



UNITED
NATIONS

ADVANCE UNEDITED VERSION

UNEP/EA.6/7



United Nations
Environment
Programme

Distr.: [Distribution]
[Date]

Original: English

United Nations Environment Assembly
of the United Nations Environment Programme
Sixth session
Nairobi, 26 February–1 March 2024
Item 5 of the provisional agenda*

International environmental policy and governance
issues

Progress in the implementation of resolution 5/9 on sustainable and resilient infrastructure

Report of the Executive Director

Introduction

1. In paragraph 3 of its resolution 5/9 on sustainable and resilient infrastructure, the United Nations Environment Assembly of the United Nations Environment Programme (UNEP) requested the Executive Director of UNEP to support Member States and members of specialized agencies to integrate sustainability and resilience into infrastructure planning and delivery by promoting the implementation of existing tools, developing further knowledge, and providing technical assistance and capacity development; supporting the sharing of experiences, and peer-to-peer learning; facilitating private sector engagement in planning, developing, and mobilizing finance for sustainable and resilient infrastructure; connecting science and policy for sustainable infrastructure; and supporting the implementation of the International Good Practice Principles for Sustainable Infrastructure (the SI Principles), including by translating them for application to specific sub-systems and stakeholder groups.
2. In the resolution, the Environment Assembly also requested the Executive Director to continue to collect and share best practices, tools, and experiences for improving the sustainability of infrastructure systems and to submit a report containing that information to the Environment Assembly at its sixth session (UNEA-6). This report describes UNEP's efforts, and a non-exhaustive list of resources containing good practices, tools, and lessons learned from country experience is included as an annex.

I. Progress in the implementation of resolution 5/9

3. Trillions of dollars of investment in infrastructure are needed over the coming decades to meet global development needs, and—since the typical lifespan of infrastructure assets is measured in decades—the choices that are made about how this money is invested will have long lasting impacts on sustainability. If infrastructure investment follows business-as-usual approaches, then it will continue to be a driver of the three environmental planetary crises.

* UNEP/EA.6/1.

4. **To implement the resolution, UNEP built on the implementation of the preceding resolutions**, in particular UNEA Resolution 4/5 on Sustainable Infrastructure, and the existing networks and partnerships: the Sustainable Infrastructure Partnership (SIP), the 10-Year Framework for Programmes on Sustainable Consumption and Production Patterns (10YFP), the Partnership for Action on Green Economy (PAGE), among others. Implementation of the resolution contributes to the UNEP Medium Term Strategy 2025 Outcomes 1A, 1B, 2A, 2B, and 3B.

5. **The present report describes UNEP's efforts to implement the resolution using the SI Principles as an overarching framework.** This has involved supporting Member States to integrate sustainability and resilience across all phases of the infrastructure lifecycle, including planning, design, procurement, financing, construction, and operations and maintenance, with a focus on the enabling policies for each of these phases. This has entailed working through different projects and initiatives to engage a wide range of relevant actors. For reporting, activities have been grouped according to the three components of the implementation plan: (a) knowledge generation and exchange; (b) strengthening countries' technical and institutional capacity; and (c) mobilizing public and private financing for sustainable and resilient infrastructure projects.

A. Knowledge generation and South-South and Triangular exchange

6. **Knowledge generation and exchange activities have focused on collection and dissemination of good practices and lessons learned and research into the positive and negative impacts of infrastructure development.** Together, these activities have helped to fill knowledge gaps related the implementation of the SI Principles, generate new data that can inform decision-making, and facilitate peer-to-peer learning amongst a broad range of actors, covering many different dimensions of sustainable and resilient infrastructure across different phases of the lifecycle.

7. **A second edition of the [International Good Practice Principles for Sustainable Infrastructure](#) was published in March 2022 after the principles were updated and endorsed by the UN Environment Management Group (EMG) at the October 2021 Senior Officials Meeting.** The UNEP-GIZ [Sustainable Infrastructure Tool Navigator](#) site was also updated to adding new tools and a new case study module featuring an initial six cases from Cabo Verde, Canada, Ghana, Indonesia, Mexico, and Ukraine. UNEP produced video versions of the three already-published case studies from Chile, Iran, and Zimbabwe. Six additional case studies will be published in advance of UNEA-6.

