

Improving Scientific Input to Global Policymaking

with a focus on the
UN Sustainable Development Goals

Report



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UN Sustainable Development Goals

**Report
May 2019**

The shaded countries in the cover image indicate where IAP member academies exist.

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FOREWORD

The InterAcademy Partnership (IAP) is a global network of over 140 science, engineering and medical academies that work together to support the role of science in seeking solutions to the world's most challenging problems. In 2016, IAP for Policy (IAP-Policy), hosted by the US National Academies of Sciences, Engineering and Medicine, and a component of the Partnership, launched a three-year project on *Improving Scientific Input to Global Policymaking with a focus on the UN Sustainable Development Goals (SDGs)*. Funded by Carnegie Corporation of New York and undertaken in partnership with the Institute for Advanced Study (IAS) in Princeton, this three-year project was governed by an international working group and supported by a professional secretariat.

The primary objective of the project was to strengthen the global science community's capacity to support the implementation of actions to achieve the SDGs, with a particular focus on the role of science academies. The Working Group has drawn evidence from a survey of national science academies (senior and young); gained insights and perspectives from global, regional and national practitioners; engaged with different parts of the UN system; and convened regional workshops. An important outcome of these activities has been a better understanding of the structures, mechanisms and processes the UN has established for incorporating science, technology and innovation (STI) input into implementation of the SDGs at all levels, which has made it possible to mobilise the academies to support this implementation more effectively.

Rigorous peer review is a hallmark of IAP studies. We would like to thank the following reviewers for their constructive comments:

- **Dr William Colglazier**, Past Co-chair of the 10-Member Group of the UN Technology Facilitation Mechanism (TFM), and Editor-in-chief, Science & Diplomacy, AAAS Center for Science Diplomacy.
- **Professor Roseanne Diab**, Former Executive Director, Academy of Science of South Africa and Director, GenderInSITE.
- **Dr Aysha Fleming**, member, Global Young Academy and social scientist, CSIRO, Australia.
- **Dr Paulo Gadelha**, member of the 10-Member Group of the UN TFM and Coordinator, Fiocruz Strategy for Agenda 2030.
- **Dr Shantanu Mukherjee**, Chief of Policy and Analysis, Division of Sustainable Development, UN-ECOSOC.

On behalf of the Working Group and IAP-Policy, we would like to thank the Project Co-Chairs, members of the Working Group, the Project Secretariat, all contributing academies and practitioners, and our funder, Carnegie Corporation of New York.

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EXECUTIVE SUMMARY

The year 2019 is a critical time for the UN's Agenda 2030, the global blueprint for the economic, social and environmental development of our planet. Four years into this 15-year framework, the UN Members' Heads of State will review progress on the implementation of the 17 [Sustainable Development Goals \(SDGs\)](#) underpinning Agenda 2030 and set the course for the next review period that will take the agenda beyond the halfway mark. The world's academies and the scientific community at large have an opportunity to act, and to effect positive change, within this critical timeframe.

Agenda 2030 is potentially transformative, but its implementation will require profound change in the world's socio-economic, political, cultural and research systems, and the unsustainable practices and behaviours, attitudes and values that underpin them. The best minds, resources, business models and innovations from all sectors and disciplines and across generations must be mobilised to effect this transformation.

Effective implementation of the [Sustainable Development Goals \(SDGs\)](#) requires access to, and the application of, the best available evidence from the global community of knowledge providers. Independent expert advice is a vital part of evidence-informed policymaking at national, regional and global levels of decision-making: strengthening the evidence-policy interface at all these levels is imperative.

The IAP project

Representing a key constituency of the global science community, the [InterAcademy Partnership \(IAP\)](#) has been exploring how scientists, and specifically academies, are helping to implement the SDGs and where there are challenges to, and opportunities for, further involvement. IAP is the global network of over 140 merit-based science, engineering and medical academies, working together to help address shared global challenges using the best available scientific evidence. Together with its four constituent regional networks in Africa, the Americas, Asia and Europe, IAP has provided numerous in-depth science policy reports and consensus statements with independent advice for national governments and international organisations.

[Improving Scientific Input to Global Policymaking](#) is a candid exploration of how merit-based academies are engaging with the SDGs, or could do so, to help motivate them and the wider science community to be more proactive. Merit-based academies comprise all IAP members as well as the [Global Young Academy \(GYA\)](#) and [National Young Academies \(NYAs\)](#). The project focuses on the SDGs as a model for global policymaking because they are universally adopted, well-articulated and the pre-eminent global agenda to 2030.

A project [survey](#) of IAP members, the GYA and NYAs in 2016-2017 showed that most recognise that academies have an important role to play in supporting the SDGs at global, regional and national levels. But the survey also revealed a variable level of understanding of the SDGs, of how the goals are being implemented and, most importantly, how academies and scientists can get involved. It also exposed weaknesses and disconnects within and across the academies, and a gap between knowledge production and its use by policymakers. Further exploration of the UN system uncovered several disconnects between and within the science and policymaking communities, and found that, while there is an apparent willingness from both communities to

engage with each other, there is also reticence or inertia in some parts of the system, hampering genuine dialogue and action. Thus, a wealth of expertise and knowledge has yet to be applied to the implementation of the SDGs.

The project has helped to increase the awareness and understanding of the SDGs amongst national academies by helping them to understand the national, regional and global context and identifying ways to engage. A brief [Guide to the SDGs](#) for IAP members and National Young Academies has helped them identify entry points within the UN system supporting the SDGs. Academies have been engaging with different pathways for feeding science advice into this system and have observed first-hand the benefits of getting involved and being part of the conversation, as well as the challenges of applying STI to the SDGs through imperfect but continually evolving mechanisms.

There are many opportunities to strengthen these mechanisms, including through the Scientific and Technological Community (STC) Major Group, High-Level Political Forum, Technology Facilitation Mechanism, Commission on Science and Technology for Development (CSTD), Global Sustainable Development Report (GSDR), UN Regional Commissions and their respective annual fora on sustainable development; as well as national mechanisms including Voluntary National Reviews. Official regional and national reports on implementation progress are subject to little scrutiny: a more rigorous, evidence-informed approach can improve accountability and assist in the implementation of the SDGs through genuine transformative change rather than retrofitting business-as-usual. This includes supporting the development of context-relevant, evidence-based indicators to help ensure better national response rates.

The project has also developed an [online database](#) of academy reports relevant to the SDGs, which is being integrated into knowledge platforms under development by different parts of the UN. Searchable by SDG, country and region, the database provides a real-time indication of in-country expertise and knowledge.

The project has benefited from IAP, the GYA and NYAs working together and drawing on their respective strengths. Four regional workshops on the SDGs – in Africa, the Americas, Asia and Europe – have demonstrated how academies can be supported and mobilised through their regional networks as platforms for sharing ideas, thinking strategically and working collaboratively.

Recommendations

Recommendations are made to the UN system; IAP, its regional networks and national members; the GYA and national young academies; and the wider science community.

At the UN level, these recommendations call for the UN to foster a culture of evidence-informed policymaking and mutual learning; consider the implications of interactions – both synergistic and competitive – between the SDGs, and of complex systems science and planetary boundaries; strengthen indicators to better measure progress; develop more effective ways of sourcing and utilizing expertise; and facilitate ways to bring policymaking and science communities together.

At the academies level, recommendations call for IAP to develop strong and coordinated working links with parts of the UN system with clear and influential policy mandates; support the Scientific and Technological Community (STC) Major Group in its role; be more attuned to the UN's timetable for SDGs review; be a stronger advocate for an independent science advisory

mechanism to the UN; lead debate on the reorientation of research and research support systems towards shared global goals; champion open and inclusive science; and support their regional networks and member academies in their efforts to effect genuine transformation. Senior and young academies can draw on their respective strengths to mutual advantage and serve as conduits for, and repositories of, knowledge and expertise. Strengthening cooperation between IAP regional networks and UN regional commissions could be especially fruitful, as could engagement in the VNR process so that regional and national reviews are more rigorous and provide genuine learning space.

At the wider science community level, interested scholars can orientate their own research in the context of the SDGs and their targets; get involved in SDGs-related activities; join the open forum, the International Network of Government Science Advice (INGSA); and early-career scholars can apply to join the GYA and, where they exist, their national young academy.

The recommendations invite the science and policymaking communities to create more opportunities to come together, and to use these opportunities to support the different elements of the SDGs implementation process. Dialogue and exchange of ideas can help:

- increase understanding between the two communities, including appreciation of each other's ways of working and their respective operational constraints;
- bridge the gap between knowledge supply and knowledge demand;
- facilitate the development of better indicators for the SDGs and their targets, as well as monitoring and evaluation frameworks;
- promote a systems-wide perspective, to better understand the interactions between the SDGs – their interdependencies, synergies and trade-offs;
- facilitate the reorientation of research and research support systems, including rewards and incentive structures, so they are more conducive to supporting shared global goals;
- facilitate the development of national science, technology and innovation (STI)-for-the-SDGs roadmaps/action plans to 2030 and beyond; and
- bring to bear independent assessments of what is working and what is not, in order to advise relevant stakeholders constructively.

The report concludes that academies should work more effectively at the science-policy interface; help to bridge national gaps caused by poor inter-ministerial and inter-UN agency coordination and by professional silos; leverage intellectual capital /networks of experts to inform and support policymakers; sensitise academia to the SDGs; and advocate for a strong, independent science advisory mechanism within the UN, supported by global networks of knowledge providers.

The project, which has been as much about process as product, has endeavoured to explore creative ways in which IAP and its members can contribute more effectively to addressing global challenges. A checklist (“How you can support the implementation of the SDGs”) is provided to help interested scientists get started or find out more.

