshops were then presented in detail highlighting similarities and key differences to enable participants understand the synergies and shared objectives for the workshops (See Annex A for the full Agenda of the Modelling and Scenario group workshop). A group photo was then taken followed by a break before experts embarking on parallel sessions in their respective breakout rooms.

Introductions and discussion on the approach and objectives of the modelling and scenario work

The Modelling and Scenario group workshop started with a short introduction of the participants with their affiliation (full list of participants and their affiliation is provided in Annex B). A detailed presentation was made by the Coordinating Lead Authors (CLAs) on the modelling and scenarios work for GEO. In its presentation the CLAs highlighted the purpose of the Outlooks section. It was highlighted that GEO's outlook section seeks to explore environmental and socioeconomic implications of different routes: 1) in the absence of new policies; and 2) under scenarios where specific environmental targets are being achieved. Multiple target-seeking scenarios are being created as there is no single pathway to achieve the targets. It was noted that GEO-7 builds on GEO-5 and GEO-6, but instead of assessing the literature new scenarios are going to be created. It was explained that the development of these target-seeking scenarios requires models and storylines.

A detailed description of the five chapters in the outlooks section of GEO-7 and their possible activities was then made: Chapter on Approaches, methodology and philosophy will have Scenario design, including the targets, storylines and modelling. The Chapter on Staying on the path we are on – global implications will present future environmental and socioeconomic implications when no new environmental policies are being implemented. The Chapter on Multiple pathways that achieve environmental sustainability – global implications will present future environmental and socioeconomic implications of the transformations in the target-seeking scenarios. The Chapter on Disaggregated solutions pathway scenarios will discuss scenario results for

countries in different economic, resource and environmental situations. Finally, the Chapter on Regional similarities and differences will focus on interpretation of regional results and includes illustrations based on regional/local models.

This was followed by a short presentation by each modeling group on their modeling work and scope. The modeling teams represented included: IMAGE (Integrated Model to Assess the Global Environment), iSDG (an Integrated Systems Model), TERI-MARKAL Energy model, LPJmL hydrology and vegetation model, the IMED model by LEEEP Group, International Futures Model, Global Trade and Environment Model (GTEM), JRC-FASST TOOL, GEM-E3, IPAC and AIM (Asian-Pacific Integrated Model). Each modeling group presented an overview of the modeling approach and tools for its scenarios and modelling work.

Discussion on the methodology, distribution of tasks and potential gaps in expertise

The group discussed in detail how to integrate and optimize the contributions from the various models presented, starting with a synthesized proposal shared by the CLAs (as a development of the first draft presented in the morning session). Issues discussed included approaches to regionalization, data and models inputs and public availability of the data and modelling outputs from the different models. A presentation and discussion of the SHAPE project and its SDPs was then carried out as a possible starting point for the storyline for GEO-7. The day ended with a discussion on key questions for the scenarios and policies group and an agreement on the content of discussion with the policy group in the joint session the following day.

On these issues the Modelling and Scenario group decided that it will continue with the mapping of proposed contributions from the existing modelling and scenarios work the following day of the workshop. Further, the group will present the outcome of the first day in the joint session the following day with a focus on where to collaborate with the policy group and continue discussion on the methodology, tasks, and potential gaps in expertise in the next session. Having no other business, the meeting was adjourned to resume the following day.

Day 2

Joint session of the Modelling and Scenarios experts with the Solutions Pathways experts

The second day of the workshop started with a joint session bringing together the Modelling and Scenarios experts with the Solutions Pathways experts selected for the GEO-7 report to exchange ideas and update each other on the progress from both workshops. The session started by an update from the Solutions Pathways group that they had a productive day in defining the term *Solutions pathways*. Different frameworks for conducting the analysis of the solutions pathways had also been discussed in the first day of the Solutions Pathways group workshop. The plan for this second day of the workshop for the Solutions Pathways group was to move to the methodological discussion after an exchange with the Outlooks group in this joint session. It was noted that although there had been productive discussions on the frameworks to be used for the Solutions Pathways analysis, a decision has not been reached and that discussion will advance in this second day session. However, the group had a clear understanding of

how it foresees a solution pathway in the definition of pathway itself. A *Solutions pathways* definition as discussed by the Policy group the previous day was shared in the joint session: *solutions pathway is a collection of actions with the defined sequence and timeline that leads to a self-sustaining momentum and to attend and to the achievement of a transformational goal.* In its presentation, the policy group highlighted that there is need to have accountability for those who implement policy and this has to be as reduced in time as possible to ensure that politicians in their term will have to be accountable for their policy implementation. Further, it was highlighted that implementation of policy goes in sequence therefore timelines would be important and also a useful consideration for the modelling group. There was also a recognition in the policy group that actions would be a combination of Policies or actions at the business level or society level that either would promote the way to get to that goal or eliminate barriers. It was therefore highlighted that the policy group would develop criteria around how to define actions in its upcoming sessions of the workshop.

