CONCLUSION

This concluding chapter highlights insights from the report that could contribute to strengthening the science-policy interface for sustainable development. The reader is referred to individual chapters and to the executive summary for a more comprehensive overview.

A message comes across strongly from chapters 1, 2, 3 and 4, even though their topics are very different and the scientific communities involved around each of them are distinct: if no one is to be left behind in 2030, the notion of inclusiveness cannot be treated as an afterthought or even mainstreamed in other areas. Rather, it should be an integral part of institution design and functioning, of research and development, and of infrastructure planning and development, to mention only topics covered in this report.

Improving our understanding of the effectiveness of development strategies in leaving no one behind

Ensuring that no one is left behind is a fundamental guiding principle for the implementation of the 2030 Agenda for Sustainable Development. Science can inform decision-making on three broad questions. First, who are those being or at risk of being left behind? Second, how can strategies and policies reach them in practice? And third, what types of strategies and policies would be appropriate in order to leave no one behind?

This report makes clear that many criteria are used in practice to identify those left behind, whether within a country or between countries. In practice, those "left behind" with respect to a particular dimension of the Agenda may be different groups in different societies. It is important to take into account the dynamic nature of deprivation and inequality; in this respect, preventive policies are critical to ensure that new people or group do not fall behind at the same time as others escape poverty and deprivation.

In many areas, inclusive development strategies are the commonly accepted paradigm. However, whether strategies succeed in reaching those left behind depend on many factors, from country-specific circumstances to their design, targeting methods and practical implementation. Available evaluations from different SDG areas all suggest that there are significant practical challenges in effectively reaching those left behind. Targeting, in and by itself, is not sufficient in order to leave no one behind –development interventions, even if properly targeted, can result in at best partial solutions to deprivations and, as a result, only address part of the problem.

Examples of interventions reviewed for the report that aim to reach the furthest behind first include: nutrition, where the core target of interventions in developing countries is those suffering the most from stunting; area-based interventions targeting the poorest locations; and strategies to provide shelter for homeless people.

Based on the limited evidence reviewed in the report, in many areas of the new Agenda, factoring in the imperative to leave no one behind in sustainable development interventions may not present insurmountable difficulties. Undertaking to systematically reach the furthest behind first may represent a much greater challenge and may in some cases imply a more significant departure from present strategies.

Going forward, it will be important to systematically collect further scientific evidence on how existing development strategies do indeed reach the furthest behind. A first step could be an inventory of existing meta-studies that attempt to review the effectiveness of development interventions in different SDG areas in reaching those left behind. While evaluations do exist for specific SDG areas, they use different criteria for defining and measuring those left behind or furthest behind and for assessing the effectiveness of interventions in reaching them. It could be worth assessing the costs and benefits of investing in more comparable frameworks for evaluating development interventions in different SDG areas. This would likely be a significant undertaking in terms of methodology and costs.

Adopting an integrated approach to sustainable development: the infrastructure-inequality-resilience nexus

This year's report examines interlinkages between infrastructure, inequality and resilience. Extensive bodies of literature have focused on each of these areas. For example, infrastructure has received significant attention in development circles, due to its perceived critical role in spurring economic growth and development. Yet, scientists focusing on each of those fields typically hail from different communities, making links between the three areas less commonly studied than any of the three areas taken in isolation. Among the possible interlinkages in the nexus, an extensive amount of scientific research was found on the links between infrastructure and inequality, as well as on how people's resilience is affected separately by infrastructure resilience and by inequality. Links from resilience to inequality and from resilience to infrastructure seem to have received less attention. Further research in this area may be needed to uncover important synergies and trade-offs.

As in any nexus, harnessing synergies and addressing trade-offs is critical for policy-making. In this regard, the chapter illustrates the importance of adopting an integrated approach towards sustainable development. The research reviewed here emphasizes that a focus on both efficiency and equity is needed to harness the synergies between infrastructure, inequality and resilience. In this regard, contributing experts have noted that reducing inequalities in any of its dimensions also contributes to better infrastructure provision and increased resilience by, for example, increasing the likelihood of infrastructure investments that benefit vulnerable groups. An important policy component is geographic equity in the provision of basic infrastructure.