How you can support the implementation of the SDGs

There are many ways academics and scientists can engage with the SDGs, for example:

As a proactive member (or member of staff) of your academy, you can:

- **Be an SDGs advocate and ambassador for the academies and your personal networks.** Learn about the UN system (see the [IAP's guide](#)¹ or, for more detail, [the UN SDGs Knowledge Platform](#)²). Encourage your academy and its regional network to have SDGs Focal Point(s).
- **Help frame your regional network's and/or national academy's strategies and programmes around the SDGs and their targets**,³ and give due consideration to the possible [interactions between SDGs](#)⁴ and reported [data gaps](#)⁵ that continue to perplex policymakers. Can your academy respond directly to these challenges and help advance understanding of them? Partner with your national senior / young (if you have one) academy counterpart to strengthen intergenerational perspectives. Where possible, engage relevant policymakers in the design of your programmes.
- **Stay informed about the state of implementation of the SDGs in your country**,⁶ and again think about how your academy can help plug gaps or improve these assessments.
- **Ensure your regional network's and academy's SDGs-related publications are uploaded to the IAP SDGs publication database**,⁷ as a repository of information for policymakers and other stakeholders. Ensure all future publications include a non-technical executive summary written for policymakers. Help create a central database for all academies (senior and young) with publications, projects and expertise organised by SDG as a resource for policymakers.
- **Be an ambassador for the academies (global, regional, national; senior, young) and help effect positive change.** Get involved in your academy's business: participate and help shape its initiatives, its governance and leadership; and help raise its visibility across all sectors. If you are a National Young Academy (NYA) member, encourage your academy to engage with other NYAs or with the GYA, which runs a number of SDG-related working groups and often acts as coordinator for [SDG-related joint activities with NYAs](#).⁸
- **Be an advocate for evidence-informed policymaking.** Join the [International Network of Government Science Advice \(INGSA\)](#)⁹ and draw on its resources for actual and aspiring practitioners.

Plugging into the UN processes is not as difficult as you might think. You can:

- **Familiarise yourself with the UN High-Level Political Forum annual review schedule for the SDGs**¹⁰. The schedule for the next four-year review period will be decided by Heads of State in September 2019 at the [SDG Summit](#)¹¹ and will be highlighted on the IAP website. Can your academy initiatives and outreach better complement these timeframes?
- **Familiarise yourself with your country's most recent Voluntary National Review (VNR)**.¹² Were the appropriate stakeholders involved in its preparation? Is the evidence presented accurate? Are key aspects missing? Share your assessment with the assigned focal point for your country's VNR and ask how your academy may be able to assist in the next VNR process.
- **Stay informed about the VNR schedule in your region.** Check the [list of countries who have committed to report](#) in the next couple of years¹³ – are any of them yours? Countries to report each year are typically announced well in advance: check for opportunities to be involved in stakeholder consultations if your country is listed.

- **Participate in your region's UN Annual Sustainable Development Fora**.¹⁴ Apply to organise a side-event. Contact your [International Science Council Regional Office](#)¹⁵ to see how you can help them in their formal S&T representation role at these fora. Ensure that science is well-represented and part of the conversation.
- **Offer to help support the key scientists in the UN system in your region in their role.** Reach out to the scientists in your region or network who sit on bodies such as the [10-Member Group on the Technology Facilitation Mechanism](#)¹⁶ and [15-Member Independent Group of Experts](#)¹⁷ responsible for the Global Sustainable Development Report 2019. How can you help? These individuals change regularly: you could monitor this.
- **Contribute to UN reports and reviews, as calls for input and nominations for expert working and peer review groups are called.** Volunteer to review current, or critique past, UN reports. These include the quadrennial GSDR and quinquennial UNESCO Science Report; the Commission on S&T for Development (CSTD) annual country and thematic reviews; and the UN Regional Commission reports on regional implementation of the SDGs. Monitor these calls and use your academy focal points if they have them.

¹ For an overview of the UN system managing the SDGs, including ways to engage, one place to start is the InterAcademy Partnership's 2017 "Supporting the Sustainable Development Goals: A Guide for Merit-based Academies," available for free download at: http://www.interacademies.org/37864/IAP_SDG_Guide.

² Sustainable Development Goals Knowledge Platform. <https://sustainabledevelopment.un.org/>. Accessed 8 March 2019.

³ Sustainable Development Goals: About the Sustainable Development Goals. <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>. Accessed 8 March 2019.

⁴ To understand more about how you could assess interactions between SDGs, take a look at ISC's report <https://council.science/publications/a-guide-to-sdg-interactions-from-science-to-implementation>.

⁵ Introducing the Our World in Data 'Sustainable Development Goal (SDG) Tracker'. <https://ourworldindata.org/sdg-tracker>. Accessed 8 March 2019.

⁶ Country profiles on SDGs implementation progress can be found at <http://www.sdgindex.org/reports/2018/>.

⁷ InterAcademy Partnership: Academy Reports Related to the Sustainable Development Goals (SDGs). <http://www.interacademies.org/SDG.aspx>. Accessed 8 March 2019.

⁸ Global Young Academy co-signs statement on the role of young academies in the UN SDG process. <https://globalyoungacademy.net/global-young-academy-co-signs-statement-on-the-role-of-young-academies-in-the-un-sdg-process/>. Accessed 8 March 2019.

⁹ International Government for Government Science Advice. <https://www.ingsa.org/>. Accessed 8 March 2019.

¹⁰ <https://sustainabledevelopment.un.org/hlpf>. The annual review schedule from 2020 onwards will be published c.September 2019

¹¹ The next review schedule will be published at <https://sustainabledevelopment.un.org/summit2019>.

¹² Find your country's most recent VNR and the focal point individual here: <https://sustainabledevelopment.un.org/vnrs/>.

¹³ Search by year to find forthcoming VNRs here: <https://sustainabledevelopment.un.org/vnrs/>.

¹⁴ For 2019, these are: UNECE (Europe): 21-22 March, Geneva, Switzerland; ESCAP (Asia-Pacific): 27-29 March, Bangkok, Thailand; ECLAC (Latin America and the Caribbean) 22-26 April, Santiago, Chile; ESCWA (Western Asia): 16-18 April, Beirut; ECA: 16-18 April, Tangiers.

¹⁵ ISC regional offices can be found in Africa, Asia-Pacific and Latin America and the Caribbean <https://council.science/about-us/regional-offices>.

¹⁶ Sustainable Development Goals Knowledge Platform: Technology Facilitation Mechanism. <https://sustainabledevelopment.un.org/tfm>. Accessed 8 March 2019.

¹⁷ Global Sustainable Development Report 2019. <https://sustainabledevelopment.un.org/globalsdreport/2019>. Accessed 8 March 2019.

CHAPTER 1: Context for the IAP project

Summary

The imperative for the STI community to support UN Agenda 2030 and the Sustainable Development Goals is clear but not easily put into practice. The inherent complexity of the SDGs and difficulty in rigorously evaluating their progress exacerbates this, as does the nature and organisation of science and policy.

The IAP project “Improving Scientific Input to Global Policymaking” sets out to explore some of the processes and mechanisms for STI-for-SDGs and to share its findings as a practical guide for academies and the wider science community.

Scientific inputs and advice are critical to informing policy on a range of global objectives, many of them encapsulated in the 17 Sustainable Development Goals (SDGs)¹⁸ endorsed by the UN in 2015. These Goals underpin Agenda 2030,¹⁹ the global blueprint for the economic, social and environmental development of the planet.

The importance of capacity building in science, technology and innovation (STI) for achieving the SDGs has been widely recognised by the global scientific enterprise and UN policymaking community (e.g.^{20,21}). Many organisations are actively working to expand the contributions of science and scientific advice to achieving the SDGs in the face of growing social, economic and technological drivers and challenges.²²

At the same time, the landscape of global scientific advice continues to evolve, with an increasing number of new, established and reconfigured organisations and networks providing advice relevant to global policymaking.^{23,24,25} There is a growing imperative for the current complex set of scientific advisory systems to work more coherently and effectively, and for the identification and implementation of effective practices for science advice to policy.

To help address societal challenges, these organisations are under pressure to break down academic, disciplinary and geographic silos by shifting from competitive, isolated professional communities to collaborative, integrated, international ones, and from working for society to working with society, openly and inclusively. There is an urgent need to bridge the gap between knowledge production and knowledge use, ranging from existing knowledge that is not yet being applied to the SDGs, to new knowledge including on topics such as new and emerging technologies, which bring both opportunity and risk.

The UN SDGs provide a platform for examining this increasingly complex landscape against a well-articulated, globally adopted framework with a high-impact, high-stakes agenda.

Furthermore, 2019 is a critical year for the UN’s Agenda 2030. Four years into this 15-year framework, the first Heads of State High-Level Political Forum (HLPF) reviews progress on the implementation of the 17 SDGs and sets the course for the next review period that will take the initiative to beyond the halfway mark. This influences how science contributes to the implementation of actions to achieve the SDGs.

This chapter introduces Agenda 2030 and the SDGs, some of the challenges the science community faces, and the IAP project that generated this report.

Agenda 2030 and the Sustainable Development Goals

Agenda 2030 is a 15-year global plan of action for planet, people, peace, prosperity and partnership. It strives to leave no one behind and reach the furthest behind first. Building on the Millennium Development Goals (MDGs), Agenda 2030 comprises 17 Sustainable Development Goals (SDGs) underpinned by 169 targets²⁶ and 232 indicators.²⁷ The SDGs place a strong emphasis on human rights and the inclusion of all, and endeavour to integrate the three dimensions of sustainable development: economic, social and environmental.

FIGURE 1.1: The Sustainable Development Goals



¹⁸ Sustainable Development Goals. <https://sustainabledevelopment.un.org/sdgs>. Accessed 8 March 2019.

¹⁹ Transforming our world: the 2030 Agenda for Sustainable Development. <https://sustainabledevelopment.un.org/post2015/transformingourworld>. Accessed 8 March 2019.

²⁰ Report available: https://sustainabledevelopment.un.org/content/documents/21201STIforSDGs10G_STIForum.pdf. Accessed 8 March 2019.

²¹ International Institute for Applied Systems Analysis. <http://www.iiasa.ac.at/web/home/research/twi/TWI2050.html>. Accessed 8 March 2019.

²² OECD Science, Technology and Innovation Outlook 2018. (2018). <https://doi.org/10.1787/25186167>.

²³ Scientific Advice for Policy Making. OECD Science, Technology and Industry Policy Papers. (2015). Organisation for Economic Co-Operation and Development (OECD). <https://doi.org/10.1787/5js3311jcpwb-en>.

²⁴ About The InterAcademy Partnership. <http://www.interacademies.org/31840/About>. Accessed 8 March 2019.

²⁵ Overview of International Science Council. <https://council.science/about-us>. Accessed 8 March 2019.

²⁶ About the Sustainable Development Goals. <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>. Accessed 8 March 2019.