A detailed discussion was then undertaken on the definition with the joint group providing inputs on key aspects of the definition. It was noted that the word *transformation* should not be defined to avoid limiting possible solutions in the solutions pathways. The actions would also be a collection of incremental and transformation.

On this issue the outlooks team appreciated the importance of the definition discussion because it leads to shared terminology among the two groups. Clarification was sort on if the GEO has a glossary that would provide such definition. Confirming with other assessments like the IPCC and the IPBES glossaries was seen a potentially useful way to help define or adapt a Solutions pathways definition in GEO-7. The Secretariat highlighted that there is a full glossary in GEO-6 and a clear definition of all terms will be provided in the end. It was agreed that the definition of Solutions pathways will continue to be developed over time based on the discussion.

The Modelling and Scenarios group then provided an update on the development in their breakout session of the first day of the workshop. A detailed presentation was made by the CLAs. It was highlighted that the modelling group had spent the first day of the workshop getting to know what different modelling teams do. An early mapping exercise had been carried out to start developing a framework on how different models link to each other and how the dataflows need to be between those models. Work on mapping tasks had also started the previous day to identify overlaps and potential gaps in the models present. It was highlighted that the scope of the available models ranged from global, to regional and national. A question about the modelling approach in case of similar models focusing on the same issue or geographical scale was raised. It was highlighted that it may be expensive to use two or more models for the same output compared to a single model per output. Consequently, it was noted that the modelling group will discuss in depth on whether to use parallel modelling as an indication of uncertainty or rely on particular models. It was further noted that the two groups would meet more in the coming days to discuss how normative and complex scenarios would need to be. Creating storylines jointly with the Policy group would be valuable.

On this issue the join group appreciated the update noting that there were clear areas of synergies. It was emphasised that validation should be ensured both in the policy solutions analysts and the models. This will be an ongoing discussion among the respective groups. The groups agreed that the Solutions Pathways group would build on

the outcomes of the Outlooks chapter, including a solution space and the socioeconomic impacts of the different pathways. The joint session then adjourned with an agreement to convene again in the third and last day of the workshop.

Continued group discussion on an agreed methodology to be adopted for the modelling and scenarios development

The Modelling and Scenario group started their session for the second day of the workshop with a continuation of discussion on the methodology to be adopted for the modeling and scenarios work. The group considered in detail the possibility of creating a “Super model” that would be a combination of different models aiming at different outputs. Annex D provides a draft linkage of models in a framework schematic. Based on this understanding the group further refined the draft model framework based on a detailed discussion of the schedule and division of tasks for the remaining part of the day. In a parallel group the storylines were being discussed. It was decided to build on existing frameworks, using the levers from GSDR and using storyline-elements from Roads from Rio+20 and the SHAPES project.

Day 3

Joint session of the Modelling and Scenarios experts with the Solutions Pathways experts

The third and final day of the workshop started with a joint session of the Modelling and Scenarios and the Solutions Pathways experts to discuss overall progress and the plan for the day before splitting into individual sessions. In this joint session the team discussed in detail how to address uncertainty in the modelling and scenarios work and how to validate results from the models outputs. It was emphasised that literature would be key in helping situate the results from the models.

Finalisation of the Modelling and Scenarios workshop

The Modelling and scenarios group met for the rest of the day to finalise its timeline, agree on methodological objectives, roles and responsibilities and develop the presentation to be made in the first authors meeting. The CLAs stated the session with a recap of the previous two-days sessions. The team then discussed in detail the distribution of tasks with an agreement that the week after will also be used to identify gaps.

The group then drafted a timeline for their work:

- In April and May the target space, model framework and storylines will be developed. A questionnaire on models would be used to develop the model framework.
- In June the FOD baseline and the target space and storylines for the pathways analysis will be finalised.
- In October FOD pathways will be completed to allow for the second writers sprint in mid-January 2023.
- In early February, the first order draft will be submitted for peer review.