8. **In September 2023, the Global Alliance for Buildings and Construction (GlobalABC) launched the [materials hub](#),** a new resource center that is designed to help governments and policymakers around the world to develop the policies that are urgently needed to decarbonize and address the resource-use impacts of buildings and construction.

9. **Under a Global Environment Facility (GEF)-funded project, the UNEP World Conservation Monitoring Centre (UNEP-WCMC) prepared a global database of planned road and rail investments and mapping of their risks to nature vs. potential economic and social benefits.** This work entailed the development of a new methodology for estimating impacts from linear infrastructure development. The methodology and results were published in a report and an [online data viewer](#).

10. **The Global Resources Outlook 2024¹ by the International Resource Panel (IRP) looks at the built environment as well as the infrastructure needs of other provisioning services such as energy, mobility, and food.** The report demonstrates that in 2020, 55% of all global material demand (about 59 billion tonnes) was related to housing and mobility, including the construction of infrastructure. Of these materials, non-metallic minerals – including sand, gravel and clay - for construction and industrial purposes are the largest component of material use, growing fivefold since 1970. This increase has been related to the massive build-up of infrastructure in many parts of the world. Scenario modelling finds that the stock of materials in the built environment at global level will continue to grow until 2060 due to rising demand for infrastructure services. Assuring sustainability of the new building stock, retrofitting the existing building stock, more intensive use of building and the decarbonization of material production are among some of the recommendations highlighted by the IRP to decrease the resource intensity of the built environment.

11. **The IRP, with the support of GIZ, also released three national level technical guidelines based on the global report '[Resource Efficiency and Climate Change: Material Efficiency Strategies for a Low-Carbon Future \(RECC\)](#)' (IRP, 2020), with assessments of the reduction**

¹ This report will be presented to UNEA-6.

potential of GHG emissions resulting from material efficiency strategies applied in residential buildings in G7 countries as well as China and India. The national Technical Guidelines identify country specific material efficiency strategies with GHG emissions reduction potential which can accelerate the net-zero agenda in residential building construction sector in Argentina, Mexico, and Indonesia. These include: the use of low-carbon materials, use less material by design, material decarbonization and substitution, decarbonization of manufacturing processes, and reducing waste and increasing reuse and recycling.

12. **Under the Global ABC, UNEP and the Yale Center for Ecosystems + Architecture (Yale CEA), published a report in September 2023 on decarbonizing and reducing waste generated by buildings and construction.** The report, “[Building Materials and the Climate: Constructing a New Future](#)” advocated for the use of a whole life cycle approach through the joint implementation of three overarching strategies to decarbonize building materials: avoid unnecessary extraction and production, shift to regenerative materials, and improve decarbonization of conventional materials.

13. **UNEP developed a pilot version of a framework for measuring progress on sustainable and resilient infrastructure at the national level.** The pilot measurement framework is based on the methodology of the Green Economy Progress measurement framework that was developed under PAGE in consultation with a group of international experts. The pilot measurement framework requires further iterative development, and UNEP is exploring potential channels to engage key partners and experts, including the United Nations Economic Commission for Europe (UNECE), and the members of the Green Growth Knowledge Partnership (GGKP).

14. **Working in partnership with the Environmental Change Institute at the University of Oxford and the United Nations Office for Project Services (UNOPS), UNEP conducted an analysis of the potential contribution of nature-based infrastructure solutions (NbI) to the Sustainable Development Goals (SDGs), Paris Climate Agreement, and the Kunming-Montreal Global Biodiversity Framework (KM-GBF) and published the results in a report, “Nature-based Infrastructure: How natural infrastructure solutions can address sustainable development challenges and the triple planetary crisis”.** The report, to be published in November 2023 finds that NbI can influence up to 79% of SDG targets across all 17 goals. When NbI is used together with built infrastructure, the combination can have a much greater impact on the SDGs (influencing approximately 25-50% more targets) than when either is used on its own. This is largely due to the multiple additional environmental, social, and economic benefits derived from NbI. NbI can also influence 70% of the GBF targets and contribute to both mitigation and adaptation objectives under the Paris Climate Agreement and is the only type of infrastructure intervention that can contribute to simultaneous positive progress on the SDGs, Paris Climate Agreement, and GBF.