²⁷ SDG Indicators. <https://unstats.un.org/sdgs/indicators/indicators-list/>. Accessed 8 March 2019.

Agenda 2030 is potentially transformative, but its implementation will require profound change in the world's socio-economic, political, cultural and research systems and the unsustainable practices and behaviours, attitudes and values that underpin them.

Science and the SDGs

All UN member states are committed to the realisation of the SDGs and have undertaken to reorientate and integrate national development priorities so that the SDGs are mainstreamed. This means that national research agendas, policy and funding priorities will reflect these global goals. Where they exist, regional research and policy agendas are undergoing similar realignment.²⁸

Science and scientists can support the SDGs in numerous ways, for example, by:

- identifying challenges, advising on policy interventions, and devising solutions by understanding enabling conditions, constraints and drivers in their respective geographic contexts;
- exploring the critical interdependencies inherent in the SDGs, as well as the competing tensions;
- designing key indicators and targets for the SDGs;
- breaking down silos and promoting inter/cross/multi-disciplinary and intergenerational cooperation;
- monitoring and evaluating progress, and measuring impact;
- promoting open, accessible data and methodologies;
- framing interventions around the stability and resilience of the Earth's systems;
- exploring futures scenarios, including the impact of new and emerging (potentially disruptive and transformational) technologies;
- communicating science to policymakers and non-scientific audiences (including conveying risk and uncertainty);
- engaging (sensitising) the academic community and wider publics on the SDGs and encouraging them to get involved;
- maintaining open and ongoing dialogue with policymakers and key influencers.

At the same time, scientists face many challenges in applying science to the SDGs, as documented elsewhere (e.g. The Organisation for Economic Cooperation and Development (OECD) 2018 STI Outlook²⁹). These include:

²⁸ For example, in the European Union, the SDGs are the reference framework for Horizon 2020, the largest single multinational research fund in the world, and for shaping development cooperation with partner countries through the European Consensus on Development. From 2020, Horizon 2020's successor programme, Horizon Europe, an ambitious €100 billion research and innovation programme, will be more mission-oriented than its predecessors, with the SDGs a core element. Similarly, the Association of Southeast Asian Nations (ASEAN) Vision 2025 roadmap complements the SDGs.

²⁹ https://www.oecd-ilibrary.org/science-and-technology/oecd-science-technology-and-innovation-outlook-2018_sti_in_outlook-2018-en.

- **The complexity of the policy landscape:** science and policy worlds are different and typically weakly connected. There is a lack of awareness and understanding of policy structures, processes and players in the wider global science community.
- **The nature of scientific research itself:** research is incomplete and imperfect; it tends to lag behind the pace of change; both its development and its applications are unequally distributed; and traditionally it is conducted in disciplinary silos.
- **The inherent complexity of the SDGs and their interdependencies, synergies, complementarities and trade-offs:** interactions between the SDGs and their targets are complex and, in many cases, poorly understood. Action on one may reinforce or conflict with another.³⁰
- **The lack of reliable data for indicators, monitoring and evaluation, and assessment of progress:** even for the developed OECD countries, it has been *estimated*³¹ that only 57% of the targets can be quantitatively evaluated. Globally, the situation is starker, with the lack of quantitative indicators combining with poor or incomplete data collection in many states.
- **The lack of funding and other incentives:** research and research support systems, including rewards, incentives and career structures, are not typically designed around science for societal benefit.

At the global level, tools have been developed to track progress on the goals and some targets, e.g. the [SDG tracker](#)³² and the [Atlas of SDGs 2018](#).³³ For nation states, the [SDG Index and Dashboard](#)³⁴ presents useful indicators of where nations might prioritise and, in particular, where science and science policy can contribute. Nevertheless, data gaps are significant, and these trackers and their appealing graphics can be misleading: for example, the SDG-13 map (climate action) gives an optimistic picture of progress, arguably because CO2 emissions are difficult to attribute nationally and some less developed nations have low emissions.

The [UN Sustainable Development Goals Report 2018](#)³⁵ provided an overview of progress on the implementation of the SDGs, reporting that “the rate of global progress is not keeping pace with the ambitions of the Agenda [2030], necessitating immediate and accelerated action by countries and stakeholders at all levels.”

³⁰ To illustrate this, the International Science Council has developed a seven-point scale to quantify synergies and conflicts, applying this to a small subset of SDGs: <https://council.science/publications/a-guide-to-sdg-interactions-from-science-to-implementation>

³¹ MEASURING DISTANCE TO THE SDG TARGETS An assessment of where OECD countries stand. <http://www.oecd.org/sdd/OECD-Measuring-Distance-to-SDG-Targets.pdf>. Accessed 8 March 2019.

³² SDG Tracker. Available at: <https://sdg-tracker.org>. Accessed 8 March 2019.

³³ Atlas of Sustainable Development Goals 2018: From World Development Indicators. <http://datatopics.worldbank.org/sdgateas/>. Accessed 8 March 2019.

³⁴ <http://www.sdgindex.org>.

³⁵ The Sustainable Development Goals Report 2018. <https://unstats.un.org/sdgs/report/2018>. Accessed 8 March 2019.

General principles or guidelines for this complex and challenging science advice process (framing, selection, production, communication and assessment) are already in the public domain,⁴⁷ and INGSA provides a [wealth of resources on good practice](#).⁴⁸

The IAP project underpinning this report focuses on national academies and how they work together regionally and globally within the science advisory ecosystem. The academies have been asked to think about their unique niche within this system. The challenges for science advice to policy have pervaded all aspects of the project as points for discussion amongst the academy community: how they might best contribute to a more streamlined, timely, inclusive, solutions-oriented science advice system. A key focus has been to develop systemic formal and informal relations with different sectors/communities and sustain these during change. Some of the project's learning has helped shape IAP's new Strategic Plan 2019-2021.

Role and capacity of science academies

IAP and its members, the national academies

The InterAcademy Partnership (IAP) provides science-based advice to international organisations and national governments to inform decision-making. IAP is the global network of over 140 academies of science, engineering and medicine. It coordinates the global and regional efforts of these academies and helps create new ones. Its membership is organised into four regional networks: the [Association of Academies and Societies of Sciences in Asia \(AASSA\)](#),⁴⁹ [European Academies' Science Advisory Council \(EASAC\)](#),⁵⁰ [InterAmerican Network of Academies of Sciences \(IANAS\)](#),⁵¹ and [Network of African Science Academies \(NASAC\)](#).⁵² Each network conducts region-specific projects and contributes to the global mission of IAP.

Academies are merit-based institutions that elect leading scientists within their respective countries (fellows or members) and elsewhere (foreign members) on the basis of peer review by their existing membership. All regional networks and some national academies draw on the expert knowledge of their members to provide independent, high-quality advice to their governments. Academies experience mixed levels of success in fulfilling this role, due in part to the inherent challenges of influencing policy. The strength of an academy's infrastructure, degree and security of funding, and level of membership engagement and commitment are also key contributing factors. Regional networks and their national members vary in terms of size, age, resources, operations and influence.

⁴⁷ For example: Christl A. Donnelly, Ian Boyd, Philip Campbell, Claire Craig, Patrick Vallance, Mark Walport, Christopher J. M. Whitty, Emma Woods & Chris Wormald, 2018. [Four principles to make evidence synthesis more useful for policy](#) *Nature* 558, 361-364 (2018) | doi: 10.1038/d41586-018-05414-4

⁴⁸ International Network for Government Science Advice: Principles and Guidelines. <https://www.ingsa.org/resources/ethics-and-principles/>. Accessed 8 March 2019.

⁴⁹ The Association of Academies and Societies of Sciences in Asia. <http://aassa.asia/>. Accessed 8 March 2019.

⁵⁰ European Academies Science Advisory Council. <https://www.easac.eu/>. Accessed 8 March 2019.

⁵¹ InterAmerican Network of Academies of Sciences. <https://www.ianas.org/>. Accessed 8 March 2019.

⁵² Network of African Science Academies. <http://nasaonline.org/>. Accessed 8 March 2019.

The Global Young Academy and National Young Academies

The [Global Young Academy \(GYA\)](#)⁵³ is an organisation of young scientists from around the world in the first 3-10 years of their research careers. They are selected on the basis of their scientific excellence and commitment to service. In contrast to the typical lifetime membership of senior academies, GYA members serve five-year terms. The GYA has a maximum capacity of 200 members, with an alumni group of 216 as of 2019. Together, members and alumni currently represent 83 countries.

The GYA provides a voice to young scientists all over the world. As an independent member-led academy, it engages in science advice and policy-for-science initiatives; and it conducts independent, externally funded studies and publishes statements on international science policy, the research environment, science education and the SDGs. The GYA also supports the establishment and coordination of [National Young Academies](#)⁵⁴ around the world, acting as a facilitator for this growing network. As of 2019, there are 37 National Young Academies (NYAs) and 10 similar bodies for early career researchers worldwide. Others are close to launching. The fastest growing region for the establishment of NYAs is Africa, which currently has 13, or 35% of the total worldwide. Their membership policies are similar to those of the GYA, with limited terms and a commitment to serving society.

The potential of all senior and young science academies

Whether academies are senior or young, new or established, they face similar challenges: influencing policy is a test of diplomacy, advocacy and tenacity, and being able to exploit the opportunities available to them requires investment in skills, money and time that many feel they can ill afford without additional support.

Nevertheless, academies can be providers and/or conduits for independent science advice in national, regional and global contexts, and agents for capacity building and change in national science systems. Academies have the potential to become stronger advocates for (i) national investment in STI, especially in developing countries; (ii) science advice for policymaking; and (iii) support from the science community for implementation of actions to achieve the SDGs.

The academies are unique institutions capable of being major conduits between government and civil society: with new academies being developed in the Middle East (UAE, Kuwait and Oman) and other parts of the world, the potential contribution of academies is growing. EASAC's recent [think tank award](#)⁵⁵ is as an example of what academy networks can achieve with strong leadership, a professional secretariat, engaged membership and a commitment to communications and outreach.

But academies are imperfect. They can be perceived to be out-of-touch, redundant, or too slow to react, and some are invisible to their own research communities. Some of these issues are addressed in **Appendix 2**, a think piece on merit-based academies.

⁵³ Global Young Academy. <https://globalyoungacademy.net/>. Accessed 8 March 2019.