The team then discussed and agreed on the agenda for the first authors meeting the

following week and the aspects of the presentation on the first day of the meeting also including a discussion on the roles of the global and regional/national models with a view of the regional outlooks. The group also discussed the role of literature relevance and use. The group discussed how to organise the literature search and presentation in the relevant outlooks chapter. It was highlighted that this is a potential role where GEO-fellows could be brought into the chapter to help.

On the models linkages, the team agreed to have a detailed discussion of each model the following week to identify the capabilities of each and understand the expectations. On this issue it was clarified that the chapter would cover the five UN regions. The team agreed to discuss the links and analysis in that chapter the following week when the regional experts are present. Further, the team decided that it would develop a matrix showing the flow of models present to link the inputs and outputs. Annex C presents a table of model distribution and function. It was agreed that a questionnaire will be developed for this to allow each modelling team to input into the matrix. Regional coverage information will also be important together with the spatial resolution and if and how it might map to the UN region definitions. The questionnaire would therefore provide an overview of each models potential contribution to GEO-7 as well as operational metrics to enable linkage and harmonisation of model outputs. It was agreed that an indication of where the model falls within the relevant modelling community would be important to the process as well as indication of key publications covering a range of topics related to the model and its output. Finally, the group enquired on the modality to collaborate with other chapters and ensure coherence across sections and chapters. On this issue the Secretariat highlighted that there is a modality of working with the other chapters that allows for experts working in different chapters and sections to meet and discuss with each other the progress and development of the respective chapters. The GEO collaborating platform also allows for experts to see other chapters drafts as they are drafted to ensure coherence.

Having no other business, the meeting was adjourned at 16h28 (Bangkok time).

Action items

- The Secretariat will prepare a written summary of the meeting.
- Modeling and scenarios group will start filling in the questionnaire as soon as possible.
- The Modeling and scenarios CLAs will finalize the presentation to be made at the plenary in the first authors meeting focusing on the discussions made in the workshop and the plan for the week.

Annex A: Final Agenda of the Meeting

UNITED
NATIONS

EP



United Nations Environment Programme

UNEP/GEO/GEO-7

Distr.: General

March 02, 2023

Original: English

Modelling and Scenario Workshop for the Seventh Edition of UNEP's Global Environment Outlook (GEO-7)

Location: United Nations Conference Centre (UNCC)
Meeting Room G/F (In person, hybrid)
Rajdamnern Nok Avenue
Bangkok 10200
Thailand
www.unescap.org/uncc

8-10 March 2023

Meeting objectives:

7. Develop a shared understanding of the objectives of the modelling and scenarios work
8. Agree on a methodology for the modelling and scenarios work
9. Discuss the roles and responsibilities of the different teams/authors in the modelling and scenarios work
10. Develop a costed work plan for the modelling and scenarios work
11. Establish a collaboration approach with the solutions pathways group
12. Discuss potential gaps in expertise to be filled and additional experts to be invited

Provisional Agenda

Wednesday March. 8, 2023 – 09h00 to 18h00

Online participants may join the meeting with this link: [Click here to join the meeting](#)

09h00 – 10h30

Location: Room G (MR-G)

Joint session with participants from both workshops

Item 1: Welcome from the secretariat, adoption of the agenda and introduction of the assessment co-chairs and session moderators

Session Objectives:

- Group introductions, affiliations, backgrounds
- Present the focal points of the two workshops
- Present the GEO-7 co-chairs
- Discuss the objectives of both workshops

Item 2: Opening sessions, GEO overview by the Secretariat

- Short introduction to the history of GEO and main findings of GEO-6 – Secretariat
- Overview of the solutions-focused approach to GEO-7 – Secretariat
- Discussion of the vision for GEO-7 from the co-chairs
- Q&A

Supporting document:

- Presentation on GEO-6 findings and GEO-7 approach, [UNEA Resolution 5/3, GEO-7 Scoping document](#)

Discussion/decision: What are the objectives of the two workshops, how are the same or different, how could they be complementary?

[10h30 – 11h00](#)

Item 3: Group photo and Coffee Break

[Location for the group photo tbc]

[The participants then move to their allocated rooms – Solutions Pathways group in Room F, Modelling and Scenarios group in Room G]

[11h00 – 13h00](#)

[Location: Room F \(MR-F\)](#)

[Link: Click here to join the meeting](#)

Item 4: Introductions and discussion on the approach and objectives of the modelling and scenario work

- Short Introduction of the participants
- Presentation on the proposed approach for the scenarios and modelling work
- Group discussion on the objectives of the modelling and scenarios work.