15. **UNEP is also developing two new tools that will support the implementation of the SI Principles.** The first is a collaboration with UNOPS to create a tool for assessing policy alignment with the SI Principles that builds on UNOPS existing Capacity Assessment Tool for Infrastructure (CAT-I); the second is a methodology for integrating nature into infrastructure planning processes being developed in collaboration with the University of Oxford.

16. **In addition to the above knowledge generation activities, UNEP organized and participated in many knowledge dissemination and exchange activities and made concerted effort to share best practices, tools, and experiences through a range of media, including partners’ publications, blog posts, and podcasts.** Events co-hosted by UNEP included a joint event with the Institution of Civil Engineers (ICE) that brought together government officials and civil society to share how they have used existing tools to integrate sustainability concerns into infrastructure planning; a seminar with the Ministry of Ecological Transition of France on transport infrastructure and biodiversity; and a seminar on the “Infrastructure Sustainability Learning Model (ISLE) initiative.

B. Country engagement, technical assistance, and capacity building

17. **With financial support from Switzerland, UNEP supported the United Nations Economic Commission for Europe (UNECE) and its Member States in the planning and preparations for the 2022 Environment for Europe Ministerial conference (EfE),** where sustainable infrastructure was one of the two themes. UNEP contributed to the development of background documents and framing for the event, provided guidance on voluntary commitments that countries could make to contribute to the implementation of the SI Principles, and hosted a side event at the conference of financing nature-based infrastructure. In total, Member States [made 40 commitments](#) on actions to support sustainable and resilient infrastructure.

18. **As an output of the EMG consultative process on SI that began as part of the implementation of UNEA Resolution 4/5, UNEP, The United Nations University Institute for Integrated Management of Material Fluxes and of Resources (UNU-FLORES), and the Ministry of Public Works of Chile (MOP) conducted an enabling environment assessment that identifies critical barriers to sustainable infrastructure in Chile and prioritized means of addressing them.** UNEP also signed an MoU with MOP to provide continued support on sustainable infrastructure. Building on links with PAGE, UNEP also completed enabling environment assessments in Thailand and Rwanda, and has further assessments planned in Costa Rica, El Salvador, and South Africa.

19. **UNEP, the Global Centre on Adaptation (GCA), the University of Oxford, and UNOPS jointly supported the Government of Ghana in developing a [national infrastructure resilience roadmap for the water, energy, and transport sectors](#).** The roadmap is the result of a climate risk assessment for built and natural assets in the three sectors and provides 35 concrete interventions that the government can take to increase infrastructure resilience. The methodology and outputs of the roadmap are informing the development of Ghana's National Adaptation Plan, which is being led by UNEP with funding from the GCF. UNEP is also working with GIZ, the International Institute for Sustainable Development (IISD), UNOPS, and the Ministry of Environment, Science, Technology, and Innovation of Ghana (MESTI) to support the implementation of one of prioritized actions from the roadmap by providing technical assistance and capacity building to integrate nature into national infrastructure planning processes.

20. **UNEP is working with the Ministry of Works and Housing of Ghana to develop a national roadmap for buildings and construction under the project “Transforming the Built Environment through Sustainable Materials”** funded by the Federal Ministry for Economic Cooperation and Development of Germany and also being implemented in Bangladesh, India and Senegal. The national roadmap will outline key steps towards decarbonization of the buildings and construction sector.