⁵⁴ Global Young Academy : National Young Academies. <https://globalyoungacademy.net/national-young-academies/>. Accessed 8 March 2019.

⁵⁵ The Power of Communication: The Public Affairs Awards Europe celebrate the best of public affairs in Europe. <http://news.prca.org.uk/the-public-affairs-awards-europe-celebrate-the-best-of-public-affairs-in-europe/>. Accessed 8 March 2019.

FIGURE 2.1: A summary of the 2016/17 academies survey on the SDGs



Survey of academies on SDGs awareness and engagement

National senior and young academies were surveyed in late 2016/early 2017. [Survey results](#) are available online,⁵⁶ as is a slide pack designed for academies to use locally and share with their respective members. The survey helped the Project Working Group understand how the academies see their role in the implementation of actions to achieve the SDGs, what they are doing to this effect, what prevents them from doing more, and how they think they can best contribute to this agenda in future.

The survey also provides a map showing where academies can bring knowledge to the SDGs. A number of external (including UN) agencies have expressed interest in the results, keen to draw on the expertise of academies and source work that can support the SDGs; similarly, international development agencies can use the database to find where there is local technical capacity and potential new in-country partners to help them support the SDGs in developing countries.

Eighty-five academies participated (40% of IAP membership and 85% of NYAs), distributed across all four regions. Overarching themes are illustrated in Figure 2.1. Blue boxes denote main survey findings, and green boxes ways in which academies feel they and the wider science community can support the SDGs.

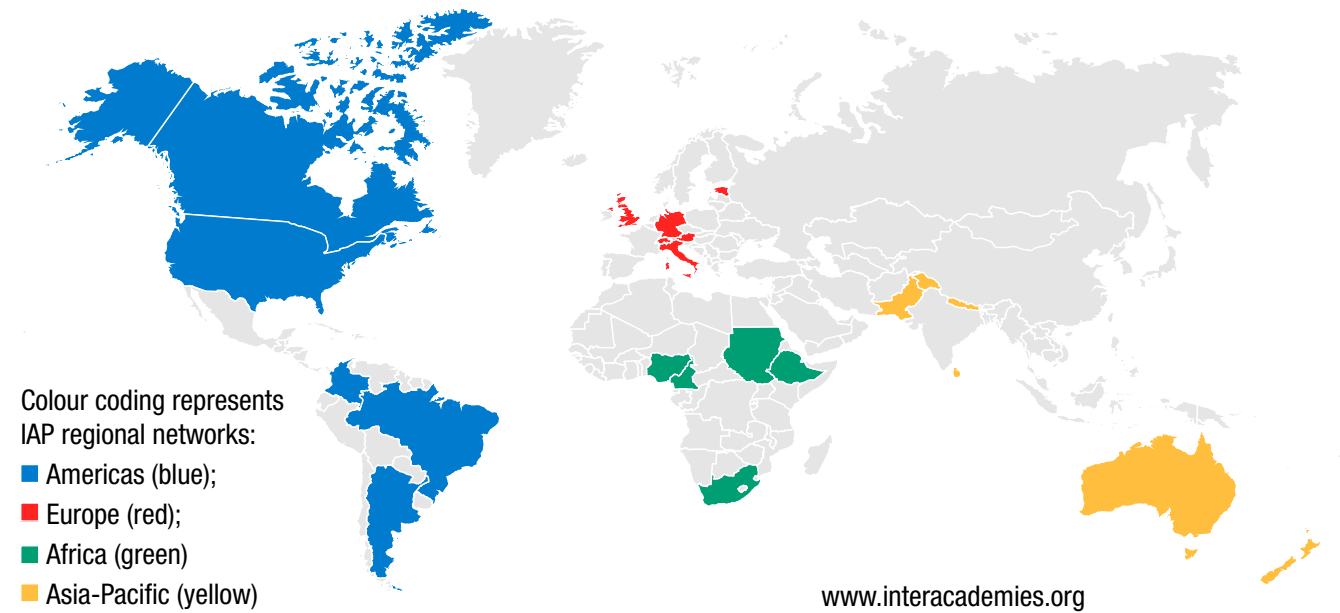
Database of SDG-relevant academy outputs

The survey identified recent and ongoing academy and inter-academy projects that are relevant to the SDGs, and a pressing need to bridge the gap between knowledge supply and knowledge demand. There is a lot of existing knowledge that is simply not being applied to the SDGs because (1) it precedes the SDGs; (2) it is not explicitly framed around the SDGs and so may not be asking the same questions policymakers seek to address; and (3) it is not reaching the target user. This reflects the lack of project co-design and co-production in the system, as well as the lack of platforms for scientists and policymakers to interact, whether directly or through brokers or intermediaries.

In response, IAP has developed an online database of recent academy reports relevant to the SDGs, which it anticipates will be of benefit to the UN and international development agencies. There are currently 424 entries (116 Americas, 59 Asia, 57 Africa and 167 Europe), including regional network publications (Figure 2.2). Searchable by SDG, country and region, the database provides an indication of in-country expertise and potential reach. This can help development agencies trying to source better data to inform immediate and long-term development planning, helping countries to use STI to respond effectively to major threats caused by climate change, unplanned urbanisation and population growth, for example. National academies could be useful in-country partners for development agencies.

⁵⁶ InterAcademy Partnership: Results of the Survey of the Academies. <http://www.interacademies.org/36188/Results-of-the-Survey-of-the-Academies>. Accessed 8 March 2019.

FIGURE 2.2: Report uploads by country



In addition to region- and country-specific projects, the IAP has a long track record of inter-academy cooperation in areas pertinent to the SDGs, picked up in the survey and database. This project has helped the projects develop better links with SDG policymaking and implementation communities (“users”). These global programmes are:

- IAP Food and Nutrition Security and Agriculture Research Project (FNSA);⁵⁷
- IAP Science Education Programme (SEP);⁵⁸
- IAP Biosecurity Working Group (BWG);⁵⁹ and
- IAP Research Integrity and Policy for Science work.⁶⁰

Representatives of parts of the UN system responsible for implementing the SDGs (described in Chapter 3) have expressed an interest in connecting IAP’s projects database with their own developing online knowledge platforms for policymakers, and work continues to align these efforts.

FIGURE 2.3: Report uploads by SDG theme [national and regional reports]



The size of the boxes is proportional to the number of reports: the academies have published most reports on health-related issues (SDG-3) and fewest reports classified under poverty (SDG-1).

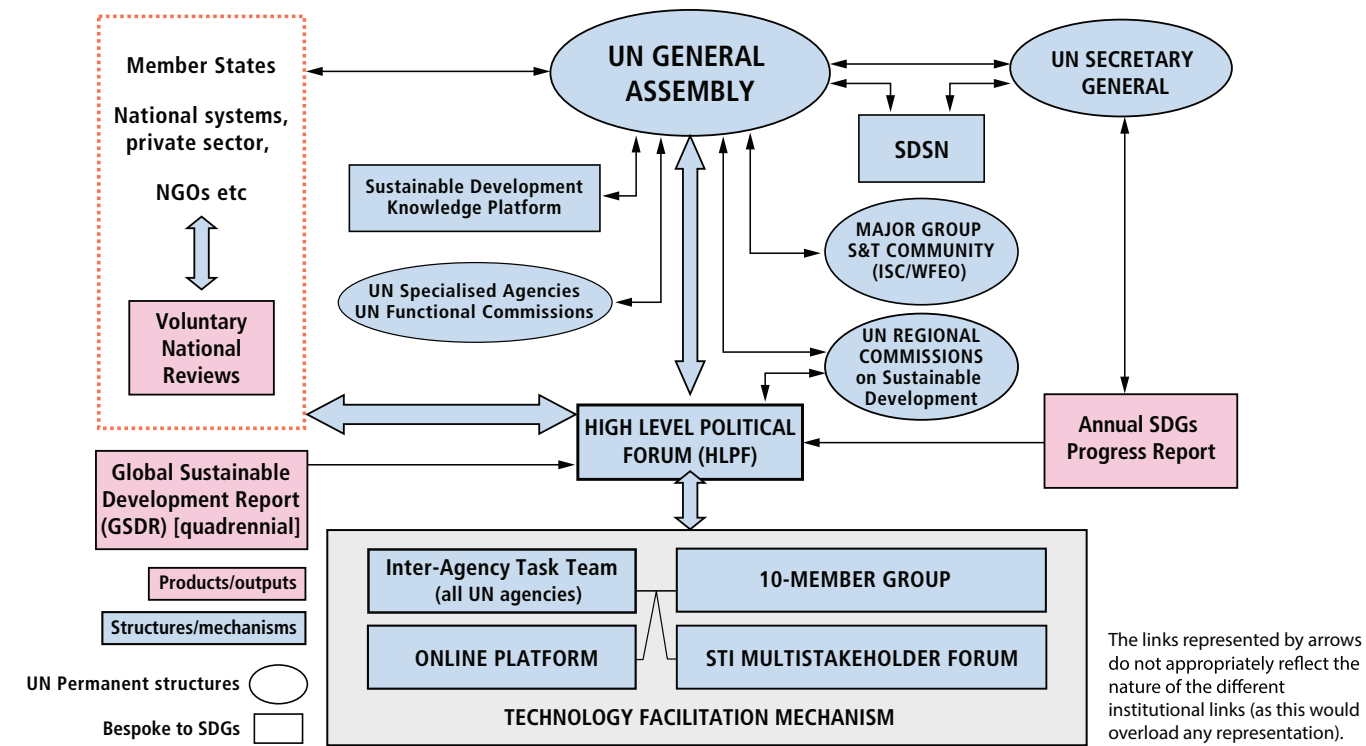
⁵⁷ Food and Nutrition Security and Agriculture. <http://www.interacademies.org/37646/Food-and-Nutrition-Security-and-Agriculture>. Accessed 8 March 2019.

⁵⁸ The Global IAP Science Education Programme. <http://www.interacademies.org/ProjectsAndActivities/Projects/12250/18276.aspx>. Accessed 8 March 2019.

⁵⁹ IAP BWG - The Biosecurity Working Group of the Global Network of Science Academies. <http://www.interacademies.org/38357/BiotechnologyandBiosecurity>. Accessed 8 March 2019.

