International Nitrogen Management System

Update on the
The International Nitrogen Assessment

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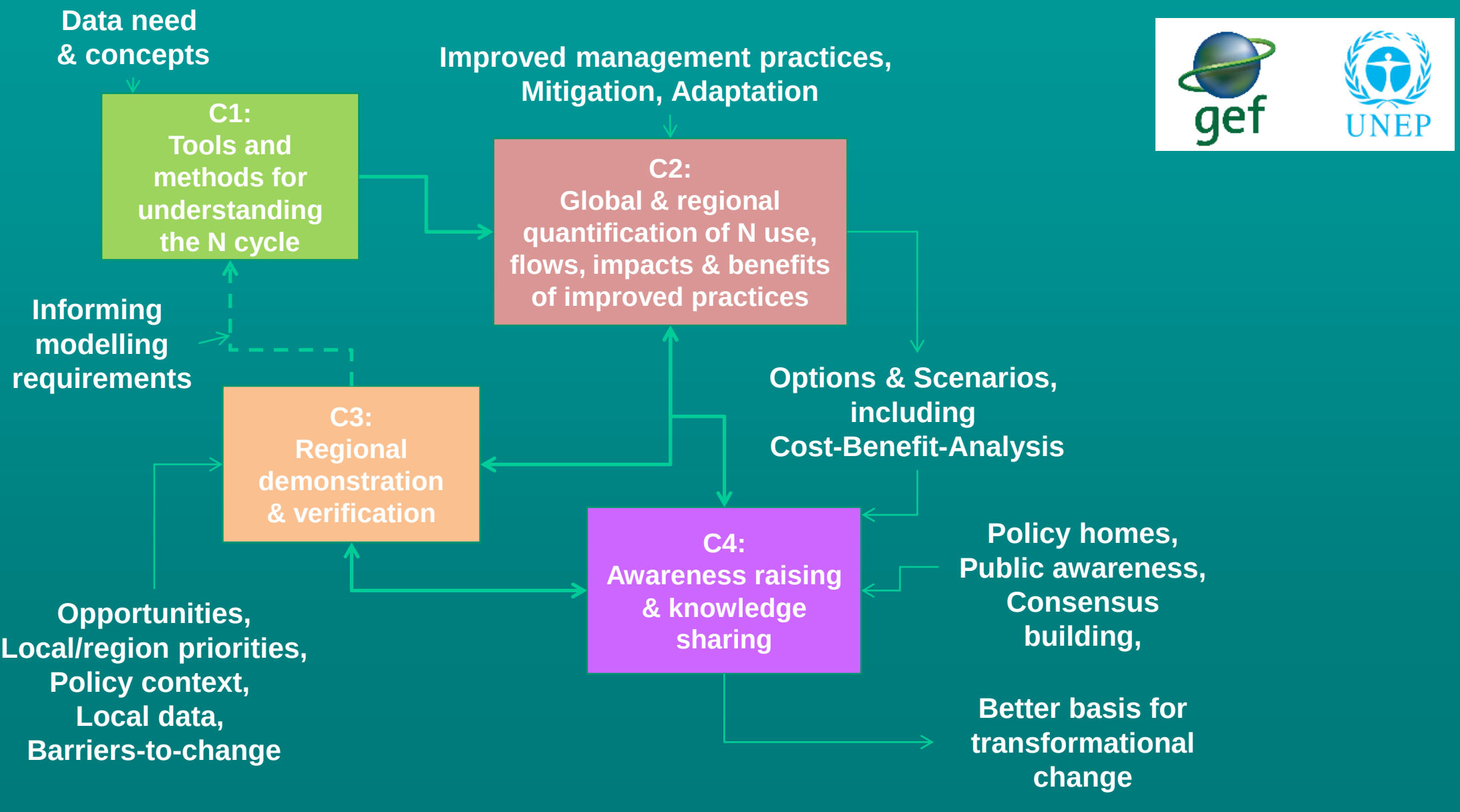
Towards the International Nitrogen Management System




Air Quality
Climate
Water Quality
Soil Quality
Biodiversity

What is INMS delivering?