21. **With financial support from the Government of China and the GEF and working with SIP partners and the governments of Mexico, Singapore, and Rwanda, UNEP conducted three week-long regional capacity-building workshops on sustainable and resilient infrastructure** for policymakers in Southeast Asia, Latin America, and East Africa in the period between November 2021 and September 2022. UNEP also held two workshops on gender responsive infrastructure in 2022, one each in Cote D'Ivoire and Zambia, which helped inform the development of policy briefs on gender and infrastructure in each country.

22. **Building on previous work in Rwanda and its status as a new PAGE country, UNEP delivered an intensive, week-long training-of-trainers (ToT) on sustainable and resilient infrastructure for Rwandan policymakers in April 2023.** Discussion of potential follow-up activities is ongoing, with a strong focus on transport infrastructure and biodiversity and links to the PAGE workplan, which is still being developed by the PAGE partners.

23. **In partnership with Duke University, Conservation International, and the International Coalition for Sustainable Infrastructure (ICSI), UNEP launched the Infrastructure Sustainability Learning (ISLE) initiative,** which aims to build capacity by facilitating peer-to-peer learning and knowledge exchange through a network of virtual communities of practice for sustainable infrastructure practitioners working on common topics or in common geographies, supported by a Centre of Excellence. A yearlong pilot training programme on the implementation of the SI Principles was completed, with the participation of more than 700 policymakers and practitioners worldwide, including the private sector. Planning and fundraising for Phase II of the ISLE initiative is under way, with a goal of launching three new peer-to-peer networks by the end of 2023.

24. **In November 2022, the governments of France and the Kingdom of Morocco and the GlobalABC announced the Buildings Breakthrough initiative, which aims to make near-zero emission and resilient buildings standard by 2030.** Twenty-five countries have already joined the Buildings Breakthrough ahead of its official launch at COP28 in November 2023. The launch will be followed by a Global Forum on Buildings and Climate in March 2024 to reinforce intergovernmental collaboration on buildings and climate across the construction sector value chain.

25. **UNEP, serving as the Secretariat of the 10-Year Framework of Programmes on Sustainable Consumption and Production (10YFP) and its One Planet Network, is mobilizing key partners and stakeholders in the development of a flagship initiative dedicated to raising climate ambitions in the building and construction sector through circularity, leveraging the power of public procurement.** In the context of the new Global Strategy for Sustainable Consumption and Production (2023-2030), which identifies Sustainable Public Procurement as a key enabler for change in high-impact sectors and value chains, the flagship initiative will: 1) develop and

promote global norms, standards and practices for circularity in the construction sector, using a whole-lifecycle approach, in partnership with governments and the private sector, and 2) establish a strategic commitment framework and a multi-stakeholder knowledge sharing and capacity-building partnership to help national and local governments use their planning, managing and purchasing power to accelerate the uptake of such norms, standards and practices. The flagship initiative is in its early stages and brings together the Global ABC, through its Circular Economy for Construction Materials sub-Working Group led by Finland and RMIT (former leads of the OPN Sustainable Buildings and Construction Programme) and the One Planet Sustainable Public Procurement programme, with the support of UNOPS and UN-Habitat.

C. Public and private finance for sustainable infrastructure

26. **While private sector investment and technical expertise are increasingly needed to help close the infrastructure gap, the public sector still accounts for most infrastructure investment.** To help align public budgets with sustainable infrastructure investment, UNEP, working with the Smith School at the University of Oxford, has developed sustainable public budgeting tools that can be applied to planned infrastructure spending to identify opportunities, barriers, and gaps and develop recommendations for increasing investments into sustainable, resilient, and inclusive infrastructure. This toolkit will be piloted in El Salvador and can then be applied in additional countries.

27. **As part of the pilot work in El Salvador, UNEP will also identify pathways and mechanisms for mobilizing financing for sustainable infrastructure projects by cooperating with multilateral and regional development banks** such as the Asia Infrastructure Investment Bank (AIIB) and provide technical assistance and capacity building to help private financial institutions and investors finance NbI and align portfolios with sustainable infrastructure objectives. This approach can then be applied in other countries. Beyond the work in El Salvador, UNEP is also engaging with regional development banks on mobilizing finance, including exploring partnerships with the AIIB and the European Investment Bank. In the case of the latter, UNEP is exploring ways that it can help to integrate sustainability and resilience into projects delivered as part of the EU's Global Gateway Initiative.