⁶⁰ Doing Global Science: A Guide to Responsible Conduct in the Global Research Enterprise. <http://www.interacademies.org/33345/Doing-Global-Science-A-Guide-to-Responsible-Conduct-in-the-Global-Research-Enterprise>. Accessed 8 March 2019.

FIGURE 3.1: Mapping science advice in the UN SDGs process (illustrative)



Governance of the SDGs within the UN system

The UN organisational structure is complex, and its components are not wholly coordinated. The current UN Secretary-General, António Guterres, has undertaken to reform UN infrastructure to position sustainable development at the heart of the UN, improve coordination and place more emphasis on national ownership.⁶⁶

Principal UN governance structures

The principal permanent organs most pertinent to governance of the SDGs are:

- **General Assembly:** the main deliberative, policymaking and representative organ of the UN. All 193 member states are represented here, making it the only UN body with universal representation. It meets annually in or around September.
- **Economic and Social Council (ECOSOC):** also a body of member states, the principal body for coordination, policy review, policy dialogue and recommendations on economic, social and environmental issues, and the implementation of the SDGs. It serves as the central mechanism for UN activities, and its specialised agencies supervise subsidiary and expert bodies. Its 54 members are elected by the General Assembly for overlapping three-year terms.

- **UN Secretariat:** comprising the **Secretary-General** and many international UN staff members who carry out the day-to-day work of the UN as mandated by the General Assembly and other principal organs. It is organised into departments and offices, each with a distinct area of action and responsibility.
- **Department of Economic and Social Affairs (UN-DESA):** its Division for Sustainable Development Goals provides leadership in coordinating the implementation of the sustainable development agenda. It serves as the co-secretariat for the High-Level Political Forum (HLPF) and secretariat to the Technology Facilitation Mechanism, structures set up specifically for the governance of the SDGs.
- **UN Statistics Division:** this is responsible for managing the global monitoring framework and produces the Secretary General's annual progress report.
- A number of **specialised UN agencies**, such as the Food and Agriculture Organisation (FAO), UN Development Programme (UNDP), UN Environment Programme (UNEP) and the UN Agency for Disaster Risk Reduction (UNISDR), many with country-level offices, are important on-the-ground agencies for implementation of the SDGs.

The UN governance structure is described comprehensively elsewhere.⁶⁷ The remainder of this chapter endeavours to summarise the **key science advisory structures within and supporting the UN**, as major entry points for the science community to engage. It builds on and supplements work already published on this subject.^{68, 69}

Permanent UN science advisory structures

Science advisory mechanisms are found in different forms throughout the UN structure, and there is little standardisation or parity. For example, the UNEP has its own Chief Scientist, and the UNISDR its own Science and Technical Advisory Group (STAG). There are also established **global science assessment panels**, the most prominent examples being the Intergovernmental Panel on Climate Change (IPCC) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).

- The Commission on Science and Technology for Development (CSTD)⁷⁰ is a subsidiary body of the UN Economic and Social Council (ECOSOC) and is responsible for examining the implications of S&T for development, advancing UN understanding of S&T policy, and formulating recommendations and guidelines on S&T matters within the UN system. It is a member state body so its decisions/recommendations are negotiated outcomes. CSTD's secretariat is provided by the UN Conference on Trade and Development

⁶⁶ Countries back 'ambitious and comprehensive' reform of UN development system. <https://news.un.org/en/story/2018/05/1011111>. Accessed 8 March 2019.

⁶⁷ United Nations: About the UN. <http://www.un.org/en/about-un/>. Accessed 8 March 2019.

⁶⁸ Knowledge and Diplomacy: science advice in the United Nations System. (2002). <https://www.nap.edu/read/10577/chapter/1>.

⁶⁹ Scientific Advice for Policy Making. OECD Science, Technology and Industry Policy Papers. Organisation for Economic Co-Operation and Development (OECD). (2015). <https://doi.org/10.1787/5js331jcpwb-en>.

⁷⁰ United Nations Commission on Science and Technology for Development (CSTD). <https://unctad.org/en/Pages/CSTD/CSTD-mandate.aspx>. Accessed 8 March 2019.

(UNCTAD) which, at the request of individual countries, conducts annual national STI policy reviews,⁷¹ or STIPs, to improve national STI plans and programmes so that they can better contribute to development strategies and improve national competitiveness; STIPs are shared with other countries in the region.

- The core programmes of the [UN Educational, Scientific and Cultural Organisation \(UNESCO\)](#)⁷² are being aligned to the SDGs and African development agendas, as it develops its new strategy. UNESCO looks to partnerships for all its strategic foci, including STEM Education and STI policy; the primary tool for the latter is the **Global Observatory Science Policy Information Network (GO-SPIN)**, which is being expanded to help member states in developing countries with STI policy and sharing good practice. UNESCO is also responsible for the quinquennial [UNESCO Science Report](#).⁷³

During the period 2014-2016, UNESCO provided the secretariat for the [UN Secretary-General's Scientific Advisory Board \(UNSAB\)](#),⁷⁴ commissioned by the then UN Secretary General, Ban Ki-moon. UNSAB's mission was to provide "advice to the UN Secretary-General and the Executive Heads of UN organisations on strengthening the interface between science, policy and society, particularly in areas relevant to sustainable development." Its mandate was not renewed, following the appointment of the current UN Secretary General, António Guterres, and it has not been replaced.

Brief comment on the UN Science Advisory Board

A group of 26 highly regarded, well-established experts in their fields, the UNSAB produced short, easily digestible reports on issues of importance to global policymaking. The model was not perfect: it was chaired and administratively supported by UNESCO, which some perceived as compromising its independence; its focus tended to be bottom-up rather than UN-driven; direct contact with the UN Secretary General was limited; it did not draw on a wider pool of scientific experts but rather an in-house (UNESCO-funded) policy team; nor was its work apparently peer-reviewed. There have been calls for the continuation of a Board – comprising different disciplines and nationalities – but with its own independent funding stream and convening meetings all over the world to engage more global scientists. An important task for any new Board would be "to determine and map the various science advisory mechanisms within the UN, in the interest both of efficiency and effectiveness."⁷⁵

UN science advisory structures specific to the SDGs

There are several UN mechanisms for feeding STI into the SDGs, some of them through permanent structures and others through dedicated structures set up specifically for the SDGs.

⁷¹ United Nations Commission on Science and Technology for Development (CSTD). <https://unctad.org/en/Pages/CSTD/CSTD-mandate.aspx>. Accessed 8 March 2019.

⁷² United Nations Educational, Scientific, and Cultural Organization. <https://en.unesco.org/>. Accessed 8 March 2019.

⁷³ UNESCO Science Report: https://en.unesco.org/unesco_science_report.

⁷⁴ The Scientific Advisory Board of the United Nations Secretary-General. <https://en.unesco.org/themes/science-sustainable-future/scientific-advisory-board-united-nations-secretary-general>. Accessed 8 March 2019.

⁷⁵ The Future of scientific advice to the United Nations: a summary report to the Secretary-General of the United Nations from the Scientific Advisory Board. (2016). <https://unesdoc.unesco.org/ark:/48223/pf0000245801>.

(i) At the global level

- **The High Level Political Forum (HLPF)**⁷⁶ is the central platform for the follow-up and review of Agenda 2030 and the SDGs. It meets annually under ECOSOC at ministerial level and quadrennially under the General Assembly at the heads of state/government level (the next one in 2019). The HLPF is the most inclusive and participatory forum at the UN, bringing together all member states, specialised agencies and [Major Groups](#),⁷⁷ which facilitate the participation of 13 different sectors, including science and technology. The HLPF has met every July since 2016 and reviews several SDGs each year. The annual review is the central platform for the follow-up and review of Agenda 2030 and the SDGs; the schedule is shown below.

Year	Theme	SDGs under review
2016	Ensuring that no one is left behind	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
2017	Eradicating poverty & promoting prosperity in a changing world	1 2 3 5 9 14 17
2018	Transformation towards sustainable and resilient societies	6 7 11 12 15 17
2019	Empowering people and ensuring inclusiveness and equality	4 8 10 13 16 17
2020 onwards	To be determined in 2019	

- The [Scientific and Technological Community \(STC\) Major Group](#)⁷⁸ is co-organised by the International Science Council (ISC) and the World Federation of Engineering Organisations (WFEO). In this capacity, ISC and the WFEO are the representatives of the global S&T community. They are invited to participate in major intergovernmental fora under the auspices of the UN; access official documents and submit position statements on behalf of the global science community; nominate experts for UN initiatives; and organise side events and roundtables in cooperation with UN member states and the UN Secretariat. The STC Major Group provides an important pathway for feeding science into UN processes, and is a major advocate for science influencing global policymaking.
- The [Technology Facilitation Mechanism \(TFM\)](#)⁷⁹ focuses on STI for the SDGs, supporting the implementation of the SDGs through the sharing of information, experiences, best practices and policy advice among Member States, civil society, the private sector, the scientific community, UN entities and other stakeholders. It briefs the UN HLPF and comprises (1) a UN inter-agency task team (IATT) on science, technology and innovation for the SDGs (comprising 42 entities including the World Bank and the UN Regional Commissions); (2) a collaborative multi-stakeholder forum on science, technology and

⁷⁶ High-Level Political Forum on Sustainable Development. <https://sustainabledevelopment.un.org/hlpf>. Accessed 8 March 2019.

⁷⁷ Sustainable Development Goals: Major groups and other stakeholders. <https://sustainabledevelopment.un.org/majorgroups/about>. Accessed 8 March 2019.

⁷⁸ Sustainable Development Goals: Scientific and Technological Community. <https://sustainabledevelopment.un.org/majorgroups/scitechcommunity>. Accessed 8 March 2019.

⁷⁹ <https://sustainabledevelopment.un.org/tfm>. Accessed 8 March 2019.

innovation for the SDGs that meets annually; and (3) an online platform, a gateway for information on existing STI initiatives, mechanisms and programmes. Every two years, a **10-Member Group of scientists** is appointed by the UN Secretary General to guide this TFM process. Their role is to challenge and change STI systems so that they are more orientated towards the delivery of Agenda 2030.