The report provides examples of policies that have been found to address synergies in the nexus. For example, labour-based programs in infrastructure projects can expand job opportunities and reduce inequalities, while at the same time improving resilience to natural disasters. Participatory processes that involve local communities and their various segments can be useful ways to ensure that considerations related to economic, social and environmental dimensions are taken into account when planning for infrastructure investment. Regulation and incentive mechanisms also need to be in place to integrate disaster risk reduction into all phases of the infrastructure life cycle, and to ensure the resilience of critical infrastructure to natural disasters. Contributing experts noted the need to further disaggregate the analysis between rural and urban contexts to be able to provide more specific policy recommendations.

Further cross-disciplinary collaboration and engagement between researchers, practitioners, decision makers and other stakeholders could be a way of achieving the mutual learning and transfer of information that would enable scientific knowledge to be transformed into practical strategies to harness the synergies and address the trade-offs between the three areas of the nexus.

Mobilizing technology for the SDGs: scientists' perspectives

The report presents a range of perspectives of scientists on the role of technology for the achievement of the SDGs. Technology is essential for achieving the SDGs and reaping the benefits of synergies among them, as well as for minimizing trade-offs among goals. Technology, society and

institutions co-evolve. Hence, technology progress requires institutional adaptations and may be constrained by social issues. Policy actions to achieve the SDGs and ensure that no one is left behind need to consider these interlinkages.

Many scientists point to a need for making simultaneous progress on equity issues (especially technology access), on overall technology system performance, and on supporting institutional change - strategies focusing only on one of these components have proven ineffective in the long-run. Innovation systems, understood as the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies, perform sub-optimally if only one or the other of these elements is supported. Policy actions must support both research and development to spur technology performance at the technology frontier, as well as promote the diffusion and adaptation of existing technologies in developing countries and among marginalized groups in all countries – one supports the other and vice versa.

Scientists emphasized a need for national and international technology roadmaps. Promising technological trajectories and new industries can be identified by each country. Scientists suggested the importance of investing at the same time in new and old technologies; in increased performance of advanced technologies and technology adaptations for underserved communities; in large-scale infrastructures and small-scale technologies with large numbers of units. They also suggested that science roadmaps should include measures relating to affordability and inclusion, which should be built into R&D processes from the outset.

Other notable key actions or policy elements suggested by scientists include: effective national science-policy interfaces; foresight and scenarios; facilitation of learning across communities, including underserved communities; and cluster analysis. The latter analyses networks of firms linked to each other (through production chains, or geographically concentrated and making use of related buyers, suppliers, infrastructure and workforce, or of similar nature), with a view to addressing systemic imperfections of innovation systems.

Inclusive institutions for sustainable development

There is clear awareness that the understanding of institutions is important for delivering on the imperative to leave no one behind. Institutions can trigger behaviours and trends that can have positive or negative impacts for development outcomes, and in particular for inclusiveness. Inclusive institutions bestow equal rights and entitlements and enable equal opportunities, voice and access to resources and services. On the other hand, power holders can shape institutions for the benefit of some rather than all groups of society.

Achieving any particular target related to inclusion (e.g. gender equality) will require a combination of factors, including: legal, regulatory components; multiple institutions intervening at various levels; and potentially broader societal changes, e.g. in social norms, which themselves can be spurred by changes in institutions. Conversely, individual institutions, especially those with broad mandates, can contribute to inclusiveness in many different areas as well as society-wide.

It is important to assess both how inclusive institutions are, and whether and how they foster inclusiveness through their actions. In this vein, the report explores two specific types of institutions: national councils for sustainable development (NCSDs) and national parliaments. More in-depth assessment of research is needed on other types of institutions and how they contribute to inclusiveness in the context of the new Agenda, and this should be a critical component of future GSDRs.

Research reviewed for the report suggests that, if provided with adequate resources, NCSDs can be effective mechanisms for stakeholder participation and engagement across the whole policy cycle, to: (1) inform and educate the public at large on sustainable development related topics; (2) stimulate informed public debates; (3) engage key stakeholders in formulating policy recommendations; and (4) involve stakeholders in various parts of implementation and progress reviews. In practice, governments' attitude regarding stakeholder involvement influences the functioning of NCSDs and the resources provided to them.

As legislatives bodies, parliaments are very important for the implementation of the 2030 Agenda and SDGs. Their role in fostering inclusiveness can be examined at two different levels: first, how parliaments themselves are inclusive in their representation of all segments of society, including of marginalized groups; and second, how, when adopting legislation, they take into account the needs of these groups. The report focuses on the inclusion of four specific groups: women, indigenous peoples, persons with disabilities, and children and youth. Research reviewed for the report suggests that progress has been made with respect to the representation of these groups in national parliaments. However, gaps still exist. Similarly, while progress has been made in terms of codifying the rights of marginalized groups, there is still a long way to go in this respect, and parliaments will have a key role to play in ensuring that no one is left behind.

