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Sustainable and resilient infrastructure

Note by the secretariat

Summary

This document shares the results of a panel discussion during the twenty-first session of the Joint Task Force on Environmental Statistics and Indicators information (17–18 October 2024) on sustainable and resilient infrastructure. The discussion was organized to respond to the need, recognized by Ministers and heads of delegation at the Ninth Environment for Europe Ministerial Conference (Nicosia, 2022), for a common understanding of sustainable and safe infrastructure and of how to quantify progress across countries. In addition, the agenda item was intended to provide input to the seventy-first session of the United Nations Economic Commission for Europe (ECE) (9–10 April 2025), following the designation by the ECE Executive Committee of “Climate action and resilient infrastructure for a sustainable future” as the crosscutting theme for the high-level segment of the Commission session.

The Committee is invited to take note of the information provided.

Introduction

1. The Ninth Environment for Europe Ministerial Conference identified the need for a common understanding of sustainable and safe infrastructure and of how to quantify progress across countries.
2. To support the outcomes of the Nicosia Ministerial Conference and to assist member States, a panel discussion on sustainable and resilient infrastructure was organized within the twenty-first session of the Joint Task Force on Environmental Statistics and Indicators information (17–18 October 2024). The panel discussion aimed to:
 - Enhance the understanding of differences and commonalities of existing definitions for sustainable infrastructure, resilient infrastructure and other related infrastructure terms used (e.g., green infrastructure and quality infrastructure), as well as for approaches taken by international organizations and countries in quantifying progress;
 - Discuss good practice examples of international organizations and countries in measuring progress in implementing sustainable and resilient infrastructure;
 - Review gaps and inconsistencies in defining and measuring progress towards sustainable and resilient infrastructure;
 - Discuss the need for developing a common definition for sustainable and resilient infrastructure and a monitoring framework including relevant indicators to quantify progress;

- Also discuss options for next steps and ways how the Joint Task Force could support international efforts in measuring progress in sustainable infrastructure development.

3. The panel, moderated by the secretariat, included three experts from the United Nations Office for Disaster Risk Reduction (UNDRR), the United Nations Environment Programme (UNEP) and the Organisation for Economic Co-operation and Development (OECD). Each expert gave a short presentation, followed by a moderated discussion. Representatives from the Netherlands, Switzerland, and the United Kingdom of Great Britain and Northern Ireland were also asked to share their reflections on the topic, followed by a discussion with members of the Joint Task Force.

4. To introduce the discussion, the ECE secretariat highlighted that sustainable infrastructure was a key theme at the Ninth Environment for Europe Ministerial Conference, where it was agreed that a common definition and of how to quantify progress through consistent measurement are needed across countries. Despite including a chapter on sustainable infrastructure in the Seventh Pan-European Environment Assessment, analysing the state and trends in sustainable infrastructure implementation and development across the region proved to be difficult due to the lack of common indicators and a comparable information base. The panel thus served as a starting point for defining and measuring sustainable infrastructure, informing future discussions and decisions, particularly ahead of the Commission session high-level segment on “Climate action and resilient infrastructure for a sustainable future”.

I. Presentations

A. Principles of resilient infrastructure, UNDRR

5. The presentation by UNDRR, Principles of Resilient Infrastructure, focused on the principles of resilient infrastructure as well as definitions and indicators used by UNDRR. The presenter explained that infrastructure resilience is defined as timely and efficient prevention, absorption, recovery, adaptation and transformation of national infrastructure’s essential structures and functions that have been exposed to current and potential future hazards. Implementing resilience across all disruption phases should be done through collaborative risk and uncertainty management, multi-hazard assessment and methods that embrace the systemic nature of national infrastructure.

6. National infrastructure is an open complex interdependent system comprised of: (i) physical built infrastructure networks, assets and buildings; (ii) governance structures; (iii) regulatory frameworks; (iv) management processes associated with the six economic infrastructure sectors (energy, transport, water, wastewater, waste and digital communications); (v) interdependencies within and between each of the above; (vi) interdependencies between each of the above and dynamic external context within which it is embedded; (vii) the systems and technologies that control and deliver outputs; (viii) human factors such as skills and knowledge; and (ix) the natural environment’s resources and features with which it is integrated and allows it to deliver the goods that provide people and organizations with critical services.