The TFM is responsible for facilitating actions and policies that strengthen STI for the SDGs capabilities and build human capacity at the individual, organisational, and political levels in every country; **platforms for sharing knowledge**, information, experiences and advice on relevant policies, actions, partnerships, technologies, and research and development (R&D) outcomes; and **mechanisms for developing national and international STI action plans and roadmaps** (including plans for R&D and technology deployment) for achieving the SDGs. Under the leadership of UNDESA and IATT institutions, with support from the Government of Japan, country case studies are being identified to develop STI roadmaps, to align them with national SDG implementation plans and national development plans. The TFM also hosts a series of expert group meetings (EGMs) to provide analysis and assessment of the implications of new technologies for the SDGs, in preparation for the STI Forum.

The first annual UN STI **Multi-Stakeholder Forum**⁸⁰ was held in June 2016. These fora will continue until 2030 with the purpose of bringing together decision-makers, practitioners, scientists, innovators and entrepreneurs to address STI for the SDGs. Their purpose is fivefold:

1. to promote STI cooperation, dialogue and exchange of good practice, including the development of accessible repositories of good practice;
2. to explore technology needs and gaps at all levels, including scientific cooperation, innovation and capacity-building, and using these fora to design national STI-for-SDGs roadmaps/action plans to support implementation and ways of measuring progress;
3. to facilitate networking and new partnerships;
4. to facilitate the development, transfer and dissemination of relevant technologies for the SDGs; and
5. to assess the impact of rapid technological change on the SDGs and explore policy options to enhance the positive impacts across countries at different stages of development.

In contrast to the HLPF's progress review of the SDGs, the TFM Multi-Stakeholder Forum discusses how STI underlies the implementation of actions to achieve the SDGs outside of the UN system and is directed at a wider audience. In general, these fora are more focused on broadening the awareness of the SDGs' complexities than analysing the progress of the goals.

- The **Global Sustainable Development Report (GSDR)**⁸¹ is an instrument for strengthening the science-policy interface and is prepared directly for the HLPF as a platform and process for engaging scientists (within and outside the UN) around the world.

⁸⁰ First Annual STI Multistakeholder Forum: <https://sustainabledevelopment.un.org/index.php?page=view&type=13&nr=1924&menu=1634>.

⁸¹ Sustainable Development Goals: Global Sustainable Development Report 2019. <https://sustainabledevelopment.un.org/globalreport/2019>. Accessed 8 March 2019.

There have been three editions to date (2014, 2015, 2016) facilitated by UN-DESA. In the most recent report, 245 scientists and experts based in 27 countries, including 13 low- and middle-income countries, contributed, prioritising: (i) the development of national and international STI-for-SDGs roadmaps/action plans; (ii) building effective national science-policy interfaces; (iii) facilitating S&T training and learning; (iv) developing new tools and scientific innovations for data collection and analysis; (v) devising metrics, establishing monitoring mechanisms, evaluating progress, enhancing infrastructure, standardising and verifying data; and (vi) foresight analyses, including identifying promising technological trajectories and new industries.

The GSDR is now being produced every four years, focusing on different subsets of the SDGs. Fifteen experts from different geographies and disciplines have been tasked with production of **GSDR 2019**.⁸²

- The UN's **Sustainable Development Solutions Network (SDSN)**⁸³ and its online "SDG Academy" aim to accelerate joint learning and help to overcome the compartmentalisation of technical and policy work by promoting integrated approaches to interconnected economic, social, and environmental global challenges. The SDSN works closely with UN agencies, multilateral financing institutions, the private sector, and civil society.
- The **UN Technology Bank** was launched in 2017 as an STI supporting mechanism dedicated to least developed countries (LDCs). Its establishment is one of the first SDG targets to be met. The bank will serve to strengthen national capabilities and provide expertise to LDCs to ensure they are not left behind.

(ii) At the regional level

- The **UN Regional Commissions** serve as the UN regional outposts across five regions: **UN Economic Commission for Europe (UNECE)**,⁸⁴ **UN Economic and Social Commission for Asia and the Pacific (UNESCAP)**,⁸⁵ **UN Economic Commission for Latin America (UNECLAC)**,⁸⁶ **UN Economic Commission for Africa (UNECA)**⁸⁷ and **UN Economic and Social Commission for Western Asia (UNESCWA)**.⁸⁸ They promote the regional implementation of actions to achieve the SDGs and help to bridge economic, social and environmental gaps among their member countries and sub-regions through peer learning and cooperation. Each hosts an annual Regional Forum on Sustainable Development, whose reports feed into the HLPF.
- **Multilateral Development Banks** – including the World Bank and Regional Development Banks – roughly correspond to the UN Regional Commissions and provide financing and professional advice on development issues. They can play an important role in technical capacity building, including policy skills.

⁸² Background to the 2019 Global Sustainable Development Report: <https://sustainabledevelopment.un.org/globalreport/2019>.

⁸³ Sustainable Development Solutions Network. <http://unsdsn.org/>. Accessed 8 March 2019.

⁸⁴ United Nations Economic Commission for Europe. <http://www.unece.org/info/ece-homepage.html>. Accessed 8 March 2019.

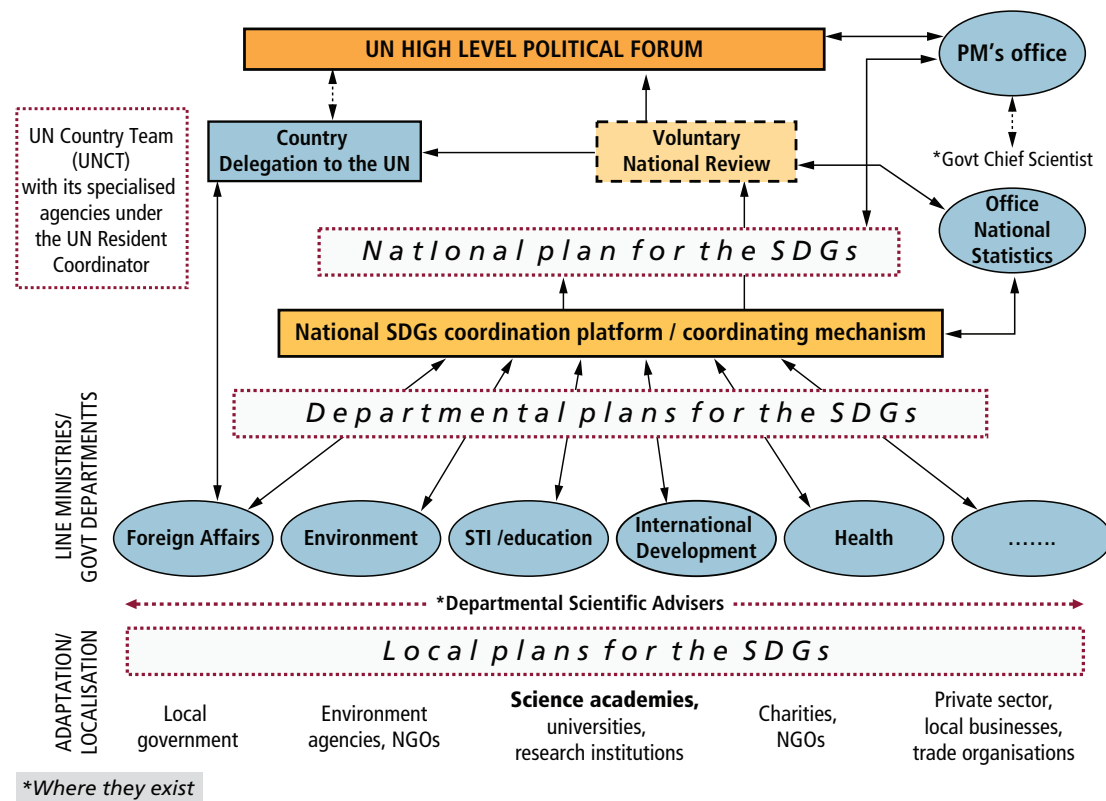
⁸⁵ United Nations Economic and Social Commission for Asia and the Pacific. <https://www.unescap.org/>. Accessed 8 March 2019.

⁸⁶ Economic Commission for Latin America and the Caribbean. <https://www.cepal.org/en>. Accessed 8 March 2019.

⁸⁷ United Nations Economic Commission for Africa. <https://www.uneca.org/>. Accessed 8 March 2019.

⁸⁸ UN Economic and Social Commission for Western Asia. <https://www.unescwa.org>. Accessed 8 March 2019.

FIGURE 3.2: Mapping science advice at the national level (illustrative)



(iii) At the national level

Few countries have a formal science advisory mechanism and, of those that do, no two are alike: they are necessarily context-specific. Figure 3.2 is a stylised, idealised national system as a non-context-specific illustration of the different levels of SDGs planning that could exist at country level, in which academies could potentially engage. In reality, achieving coherent structures like this is both difficult and rare.

One thing common to all countries, in the context of the SDGs, is the **Voluntary National Reviews (VNRs) process**.⁸⁹ As part of its follow-up and review mechanisms, the 2030 Agenda for Sustainable Development encourages member states to “conduct regular and inclusive reviews of progress at the national and sub-national levels, which are country-led and country-driven” and presented to the HLPF. VNRs aim to facilitate the sharing of experiences, including successes, challenges and lessons learned amongst in-country stakeholders; strengthen government policies and institutions; and mobilise multi-stakeholder support and partnerships.

Each year UNDESA releases an updated **Handbook for the Preparation of VNRs**⁹⁰ and voluntary reporting guidelines for participating member states. Twenty-two VNRs were reviewed in 2016; 43 in 2017; 46 in 2018; and 51 countries are committed in 2019. **The latest synthesis on the VNR process**⁹¹ identifies ongoing challenges in implementation,

including “the prioritization of the SDGs in the local context and the strengthening of the institutional capacities of all the key stakeholders engaged in the process, including the monitoring and reporting institutions” and “strengthening the role of evidence-based [statistics and] policy making to increase transparency... the production of high quality, timely, reliable and disaggregated data is critical to support effective policy and decision-making remains a challenge.”

The VNRs have a tendency to silo the SDGs, so critical interactions between the goals are neglected or underplayed. This failure to analyse interdependencies and competition between the goals is aggravated by a tendency to retrofit existing programmes that were not designed specifically to address the SDGs.