Session objectives:

- Having a shared view on role and objective of the modelling work

Supporting document: [GEO-7 Scoping document](#), and background paper

Discussion/decision:

- Agreed objective of the work

[13h00 – 14h00](#)

Item 5: Lunch

[14h00 – 15h30](#)

[Location: Room F \(MR-F\)](#)

[Link: Click here to join the meeting](#)

Item 6: Continued discussion on the methodology and discussion on contributions and potential gaps in expertise

Session objectives:

- Overview of the different modelling and scenarios tools in the room: short presentations (3 slides; 5min)
- Further discuss the proposed approach to the methodological work
- Mapping of proposed contributions from the literature and existing modelling and scenarios work to build upon

Supporting document: Background paper

Decision/discussion:

[15h30 – 16h00](#)

Item 7: Coffee Break

[16h00 – 17h50](#)

[Location: Room F \(MR-F\)](#)

[Link: Click here to join the meeting](#)

Item 8: Discussion on collaboration with policy group and continued discussion on the methodology and discussion on contributions and potential gaps in expertise

- Discuss linkage to solutions pathways part (prepare next day session)
- Group discussion on the methodology and how it can be implemented by the various groups.

Session objectives: Shared view on collaboration with policy group, and discussion of an approach to reach an agreed methodology

Decision/discussion:

- Shared view on collaboration with policy group
- What are the gaps in expertise to be filled?

[17h50 – 18h00](#)

Item 9: Closing of the meeting and takeaways from Day 1

[Thursday March. 9, 2023 – 09h00 to 18h00](#)

[09h00 – 09h10](#)

[Location: Room G \(MR-G\)](#)

[Link: Click here to join the meeting](#)

Item 10: Recap of Day 1

[9h10 – 10h30](#)

[Location: Room G \(MR-G\)](#)

[Link: Click here to join the meeting](#)

Joint session with participants from both workshops

Link:

Item 11: Exchange of ideas and progress update with participants from both workshops

Session objectives:

- Brainstorm with the solutions pathways experts to ensure alignment
- Sharing of initial ideas from a solutions pathways perspective and modelling/scenarios perspective

- Discussion on how to link the two parts and respective needs

Supporting document: [GEO-7 Scoping document](#), background paper

Decision/discussion:

- How can the two groups best collaborate?
- What's the timeline for the work of the two groups?

[10h30 – 11h00](#)

Item 12: Coffee Break

[11h00 – 13h00](#)

Link: [Click here to join the meeting](#)

Item 13: Continued brainstorm

Session objectives:

- Brainstorm with the solutions pathways experts to ensure alignment
- Sharing of initial ideas from a solutions pathways perspective and modelling/scenarios perspective
- Discussion on how to link the two parts and respective needs

Supporting document: [GEO-7 Scoping document](#), background paper

Decision/discussion: Discuss and agree on how the groups will work together, how the methods will dovetail and what key aspects of the work must advance and by when

[13h00 – 14h00](#)

Item 14: Lunch

[14h00 – 15h30](#)

Location: Room F (MR-F)

Link: [Click here to join the meeting](#)

[The participants move to their allocated rooms - Modelling and Scenarios group in Room F]

Item 15: Group discussion on an agreed methodology to be adopted for the modelling and scenarios development, considering:

- Link to the solutions pathways analysis
- Identify additional needs in expertise and gaps to be filled and propose additional experts to be contacted
- Links to existing literature
- Regional perspectives

Session Objectives: Further develop the methodology

Supporting documents: [GEO-7 Scoping document](#), background paper

Decision/discussion: Agreed approach to the methodological work

[15h30 – 16h00](#)

Item 16: Coffee Break

[16h00 – 17h50](#)

Location: Room F (MR-F)

Link: [Click here to join the meeting](#)

Item 17: Group discussion on a shared methodology to be adopted for the drafting of the chapters and the modelling and scenarios development, considering:

- Link to the solutions pathways analysis

- Identify additional needs in expertise and gaps to be filled and propose additional experts to be contacted
- Links to existing literature
- Regional perspectives

Session Objectives: Further develop the methodology

Supporting documents: [GEO-7 Scoping document](#), background paper

Decision/discussion: Agreed approach to the methodological work

[17h50 – 18h00](#)

[Location: Room F \(MR-F\)](#)

[Link: Click here to join the meeting](#)

Item 18: Closing of the meeting and takeaways from Day 2

[Friday March. 10, 2023 – 09h00 to 18h00](#)