7. She also introduced the concept of Net Resilience Gain, which is defined as the long-term collaborative commitment to both: (i) address systemic resilience loss, which reduces or removes actions that erode, reduce or undermine systemic resilience; and (ii) enhance systemic resilience that prioritizes actions creating systems intrinsically resilient to potential disruptions.

8. The presenter outlined six principles for infrastructure resilience, each with a normative goal, enabling continuous improvement of national infrastructure resilience: socially engaged, environmentally integrated, shared responsibility, continuously learning,

proactively protected and adaptively transforming.¹ She also provided further details on the principle of “environmental integration” including key actions to be taken and indicators used in the different stages of the infrastructure cycle.

9. The principles were developed by UNDRR through consultations with over 100 countries to help Member States understand, assess and implement resilient infrastructure and piloted in various countries. A handbook was created to guide the implementation of these principles, detailing actions and indicators for each.

B. Role of sustainable infrastructure in shifting investments toward more resilient projects, UNEP

10. The presenter from UNEP discussed sustainable infrastructure’s role in shifting investments toward more resilient projects. UNEP uses a definition adapted from the Inter-American Development Bank and defines sustainable infrastructure systems as those that are planned, designed, constructed, operated and decommissioned in a manner to ensure economic and financial, social, environmental (including climate resilience) and institutional sustainability over the entire infrastructure lifecycle. Instead of focusing on specific sectors and specific type of infrastructure, this definition refers to the outcomes and performance of infrastructure development across the lifecycle.

11. The speaker then introduced the UNEP International Good Practice Principles for Sustainable Infrastructure,² which are intended to guide policymakers in considering the full scope of sustainability. These principles are not indicators but rather guidelines for planning. UNEP, in collaboration with the United Nations Office for Project Services, has developed a Sustainable Infrastructure Tool to assess policy alignment with these principles and measure upstream interventions.³ The speaker also referred to SDG indicators 9.1.1 and 9.1.2 and their limitations as they do not cover sustainability, inclusiveness, quality and reliability in a meaningful way. The speaker emphasized that infrastructure has mainly been assessed at project level so far, which seems insufficient for measuring national progress. UNEP also stated its interest in continuing the work on how to measure progress at the national level.

C. Resilient infrastructure, OECD

12. OECD presented its work on sustainable and resilient infrastructure and the definitions it uses for quality, sustainable and resilient infrastructure, along with the key dimensions each of the definitions considers. OECD has no harmonized definition of sustainable infrastructure and refers to the definition of the Inter-American Development Bank as infrastructure that, throughout its life cycle, provides social, economic and environmental benefits. OECD defines resilient infrastructure as infrastructure that is planned, designed, constructed and operated in a way that anticipates, prepares for and adapts to the changing climate, while it can withstand and recover rapidly from disruptions caused by changing climate conditions throughout its entire lifetime. This definition applies to both new and existing infrastructure, ensuring preparedness and resilience over time.

13. OECD does not have a standardized set of indicators for measuring progress towards sustainable or resilient infrastructure. However, progress is tracked through other frameworks and indicators including the OECD green growth indicators, SDG indicators or sectoral indicators. The presenter emphasized that, in future discussions and joint work, it will be important to agree on what to measure to ensure comparable cross-country data, the availability of data sources and the opportunity for developing new sources (e.g., geospatial

¹ See also the UNDRR *Principles for Resilient Infrastructure*, available at <https://www.undrr.org/publication/principles-resilient-infrastructure>.

² Available at <https://www.unep.org/resources/publication/international-good-practice-principles-sustainable-infrastructure>.

³ The tool is available at <https://sustainable.unops.org/si-content/enable-2>.

data) and the importance of promoting a whole-of-government approach to infrastructure development.

II. Panel discussion

A. Definitions and harmonization

14. The first group of questions addressed how each organization defines sustainable and resilient infrastructure, whether the concepts of sustainable and resilient infrastructure are compatible with each other and what must be considered when using these terms. Organizations were also asked to give a few practical examples.