Summary of routes by which the science community can support the SDGs

There are numerous opportunities for the science community to support the SDGs, summarised as follows:

- Supporting the Technology Facilitation Mechanism (TFM), including participating in the annual UN STI Multi-stakeholder Forum, supporting TFM working groups and Expert Group Meetings (EGMs) organized by UNDESA to focus on specific issues;
- Supporting the quadrennial Global Sustainable Development Report (GSDR) process;
- Contributing to consultations and calls for experts through the STC Major Group;
- Providing expertise to the science-based work of the various UN structures, including annual STI policy and thematic reviews conducted by UNCTAD and CSTD;
- Engaging with the UN Regional Commissions and their annual regional fora on sustainable development, especially through the IAP regional networks;
- Supporting the Voluntary National Review (VNR) process;
- Participating in national sustainability platforms/equivalent coordination mechanisms;
- Contributing to the development of national STI-for-SDGs roadmaps/action plans, including helping to assess countries where they may be most effective (e.g. countries with high “readiness” indices);
- Participating in international research collaborations, monitoring and evaluation programmes, e.g. Future Earth;
- Advocating for a stronger science advisory mechanism for the UN to strengthen global evidence-informed policymaking;
- Reflecting the SDGs in (inter)academy programmes and initiatives.

UN mechanisms designed specifically for the SDGs create more opportunities than ever for STI to inform global policymaking, with multiple pathways and structures. But this in turn creates complexity; the project survey responses suggested that these UN mechanisms, meant to facilitate engagement, are instead perceived as a barrier. This chapter has endeavoured to help the science community more readily navigate its way around the UN and find the most effective entry points for bringing science to the SDGs.

⁸⁹ Background to Voluntary National Reviews at: <https://sustainabledevelopment.un.org/vnrs/>.

⁹⁰ Handbook for the Preparation of Voluntary National Reviews. https://sustainabledevelopment.un.org/content/documents/20872VNR_hanbook_2019_Edition_v4.pdf. Accessed 8 March 2019.

⁹¹ Synthesis of Main Messages 2018. https://sustainabledevelopment.un.org/content/documents/20027SynthesisofMainMessages2018_0607.pdf. Accessed 8 March 2019.

smart agricultural adaptation and for mitigating agriculture's contribution to climate change. There is an appetite within the UN for comparative analyses and interregional methodologies, especially ones that take an integrated approach and explore interrelated sets of SDGs. In future, IAP could consider applying a similar methodology to other clusters of SDGs as a unique contribution to better understanding SDG interdependencies and informing more robust policy investments. In doing so, it should factor in the HLPF annual review schedules for the SDGs so that it can time its output optimally.

Engaging with the Commission on S&T for Development (CSTD)

A subsidiary body of the Economic and Social Council (ECOSOC), the CSTD is responsible for monitoring STI developments and their policy implications, and formulating recommendations and guidelines on S&T matters within the UN system. Several efforts were made to engage CSTD on the FNSA and the wider project, but with little traction. Timing of the FNSA report (two years after the CSTD was reviewing food security and one year after HLPF was reviewing SDG-2) was undoubtedly an issue, but this does not account for failure to build stronger institutional links. It is perhaps an illustration of how difficult it can be to find entry points into a complex UN system resourced by busy people managing many constituencies. Nevertheless, nurturing effective, long-term connections with CSTD should be a goal for IAP.

Engaging with the STC Major Group

The [Scientific and Technological Community \(STC\) Major Group](#)⁹⁵ is responsible for ensuring that science is integrated into UN policy development. It is a formal and vital mechanism for feeding the voice of global science – where properly constituted – into UN deliberations, but it needs support, especially at the regional level.

Throughout the course of this project, it became clear that the STC Major Group function is not widely recognised or understood by many in the global science community, even amongst ISC members (many of which are academies). By virtue of the IAP project, the IAP Working Group was included in the STC Major Group consultation for scientist nominations for the 2018 HLPF and contributed to the STC Major Group's position paper for the HLPF delegates' briefing pack.

IAP and its member academies can use this mechanism, perhaps especially those who are also members of the International Science Council, to help apply science to the SDGs. A challenge beyond the lifetime of the project will be to sustain links with the STC Major Group and continue to be a point of reference for ongoing consultations.

Participating in the UN STI Multistakeholder Fora

The UN STI Multistakeholder Forum reports to the HLPF and is responsible for strengthening policy and practice that supports the application of STI to the SDGs. Part of the Technology Facilitation Mechanism and organised by UNDESA, the InterAgency Task Team (IATT) and the 10-Member Group, the Forum – for the first time – brings together many different agencies (under the IATT), Major Groups and stakeholders from the global STI community.

The IAP project was represented at the inaugural UN STI Multistakeholder Forum in June 2016 and subsequent 2017 and 2018 meetings. The 2016 Forum set out the paradigm shift required in science to meet the SDGs; the profound changes required at four levels (individual,

organisational, policy, international);⁹⁶ and the need for strong and coherent science advisory systems at all levels. The mood of the Forum was one of optimism and opportunity; of starting something new, as captured in the [Co-Chairs' summary for the HLPF](#).⁹⁷

In 2017, the Forum featured an [IATT mapping exercise](#)⁹⁸ of existing UN STI initiatives and built on the concept of national, regional and global STI-for-SDGs roadmaps to identify gaps and opportunities in skills, expertise, R&D, financial planning and investment. Common themes were building effective partnerships across global science networks so that there is a unified global voice for science; the need to strengthen the integration of research across disciplines; mutual problem-solving through co-design and co-production of knowledge; and being truly global by harnessing multiple geographic approaches and considerations.

IAP ran a side event at the 2017 forum on improving scientific input to global policymaking. Side event organisers can feed the output and key messages from their event into the STI Forum Co-Chairs' summary, which is submitted to the HLPF. In 2017, IAP was partly responsible for the inclusion of two important paragraphs in the [Co-Chairs' summary](#).⁹⁹

61. Scientists must better understand policy and policymaking processes. A diversity of scientists – both young and old – must be incentivized and mobilised to support evidence-based policymaking.

69. National science, technology and innovation plans and policies should be conceived and designed in an open and inclusive manner, building on the diverse expertise and knowledge of stakeholders. Academies of science and related organized science groups should be encouraged to take an active role in national science, technology and innovation policy processes and in identifying needs and gaps. Effective science-policy interfaces are crucial for informed policymaking. The United Nations system should strengthen such interfaces, building trust between science and politics.

The third STI Forum in 2018 was led by new Co-Chairs and a new 10-Member Group. It was more technology- and innovation-focused than prior fora, with less consideration of science *per se* and of strengthening the science-policy interface. Side event applications were heavily over-subscribed, demonstrating the significant demand for such a forum. There was apprehension about the impact of new and emerging technologies on the development agenda, and NGOs, through the Major Group process, had a strong voice. The deliberations of the 2018 Forum were set out in the [Co-Chairs' summary](#).¹⁰⁰

⁹⁶ (1) individual level, e.g. developing metrics for valuing excellence and shaping career advancement that do not create perverse incentives; (2) organisational level, e.g. addressing the competitive system of university rankings; (3) policy level, e.g. reconciling national STI policies driven by economic benefit yet being required to serve the SDGs; and (4) international level, e.g. rationalising disjointed and competitive global science advisory systems.

⁹⁷ Multi-stakeholder forum on science, technology and innovation for the Sustainable Development Goals: summary by the Co-Chairs. http://www.un.org/ga/search/view_doc.asp?symbol=E/HLPF/2016/6&Lang=E. Accessed 8 March 2019.

⁹⁸ Landscape of Science, Technology and Innovation initiatives for the SDGs. https://sustainabledevelopment.un.org/content/documents/147462017.05.05_IATT-STI-Mapping.pdf. Accessed 8 March 2019. This reported that STI is the second means of implementation for the SDGs after financing for development; with 20 UN agencies delivering 1,600 UN STI initiatives, drawing on 2,600 staff, a US \$1 billion budget, and US \$120 billion in loans and grants

⁹⁹ Multi-stakeholder forum on science, technology and innovation for the Sustainable Development Goals. (2017). http://www.un.org/ga/search/view_doc.asp?symbol=E/HLPF/2017/4&Lang=E. Accessed 8 March 2019.

¹⁰⁰ Multi-stakeholder forum on science, technology and innovation for the Sustainable Development Goals. (2018). https://sustainabledevelopment.un.org/content/documents/19280STI_forum_2018_cochairs_summary_final_4_DRAFT_clean.pdf. Accessed 8 March 2019.

⁹⁵ Sustainable Development Goals: Scientific and Technological Community. <https://sustainabledevelopment.un.org/majorgroups/scitechcommunity>. Accessed 8 March 2019.

The multistakeholder nature of these fora contrasts with traditional UN meetings, and the IATT has been an important innovation. IATT and the 10-Member Group are developing workstreams (such as STI-for-SDGs roadmaps) and have an opportunity to develop an overall strategic vision for STI-for-SDGs to 2030, and to bring rigour and continuous review and improvement to implementation. One approach could be to systematically identify and distinguish between basic research, technological and data questions that need to be addressed for each SDG, potentially creating new, integrated fields of science. Nevertheless, the lack of substantive UN funding for the TFM is a major obstacle (the online platform, for example, has stalled due to lack of funds), and it remains unclear if these multistakeholder fora can realise their ambition.

With this caveat, IAP could continue to participate in these fora and build on the connections made there:

- In running sessions and side events, organisers have an opportunity to submit key messages to the UNDESA Secretariat for potential inclusion in the summary for HLPF; general participants do not.
- The 10-Member Group needs support: changing every two years and hampered by diverse national interests and lack of funding, the Group must draw on the global science community and its leadership to effect change.
- Major Groups can influence the views of member states, and some – those that are well-represented and vocal – can be effective advocates for their respective constituencies. IAP, its regional networks and members can help strengthen the STC Major Group by supporting the efforts of ISC and WFEO.

Expert Group Meetings on STI-for-SDGs roadmapping

STI roadmaps or action plans can help identify challenges and solutions, advise policies and actions, and help monitor and evaluate progress: integrated into national development plans incorporating the SDGs, they can potentially effect real change. Four “expert group meetings” (EGMs) on STI roadmaps were convened around the world in 2018, hosted by UNDESA, UNCTAD, UNESCO and several agencies, and with strong backing from the Government of Japan and the World Bank. The EGMs are consultation events helping to shape a “Guidebook on Development of Science, Technology and Innovation Roadmaps,” presented at the UN STI Multistakeholder Forum in May 2019. The guidebook must be tailored to national contexts to be useful. In spite of some scepticism, many hold the view that until STI roadmaps are developed and implemented, STI-for-SDGs risks remaining as rhetoric.