[Location: Room G \(MR-G\)](#)

[Link: Click here to join the meeting](#)

[09h00 – 09h10:](#)

Item 19: Recap of Day 2

[9h10 – 10h30](#)

Item 20: Further elaboration of the agreed methodology

Session Objectives: Outline the detailed elements of the methodology

Supporting document: Discussion document

Decision/discussion: Detailed elements of the methodology

[10h30 – 11h00](#)

Item 21: Coffee Break

[11h00 – 13h00](#)

[Link: Click here to join the meeting](#)

Item 22: Group discussion and agreement on:

- roles and responsibilities
- best practices on how to work together, including the use of the GEO collaboration platform and other tools
- workplan for 2023-2024

Session objectives: Discuss and agree on:

- workplan for developing the methodology
- divisions of roles and responsibilities
- modus operandi and best practices on how to work together

Supporting document: [GEO-7 timeline](#), [GEO-7 Scoping document](#)

[13h00 – 14h00](#)

Item 23: Lunch

[14h00 – 15h30](#)

[Location: Room G \(MR-G\)](#)

[Link: Click here to join the meeting](#)

Item 24: Continued group discussion and agreement on:

- roles and responsibilities
- best practices on how to work together, including the use of the GEO collaboration platform and other tools
- workplan for 2023-2024

Session objectives: Discuss and agree on:

- workplan for developing the methodology
- divisions of roles and responsibilities
- modus operandi and best practices on how to work together

Supporting document: [GEO-7 timeline](#).

[15h30 – 17h00](#)

Item 25: Coffee Break

[16h00 – 17h50](#)

[Location: Room G \(MR-G\)](#)

[Link: Click here to join the meeting](#)

Joint session with the participants of both workshops

Item 26: Recap of the three days and preparation of the presentation for the Authors meeting

- Discussion and agreement on methodological objectives, roles and responsibilities
- Collective preparation of the presentation for Day 1 of the authors meeting on next Monday
- Collection of takeaways from the three days of workshop

Session objectives:

- Development of a presentation for Day 1 of the authors meeting
- Summarize the takeaways from the three days of the workshops.

Decision/discussion: Agreement on a methodology and ways to collaborate among the two groups

[17h50 – 18h00](#)

Item 27: Closing of the meeting

Annex B: Participants list

Title	First name	Last Name	Occupation	Affiliation
Dr.	Nyovani	Madise	Director of Development Policy	Head of the Malawi office of the African Institute for Development Policy (AFIDEP)
Prof.	Ying	Wang	Professor in College of Environmental Science and Engineering	Tongji University.
Dr.	Detlef	van Vuuren	Senior Researcher	PBL Netherlands Environmental Assessment Agency
Mr.	Paul	Lucas	Senior Researcher	PBL Netherlands Environmental Assessment Agency
Dr.	Claudio	Belis	Senior Scientist	<u>European Commission, Joint Research Centre</u>
Dr.	Hester	Biemans	Researcher global water and food security	Wageningen University and Research
Dr.	Hancheng	Dai	Professor	Peking University
Dr.	Mariana	Paz	<u>Researcher</u>	USP Global Cities Programa; and National Institute for Space Research
Dr.	Heinz	Schandl	Senior Science Leader	CSIRO Environment
Dr.	Shinichiro	Fujimori	Associate Professor	<u>Kyoto University</u>
Dr.	Leonidas	Paroussos	Managing Director	E3-MODELLING S.A.
Dr.	Panagiotis	Fragkos	Director, Global Energy Markets & Integrated Asses	<u>E3-MODELLING S.A.</u>
Ms.	Taylor	Hanna	Associate Director of Development Analysis	University of Denver Pardee Center
Dr.	Steven	Arquitt	Senior Research Analyst	<u>Millennium Institute</u>
Dr.	Alaa	Al Khourdajie	Research Fellow, Senior Scientist	<u>Imperial collage London</u>
Dr.	Vassilis	Daoglou	Senior Scientist	<u>PBL Netherlands Environmental Assessment Agency</u>
Dr.	Sanchit	Saran Agarwal	Associate Fellow-Integrated Assessment & Modelling	<u>The Energy and Resources Institute (TERI)</u>