Identifying emerging issues for the HLPF

The identification of new and emerging issues warranting policy makers' attention is a critical function of the science-policy interface. Policymakers are exposed to a broad range of analyses, rankings, and advice concerning emerging issues. In addition, the sheer breadth of the sustainable

development agenda requires the consideration of issues from different sources and processes. Yet, intergovernmental processes such as the HLPF can only consider a limited numbers of issues, and by their mandate and place in overall governance frameworks can only address some issues.

There is scope for enhanced dialogue between scientists and policy-makers in considering both the processes by which emerging issues are identified, selected and brought to the attention of the HLPF, as well as the substantive character of issues that could usefully by considered by the forum.

The chapter demonstrates that a wide range of sources – document analysis, crowdsourcing, and expert meetings – can usefully be drawn on when identifying emerging issues in the context of sustainable development. The report introduces "scanning" as a major approach for finding emerging issues. The process of scanning can be usefully guided by criteria, which help to make explicit assumptions about what counts towards designing issues as emerging. Such criteria include impact and probability of occurrence, persistence, irreversibility, ubiquity, novelty, and potential for mobilization. Priority, a criterion that is meant to capture an issue's importance in terms of social and cultural norms or impact on already vulnerable and marginalized groups, can accommodate principles such as 'ensuring that no one is left behind'.

The report provides a simple framework for categorizing emerging issues, as well as criteria that the HLPF could consider using to filter emerging issues in order to identify a limited number of those that are most relevant. It is suggested that the following criteria could serve as starting points: (a) the extent to which the issue in question related closely to the SDGs; (b) whether the issue is a potential threat or opportunity of global or at least international relevance; (c) whether management of the risk or harnessing of the opportunity depends on international action and cooperation; and (d) whether the issue is expected to persist (non-transient) and whether or not a clear increasing trend can be established.

The report also reflects efforts made to test the approach proposed for the identification and filtering of emerging issues, which involved an expert assessment of emerging issues. Experts pointed to the interdependence among emerging issues. The expert assessment made clear that such interdependence is best perceived by replacing emerging issues in a broader framework, which clarifies the values that are to be sustained, potential threats and opportunities, causal mechanisms at play, possible responses and actions, and key emerging features.

The involvement of experts from multiple disciplines brings critical added value to this process, including for prioritizing

emerging issues and provide multi-dimensional analyses of the issues and their inter-connectedness. The regular scanning and multidisciplinary analyses of emerging issues from different levels and perspectives is important and should be maintained as a necessary and useful early warning system for the science-policy interface.

Taking stock from three editions of the Global Sustainable Development Report

Since UN Member States foresaw a Global Sustainable Development Report as an instrument to strengthen the science policy interface for sustainable development at Rio+20, three yearly editions of the report have been published by UNDESA in 2014, 2015 and 2016. Taken together, these reports have contributed to the science-policy interface in three main ways.

Firstly, since 2014, the Global Sustainable Development has become a platform and process for engaging scientists and experts in the UN deliberations on sustainable development. It has been open for participation to all interested UN entities, organized science institutions and programmes, and individual scientists – the only requirement being that contributions needed to be grounded in science. The process for the preparation of the reports sought to engage key players in organised science. In particular, the International Council for Science (ICSU) – the official organisation representing the scientific and technological community at the UN - has played a crucial role in encouraging scientific contributions. To date, 35 UN entities and more than one thousand scientists have contributed to the Report. The open call for science-policy briefs alone resulted in 589 scientists from all parts of the world submitting 264 briefs.

The approach followed for the three reports started from the premise that anybody interested in the GSDR should be able to provide inputs. For this reason, multiple channels for outreach and inputs were developed, from the most conventional such as relying on organized science to more innovative ones, such as open calls for science briefs in multiple languages. Through these channels, an effort was made to reach scientific communities (e.g., young scientists) that usually have limited access and input to large assessment processes. Multi-lingual crowdsourcing inputs and calls for papers have also sought to address the traditional bias of large assessment reports that rely on English language, peer reviewed science, leaving aside large bodies of literature in other languages that may be highly relevant to specific contexts, including regional experiences.

All editions of the GSDR benefited from advice and guidance from many senior scientists and experts of the science-policy interface, some of which had been involved in major efforts to devise sustainable development assessments in the past, including: reports from the US National

Academy of Science; the Global Environment Outlook; the Intergovernmental Platform on Biodiversity and Ecosystem Services; and others.