- A platform for better cooperation across science and policy helping to overcome the barriers.
- Guidance on joining up mitigation and adaptation options and strategies, linked to circular and green economy thinking.
- A global assessment of the threats and benefits of human alteration of the nitrogen cycle and the opportunities for improvement.
- A forward look of what may happen if the problem is ignored.
- Other Products Guidance Documents, Special Reports, Databases, Event engagement & mobilization etc.

Contents of the International Nitrogen Assessment

Summary for Policy Makers

Technical Summary

Part A: The global nitrogen challenge: problem definition

1. Introduction: From pollution problems to nitrogen opportunity
2. Nitrogen, environment and sustainable development
3. Nitrogen and food security
4. Nitrogen in current national and international policies
5. Towards a holistic response to the global nitrogen challenge

Outline contents of the International Nitrogen Assessment

Part B: Foundations for Assessing the Nitrogen Cycle

6. Approaches and challenges to assess nitrogen impacts
7. Performance indicators for the global nitrogen cycle
8. Approaches and challenges to assess N pressures & distribution
9. Approaches and challenges to value nitrogen benefits and threats

Outline contents of the International Nitrogen Assessment

Part C: Global integrated assessment across the nitrogen cycle

10. Assessment of global and continental scale total nitrogen budgets
11. WATER: Flows on impacts of nitrogen on freshwater, coastal & marine systems
12. AIR: Emissions and air quality impacts of nitrogen on human health & crops
13. GREENHOUSE: Impacts of anthropogenic nitrogen use on global warming potential and radiative balance, and role of nitrogen for stratospheric ozone depletion
14. ECOSYSTEMS: Inputs of nitrogen to terrestrial and aquatic ecosystems and the impacts on biodiversity.
15. SOILS: Inputs, outputs and impacts of nitrogen for agricultural land and relationships with non-agricultural land

Outline contents of the International Nitrogen Assessment

Part D: Nitrogen challenges and opportunities for key world regions

16. Approach, Synthesis and Lessons and from the Regional Nitrogen Assessments

Assessment of flows, impacts and solutions for:

17. East Asia (focus on East China Sea in continental context)

18. South Asia (all 8 countries of South Asia)

19. Africa (focus on Lake Victoria Basin)

20. Latin America (focus on La Plata Basin)

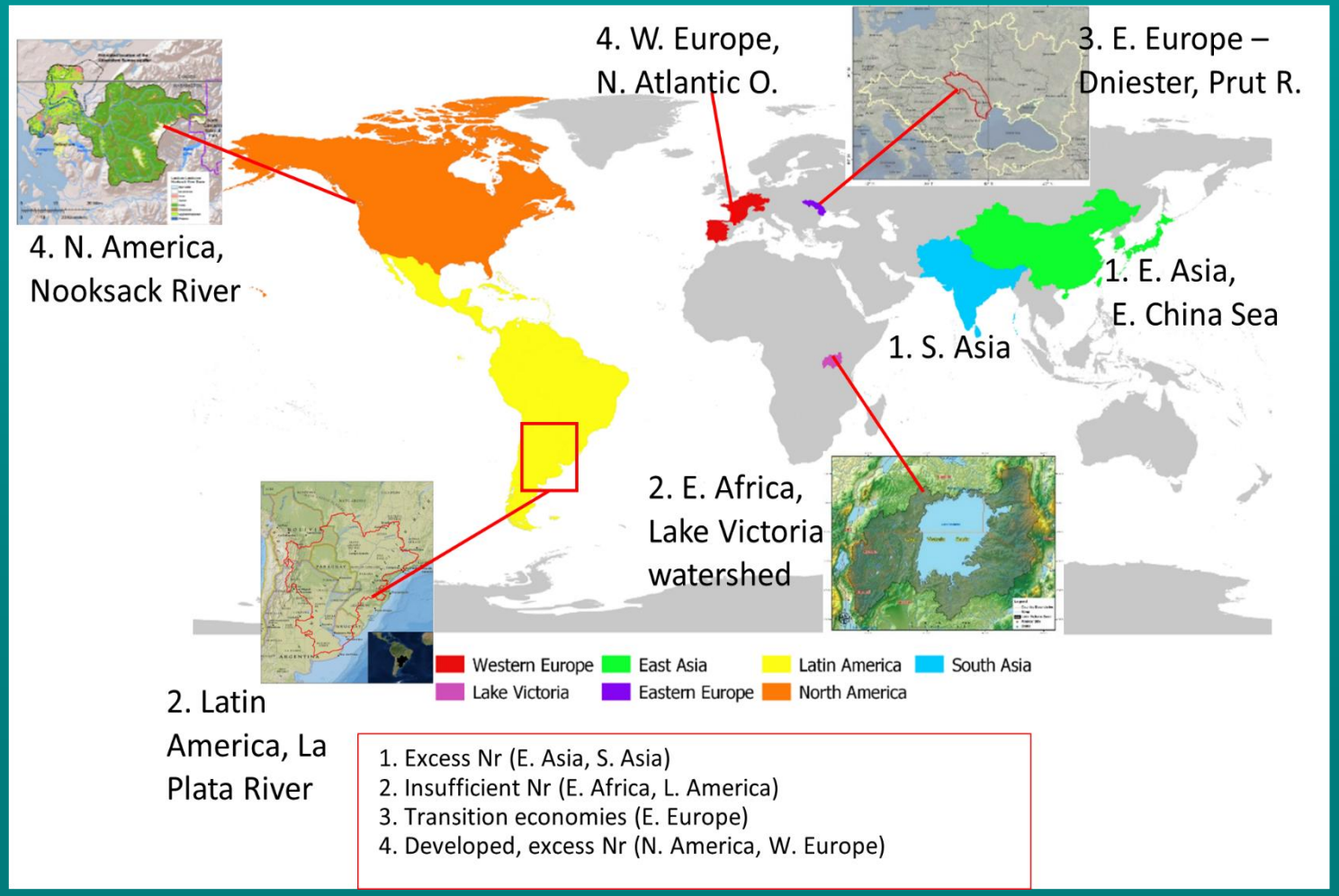
21. West Europe (focus on coastal seaboard, in EU context)