Dr.	Kejun	Jiang	Senior Researcher	<u>Energy Research Institute, Chinese Academy of Macro-Economic Research</u>
Dr.	Lindsay	Beevers	Professor of Environmental Engineering	<u>The University of Edinburgh</u>
Dr.	Ploy Pattanun	Achakulwisut	Research Fellow	<u>Stockholm Environment Institute - Asia</u>
Dr.	Pankaj	Kumar	Senior Policy Researcher	<u>Institute for Global Environmental Strategies</u>
Dr.	Sibel	Eker	Assistant Professor	<u>Radboud University (Netherlands) & International Institute for Applied Systems Analysis (Austria)</u>
UNEP TEAM				
Mr.	Jason	Jabbour	Chief Scientist Office	UNEP, Nairobi
Mr.	Edoardo	Zandri	Scientific Assessments Branch, GEO	UNEP, Nairobi
Mr.	Franklin	Odhiambo	GEO	UNEP, Nairobi

Apologies

Title	First name	Last Name	Occupation	Affiliation
Dr.	Jean	Ometto	<u>Titular Scientific Research</u>	(Brazilian) National Institute for Space Research
Dr.	Jonathan	Moyer	Professor	<u>University of Denver Pardee Center</u>
Mr.	Jonathan	Doelman	Researcher	<u>PBL Netherlands Environmental Assessment Agency</u>
Dr.	Renato	Rodrigues	<u>Biologist</u>	Fluminense Federal University / Regrow Ag

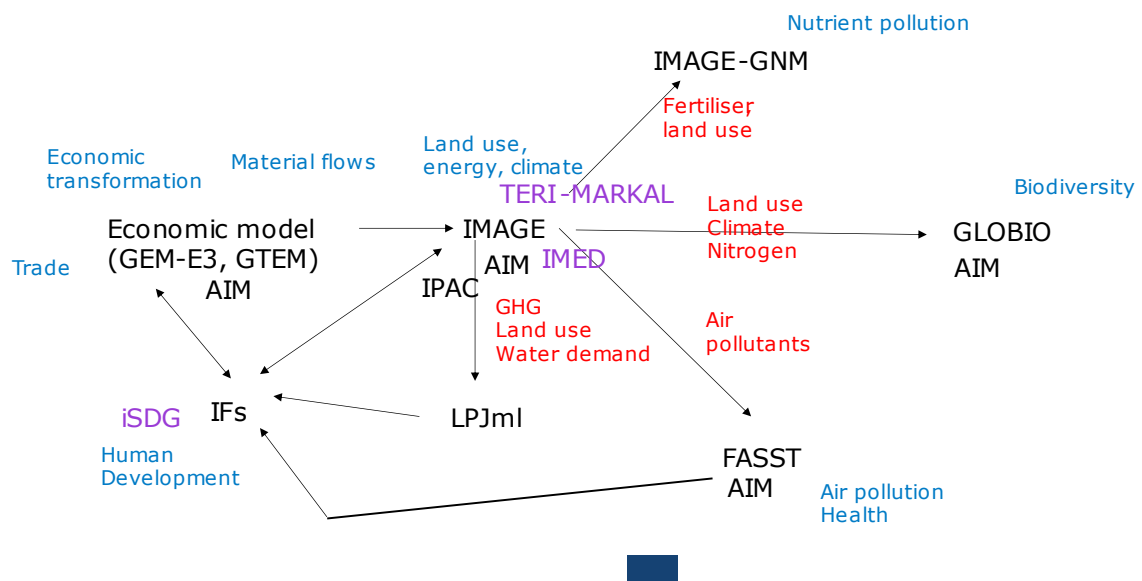
Annex C: Models distribution per function and coverage

	Integrated assessment models	Human development models	Economic models	Biodiversity models	Pollution models	Water models
Purpose	Provide insight into overall trends for land use and climate	Provide insights into socioeconomic SDGs	Provide insight into economic impacts	Provide insights into biodiversity impacts	Provide insights into pollution	Provide insights into water use
Issues	Agriculture, energy, land-use, climate, ...	Poverty, health, gender, inequality, hunger, access to water and energy, ...	Poverty, inequality, labor, investments, ...	Biodiversity	Air, land and water pollution	Water scarcity
Global models	IMAGE, AIM, IPAC	IFs	GEM-E3, GTEM, AIM	IMAGE-GLOBIO, AIM	IMAGE-GNM, FASST, AIM	LPJmL
National/Regional models	TERI-MARKAL, iSDG, IMED					

Annex D: Possible Model framework from the workshop



Planbureau voor de Leefomgeving



Note:

- Global Models are presented in Black colour
- Regional Models are presented in Purple colour.