28. **Global ABC, in collaboration with UNEP-Finance Initiative, conducted regional training for commercial banks from Eastern Europe, Asia Pacific, and Africa regions** on investment in green buildings as a means of reducing embodied and operational carbon in their portfolios. Additional training is planned for Latin America in 2024.

II. Lessons learned

29. **If planned well, infrastructure investments can respond to multiple crises, including climate change mitigation and adaptation, resource overuse, biodiversity loss, and pollution.** However, most new infrastructure development continues along the “business-as-usual” pathway that fails to deliver sustainable infrastructure on the scale required to respond to global challenges; and much of the forward planning still fails to anticipate the likely impacts of an increasingly volatile climate.

30. **Integrated approaches that consider all aspects of sustainability throughout the infrastructure life cycle in a way that accounts for interlinkages between different infrastructure systems can contribute to more sustainable and resilient outcomes.** When infrastructure is viewed as a “system of systems”, trade-offs and synergies from different projects and sectors can be balanced to achieve more efficient and sustainable service delivery that better contributes to national sustainable development objectives.

31. **Planning of infrastructure needs to modeled on forward looking trends, and not only on historical and “backward looking” data.** Future infrastructure planning needs to consider the possible and emerging scenarios of the IPCC, so that 100-year flood maps of tomorrow and other relevant modeling tools consider the most up-to-date scenario analysis. Practitioners will also need to integrate nature-based solutions into planning and design processes, necessitating a rethink of current and existing school and university curricula in the area of sustainable infrastructure.

32. **To reduce the resource and carbon intensity of infrastructure development and operation, planners and designers should consider all available options for meeting service needs, starting with alternatives to building new “grey” infrastructure.** These could include increasing the longevity of existing infrastructure systems, investing in natural and nature-based infrastructure, “dematerialized” solutions enabled by digital technology, and managing demand for certain services.

33. **There are many ongoing challenges to sustainable and resilient infrastructure that need to be addressed.** These include lack of coordination across sectors and disciplines among the major actors at the international and national levels; a lack of capacity to navigate the wealth of information and tools available, to understand when, why and how to use them, and then to create the institutions, policies and governing frameworks (i.e., the enabling environment) needed to apply them effectively; the perception that sustainable infrastructure is more expensive than less sustainable “business-as-usual” options; a lack of financing mechanisms for sustainable infrastructure, especially nature-based infrastructure; and lack capacity to develop pipelines of bankable sustainable and resilient projects.

34. **To address these challenges, more financial and technical support is needed,** including capacity building and technical assistance related to integrating nature and ecosystem services into infrastructure planning processes and investment decisions, inter-ministerial and inter-disciplinary coordination, building the business case for sustainable and resilient infrastructure solutions that factor in the long-term economic, social, and environmental benefits that can offset upfront costs, and the development of innovative financing mechanisms that incorporate these costs and benefits and allocate risk accordingly.

35. **UNEP has seen growing interest and commitments from countries that wish to use the SI Principles to inform national infrastructure policies and master plans as a means of aligning them with the SDGs and the Paris Agreement and have requested UNEP’s support in doing so.** Providing the requested support will require additional financial resources to be mobilized.

III. Recommendations and suggested actions

36. **Addressing the sustainable infrastructure challenges requires engaging a wide range of stakeholders and partners, including policymakers, planners, designers, builders, operators, and financiers and investors.** Governments, however, have an important role to play in creating the enabling environment for investments in sustainable and resilient infrastructure. For this reason the Assembly may wish to emphasize the need to strengthen national policy and regulatory measures to mainstream sustainability and nature into infrastructure financing decisions as a means to align public and private finance with national plans and strategies to implement the KM-GBF and 1.5 pathways.