22. East Europe (focus on Dniester and Lower Danube in EECCA context)

23. North America (focus on transboundary Nooksak in NA context)

Regional Overview: Transboundary basins, multi-country regions; - Common methodology

C1, C2 Tools & Data



C3 Regional N Assessments

Step 1
Quantify N flows, uncertainties; data availability

BUDGETS

Step 2
Identify N threats/benefits using consistent performance indicators

"WAGES"

METRICS & STANDARDS

Step 3
Options for better N mg'ment:
- Profile success stories;
- Barriers to change

PRACTICES & POLICIES

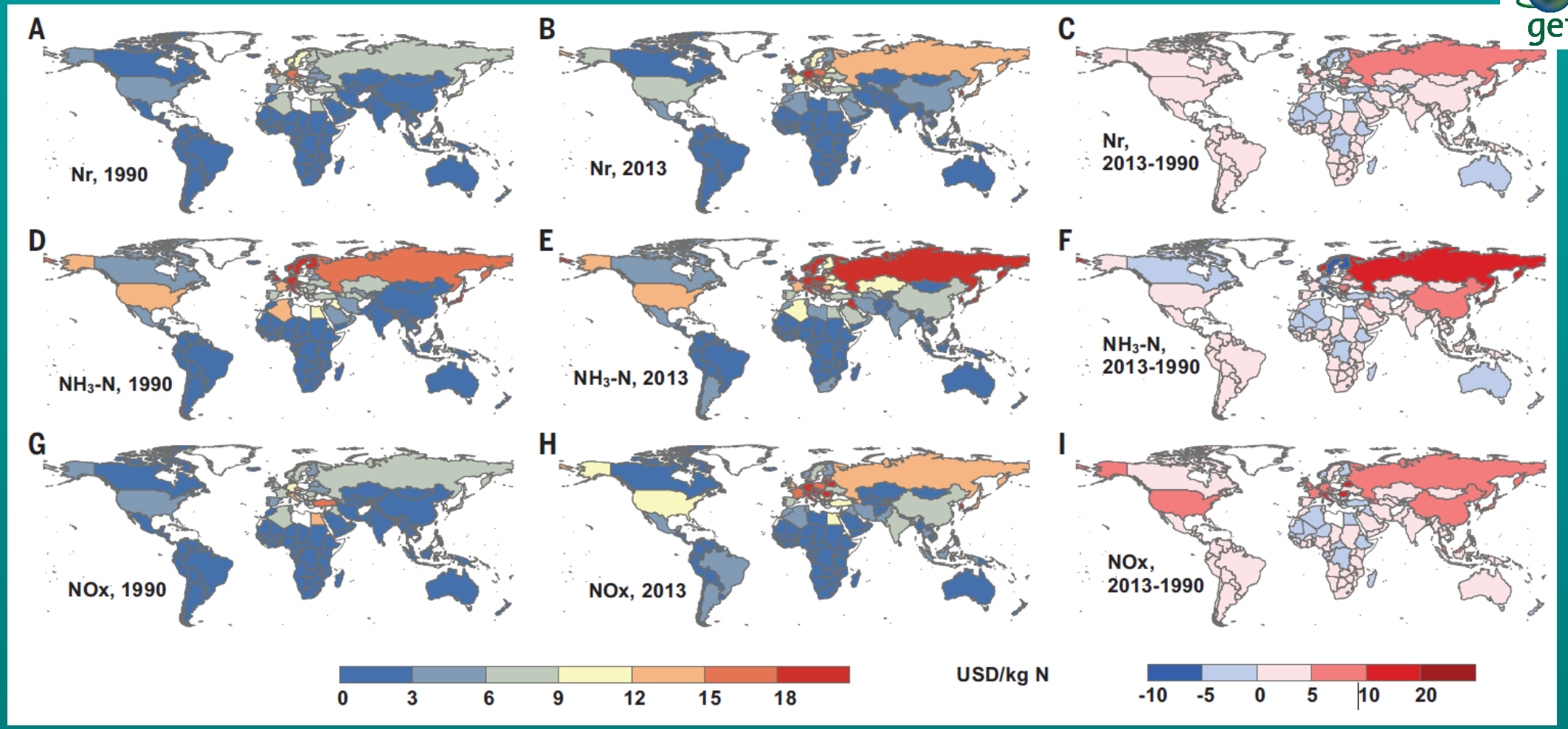
(IN)ACTION

Contents of the International Nitrogen Assessment

Part E: Grasping the future challenge

24. Key actions for better nitrogen management
25. Addressing the barriers to better nitrogen management
26. Costs and benefits of nitrogen at global and regional scales
27. Goals and Pathways: How to Halve Nitrogen Waste by 2030?
28. Evaluation of policy options and instruments for better nitrogen management

Mortality cost per kg N_r emission caused by $PM_{2.5}$ air pollution



Gu et al. (**Science**, 2021) Abating ammonia is more cost-effective than nitrogen oxides for mitigating PM2.5 air pollution

Values are based on the control of different N_r components. Shown are control of total N_r emission for 1990 (A), 2013 (B), and differences between 2013 and 1990 (C); control of NH_3 emission for 1990 (D), 2013 (E), and differences between 2013 and 1990 (F); and control of NO_x emission for 1990 (G), 2013 (H), and differences between 2013 and 1990 (I). Positive values for (C), (F), and (I) indicate an increase over time.

Emerging key messages 1

- A process of linking communities across nitrogen related issues leading to harmonization of indicators, metrics and approaches to enable more effective integration of benefits.
- Examining the relationship to sustainable development and food goals, and quantification of possible future scenarios.
- A developing financial case for why action on nitrogen is needed. Global modelling supported by cost-benefit analysis (e.g., air quality results published in *Science*).

Emerging key messages 2

- Overall nitrogen flows and their impacts on multiple environmental issues, need for a joined-up approach.
- Estimation that the world is losing over $300-600 billion per year in wasted nitrogen resources (2022-2023 prices), plus even larger costs for environment and health.
- An examination of solutions and how these vary across example world regions through regional chapters
- The need to move to a nitrogen circular economy. Examination of barriers, policy options and opportunities

Timeline

- Summer 2024: Finalizing editing; Drafting summary chapters
- Autumn 2024: Submission to Cambridge University Press
- Winter 2024: Preparation of draft UNEP ‘Synthesis of INA with compendium of national estimates’.
- Spring 2025: Discussion with UNEP WGN on Synthesis for publication by UNEP
- Summer 2025: Publication and Launch.