15. The UNEP expert underlined that having a common definition is valuable, but that it is even more important to ensure key components—such as traditional, social, and natural infrastructure—are included. He also pointed to the often-forgotten soft components of infrastructure, such as the people, knowledge and processes to be included in the definition. The UNDRR expert noted that there is overall complementarity of all definitions presented and focused on how definitions should work to support regulatory frameworks and policies. OECD emphasized that the definitions are general compatible due to their broadness. She stressed that it is the outcomes that matter most.

B. Holistic approaches

16. The panellists were asked how to ensure a holistic approach to sustainable infrastructure, for example, by looking at infrastructure systems instead of single infrastructure projects. UNDRR explained that using the Sendai Framework helps map stakeholders and institutions, promoting cross-sector collaboration from the start, with a focus on interdependence between sectors. The OECD expert discussed the importance of strategic planning and aligning long-term infrastructure plans with low-emission strategies across the country in question. The speaker from UNEP noted that a systemic, needs-based approach should be applied, incorporating for instance, nature-based solutions to meet infrastructure demands.

C. Importance of measurement

17. The third group of questions focused on the importance of measuring progress in sustainable infrastructure and indicators used. The OECD expert highlighted the need for measurement to attract financing and for assessing risks and most importantly for investors, the returns. More generally, she pointed to sustainable infrastructure as a growing topic within policy dialogues and as such, the need for measurement. UNEP agreed, stressing that better measurement informs more effective planning. The UNDRR expert added that measuring progress is crucial to preventing losses to critical infrastructure and services, particularly, in the context of a changing climate.

D. Way forward

18. The last questions centred on recommendations for countries on how to measure sustainable infrastructure and whether there is a need for common indicators when looking at the way forward. UNEP noted that having common indicators would be useful, but that it would be practical to build on existing frameworks, to the extent possible. UNDRR agreed, emphasizing the importance of starting the measurement process using what already exists. The OECD expert advocated for developing a common set of indicators to guide countries in their self-assessments and expressed interest in working together with ECE and other international organizations and countries on this topic.

III. Reflections from member States

19. The delegate from the Netherlands emphasized that understanding the target of measurement is essential for sustainable infrastructure. The representative of the United Kingdom of Great Britain and Northern Ireland noted that, while the country does not currently use sustainable infrastructure indicators, a harmonized definition would be crucial for statistical purposes. The representative of Switzerland shared that it uses the UNEP principles and has recently shifted its public procurement law toward sustainability. Bosnia and Herzegovina stressed the urgency of addressing sustainable infrastructure in the face of climate change, while Austria highlighted the need to balance infrastructure development with efforts to conserve and restore nature and biodiversity and referred to the need for better spatial planning and the reduction of land use for infrastructure.

IV. Conclusion and way forward

20. The session concluded with a discussion and a suggestion on a two-phase approach: first, an in-depth review of existing frameworks, and second, the formation of an expert group to clarify what should be put forward as standard practice for measuring sustainable infrastructure. The secretariat then asked the panellists to share some final thoughts.

21. The expert from UNDRR emphasized that there are already data and indicators that can be used and suggested that the focus should be on consolidating and refining these to make them more practical and, only where there are gaps, to suggest new indicators. She stressed that indicators must remain simple and measurable to enable accurate local reporting by national statistics offices.

22. The OECD expert welcomed the discussion, noting that it aligns with current initiatives of OECD. She highlighted the value of taking stock of existing data and tools, ensuring they are practical and aligned with each country's priorities, while emphasizing again the interest of OECD in cooperating with ECE and other international organizations and countries on this topic.

23. The UNEP expert expressed readiness to support the proposal. He noted that even subtle distinctions in data are critical in statistics, especially when integrating concepts like nature-based solutions into sustainable infrastructure, as raised by the representative of Austria.

24. At the end of the panel discussion the Joint Task Force:

(a) Thanked the panellists for their contributions to the discussion on a common definition of sustainable and resilient infrastructure and invited member States and international organizations to continue the discussion;

(b) Requested the secretariat to propose to the Committee on Environmental Policy and the Conference of European Statisticians to conduct an in-depth review and consider setting up an ad-hoc expert group on this topic, with the objective of drafting guidelines for measuring sustainable and resilient infrastructure, and asked the secretariat to invite the International Finance Corporation, UNEP, OECD and UNDRR to participate in the work of this expert group.