Secondly, the reports have provided specific suggestions on how the HLPF could operationalize the science-policy interface in practice in years to come. Chapter 1 of the 2015 edition suggested a range of ways for the HLPF to enable constructive interactions between science and policy-making at the UN. Actions that the HLPF might consider spanned the space between science and policy, from the provision of policy-relevant data, analysis and information, to actions that the HLPF could take to support enhanced dialogue between science and policy, to the translation of the results of science-policy dialogue into policy-making. Ultimately, it will be up to UN Member States to decide how they want the HLPF to strengthen the science-policy interface, and which of these actions they want to undertake, if any.

Among ideas considered by experts, providing improved access to the findings of existing assessments, highlighting synergies and trade-offs and tools to address them, and helping transpose the outcomes of global science-policy debates into regionally and nationally relevant frameworks for action were the most consensual. Many practitioners who provided inputs for this chapter emphasized the importance for the HLPF to consider a combination of

actions, rather than any single action, recognizing potential synergies among them.

All three editions devoted space to the identification of new and emerging issues, from their identification by all areas of science to how existing scanning processes may be combined to provide the HLPF with a usable list of topics for addressing in that forum.

Thirdly, the reports have explored different perspectives on the SDGs as an integrated and indivisible set of goals, and translated those in chapters that adopted a diversity of focuses and approaches. The chapters of the three editions of the report can all be clustered into a simple list of generic chapters, which are all relevant to an assessment of assessment approach covering the science-policy interface for sustainable development. This is illustrated in table 6.1. Such a structure emphasizes an integrated approach that focuses on the interrelationships among areas of the SDGs seen as an indivisible system, and a balanced consideration of the three dimensions of sustainable development.

For example, the 2014 edition provided templates for looking at progress made on sustainable development over the long term, as well as for synthesizing insights from sustainable development scenarios undertaken by leading institutions covering a wide range of thematic areas. The reports also included the examination of four clusters

Table 6-1: Generic chapters of past Global Sustainable Development Reports

Chapters	Generic description	GSDR 2014	GSDR 2015	GSDR 2016
Science-policy interface, including assessments	Describes the landscape of existing assessments; assesses the science-policy interface in various contexts	Ch.2	Ch. 1, Ch. 2	Ch. 1
Trends and review of progress	Reviews sustainable development trends in a comprehensive way for the whole set of SDGs seen as an indivisible system	Ch.3		
Sustainable development scenarios	Documents sustainable development scenarios and long-term modelling exercises published by diverse institutions in a uniform way	Ch.4		
New and emerging issues	Takes stock on existing processes to identify emerging issues and compares their outcomes. Provides science digests on issues of concern emerging in the scientific literature	Ch. 7	Ch. 7	Ch. 5
Featured clusters or nexuses	Takes an in-depth look at interlinkages, synergies and trade-offs among a subset of SDG areas, and examines the status of scientific knowledge on the various interlinkages	Ch. 6	Ch.3, Ch.5	Ch. 2
Cross-cutting issues	Takes an in-depth look at interlinkages between a cross-cutting issue (e.g. disaster risk reduction, institutions, technology, inclusiveness) and all the SDGs, and examines the status of scientific knowledge on the various interlinkages	Ch. 6	Ch. 2, Ch.4	Ch. 4, Ch. 3
Countries in special situation	Focus on overall progress, thematic or cross-cutting issues for one or several categories of countries in special situations (LDCs, LLLDCs, SIDS, Africa, and MICs)		Ch. 6	
Data and measurement (measuring progress)	Takes stock of initiatives aiming at measuring progress in different ways; highlights innovative data approaches on specific themes or in specific regions	Ch.5	Ch. 8	

Source: Authors' elaboration.

of issues (climate, land, energy and water; oceans and livelihoods; industrialization and sustainable consumption and production; and infrastructure, inequality and resilience), as well as cross-cutting issues (disaster risk reduction, innovative data and measurement approaches, technology). These contributions provide illustrations of how policy-relevant conclusions can be gleaned from existing scientific assessments.

As the Global Sustainable Development Report moves to a new phase after the HLPF 2016, the lessons learned in attempts to mobilize a broad range of scientific communities, and the collaborations initiated for this purpose, can provide an interesting base on which to build an ambitious yet actionable multi-year report for the benefit of the HLPF. Ultimately, the GSDR could become a science engagement platform for science-policy interface.