The IAP project was represented at two of these EGMs (Asia and Europe), where it became clear that academies can support STI-for-SDGs roadmaps in at least three ways:

- **using their convening power:** facilitating the development of national or regional roadmaps by convening key stakeholders;
- **socialising (STI for) the SDGs:** engaging with their respective governments, their members, their universities and students, and the public through outreach programmes;
- **creating institutional roadmaps:** developing their own action plans to support and inform national ones.

Academies might also be able to help identify the *readiness* of academic communities for supporting the SDGs and possibly even to help identify those countries where roadmaps might be especially impactful. **Indicators for readiness** could include, for example, advisory ecosystems reorientating around the SDGs, science academy engagement, and SDGs being prominent in higher education curricula.

Supporting the Global Sustainable Development Report 2019

As a result of connections made with UNDESA and the Independent Group of Scientists (IGS), IAP was invited to peer review the 2019 Global Sustainable Development Report (GSDR), alongside the STC Major Group co-convenors, ISC and WFEO. IAP’s involvement has broadened the perspective and demographic of the review panel, including engaging members of the Global Young Academy so that early-career researchers can participate and have a voice. Additionally, IAP has been a source of material for the GSDR, drawing on the observations of this project and the FNSA global synthesis report.

The GSDR is covering the transformations required to realise the SDGs and will be presented to the first Heads-of-State level HLPF in September 2019. GSDR is being designed to advance implementation of actions to achieve the SDGs and serve as a major input to member states’ follow-up and review of Agenda 2030. Through its involvement, IAP has been able to provide practitioner input and contribute intellectually to the critical next phase of the implementation and review of the SDGs.

Participating in other international science meetings

There are many international science meetings whose express intent is to bring science to policy and thereby improve global policymaking. Having a presence at key international meetings was an important element of the project, as a way to continue to raise the profile of the SDGs and the opportunities they afford the science community to contribute toward their realisation. The project was represented at:

- (1) The **Worldwide Meeting of Young Academies** in July 2017, which provided a rich source of insight and ideas for the project, especially how young scientists and young academies can support national strategies to achieve the SDGs. It brought together over 60 young scientists representing the Global Young Academy (GYA) and over 35 National Young Academies (NYAs) or their equivalents. The meeting informed the [GYA/NYAs statement](#)¹⁰¹ on their role in supporting the SDGs, published in October 2017. Focusing on three areas – policy advice; science communication and outreach; and capacity enhancement for young scientists and young academies – the statement has helped launch a range of [SDGs-oriented activities](#).¹⁰²
- (2) The **Euroscience Open Forum** in July 2016, where academies and learned societies were implored to engage and mentor young scientists and those from developing countries, instead of “setting up panels of elderly scientists who were once good,” as one participant observed. Academies have a duty to mentor young scientists and lobby for strong scientific institutions that build trust with governments and policymakers.

¹⁰¹ 3rd Worldwide Meeting of Young Academies Statement: The role of Young Academies in achieving the UN SDGs. (2017). <https://globalyoungacademy.net/wp-content/uploads/2017/10/Statement-RoleYoungAcademies-SDGs-Oct2017.pdf>. Accessed 8 March 2019.

¹⁰² GYA & the United Nations Sustainable Development Goals. <https://globalyoungacademy.net/sdgs/>. Accessed 8 March 2019.

(3) The **World Science Forum** in November 2017, where IAP and the GYA were active participants, leading several sessions and side events. This engagement is particularly important given the lack of science academies and scientific scrutiny in the Middle East and North Africa (MENA) region.

The overriding theme of the international science meetings attended by project representatives was engaging and empowering the next generation of scientists and science leaders in order to strengthen the global voice for science and improve scientific input to policymaking at all levels. But the realisation of this requires a step change, beyond lip service. There is a good deal of rhetoric and repetition across established international science fora, which is a missed opportunity. It should be feasible to re-engineer these fora so that they are more coherent, strategic and impactful; engage both science and policy communities; and are used to advance agendas and effect genuine change. Unless they can do this, they offer little additional value beyond informal networking.

Engaging at the regional level

The most substantive efforts of the project were at the regional level, capitalising on the way the UN and the academies already organise themselves. Engagement was twofold: (1) building relations with the five UN Regional Commissions through participation in their respective Annual Fora on Sustainable Development, and (2) working with the IAP regional networks on regional workshops for academies interested in learning more about the SDGs.

Building relations with the UN Regional Commissions

Chapter 3 describes the five UN Regional Commissions as the building blocks of the UN. At their respective annual fora on sustainable development, their member states meet to discuss national and regional implementation of actions to achieve the SDGs. Following negotiations with the UN organisers, small delegations of IAP project representatives, regional network leads and local senior and young academies participated in these fora in 2018.

Feedback on this experience was generally positive. Scientists found the experience useful, especially in terms of networking, but were apprehensive about whether their regional academy networks could feasibly develop links with the UN Regional Commissions, and whether there were real opportunities for mutually beneficial collaboration beyond well-meaning rhetoric. Nevertheless, they indicated that scientists and academies should have more of a presence at these fora – emulating strong voices from other, better represented Major Groups, e.g. Children and Youth, Women, NGOs. The STC Major Group was represented at some of the fora, but with little support and limited visibility.

These fora are useful in terms of reinforcing key messages and priorities and sharing good practice, and for networking. Many of the IAP delegates were struck by the lack of reference to evidence and argued that academies can help build evidence considerations into policy thinking. As one scientist put it, “There was very little discussion of evidence-based policy, but the types of statements being made were very sweeping/high level, e.g. ‘Agriculture is

important. We need to invest in agriculture.’” In those fora where a senior scientist gave a keynote in plenary (UNECE, UNESCWA), there was noticeably more discussion of evidence and on the complexity of, and interactions amongst, the SDGs. Similarly, where IAP ran a side event at the fora (UNECA, UNECLAC, UNESCAP), scientists reported that they got more out of their experience.

It was also clear that UN Regional Commissions operate differently from each other, so even if traction is minimal with one, there may be opportunities with another. As one young scientist put it, “Don’t stay in your comfort zone. You always learn something new when you are open to new ideas and friends.” The importance of language as both a facilitator and barrier was also emphasised.

UN Regional Commission senior officials welcomed more prominent engagement of the science community to help bring rigour to their members’ discussions, stimulate inquisitive thinking and generate an interest in the evidence base. UN Regional Commissions have been tasked by the UN Secretary General to play more of a think tank role and are looking for partners to help them do this. They were keen to know how the academies could help here, recognising their core principles of excellence and independence. Certainly, the academies’ participation in 2018 has helped raise an awareness and understanding of their role; feedback on the young scientist contingent was especially positive in some regions.

The STC Major Group presence at these UN regional meetings was weak and needs to be strengthened. Representing the STC Major Group, ISC Regional Offices could look to their local members for support, which would also help build wider understanding and capacity. Participation helps raise the profile of the academies amongst national and regional policymakers, and their consideration of evidence-informed policymaking. Some UN Regional Commissions were keen to develop more systemic links with IAP and its relevant regional networks.

Accepting that UN regional fora are designed and organised in different ways, opportunities for scientists to engage include (1) supporting and strengthening the regional STC Major Group effort (which officially should be managed through ISC’s Regional Offices); (2) participating as speakers, for plenaries, roundtables and panels; (3) leading side events; (4) having a presence at side exhibitions. Leading side events provides an opportunity to raise the profile of the science community, and in some cases, as at the UN STI Multistakeholder Forum, side event organisers are given an opportunity to provide input into the final report submitted to the HLPF.

Where there is traction and capacity, efforts have continued to engage with UN Regional Commissions and their respective annual fora in 2019.

Engaging with UN Regional Commissions

Priorities identified for science input included:

- understanding interactions between goals;
- developing indicators for measuring the SDGs, especially Tier 3 (poorly defined or non-existent), and reviewing the effectiveness of those already being used;
- helping improve intersectoral and interministerial coordination and cooperation;
- engaging financial institutions to invest and scale up projects that work;
- knowledge sharing and exchange (including linking UN Helpdesks and Portals with science databases);
- helping to shape and implement UN regional strategies for engaging academia;
- helping to shape / lead sessions at future Annual Fora on Sustainable Development;
- reviewing regional progress on implementation and helping to develop regional roadmaps for STI-for-SDGs to 2030;
- exploring pairing exchanges between academy members/staff and UN regional commission staff; and
- supporting Voluntary National Reviews and national roadmapping processes.

Working with IAP regional networks

IAP regional networks have been updated on progress and how they can get involved throughout the course of the project. There was some apprehension on the part of regional network leadership about engaging more systematically with parts of the UN system, or constructively critiquing it in any way. Further hindering regional engagement, the modus operandi of regional networks tends to be one of bottom-up initiatives that take their steer almost exclusively from the academies and their members.

In partnership with the regional network leads, during the period May-September 2018, four workshops were held to explore the SDGs and the opportunities they present. In total, the four workshops engaged more than 180 senior and young academicians; representatives from the three ISC Regional Offices, for Africa, Asia-Pacific, and Latin America and the Caribbean; and national and regional policymakers. The workshop objectives were: (1) to share national and regional experiences – opportunities, challenges, lessons learned, good practice – including from those academies that have researched and/or engaged in their Voluntary National Review processes; (2) to identify knowledge gaps where stronger intervention is most urgently needed; and (3) to develop actions/interventions for how academies and members could work together to support the SDGs to 2030.

The workshops were helpful in multiple ways, including:

1. They helped raise the awareness and understanding of the SDGs and the policy processes underpinning them, including identifying scientists playing a leadership role in each region (e.g. members of the TFM 10-Member Group and GSDR 15-Member Group).
2. They helped strengthen links between senior and young academies, between academies and their respective ISC Regional Offices, and between science and policy communities.
3. They provided a comparative analysis of regional similarities and differences.
4. They led to the design of voluntary action plans, identifying interventions at regional, national, institutional (academy) and individual levels.
5. They identified examples of good practice at the national level.

The majority of participants reported that the workshop had changed the way they thought about the SDGs and how they can engage, indicating they would actively pursue opportunities for further collaboration with their respective policymaking and academy communities. But evidence of this enthusiasm being translated into institutional change is thus far limited.

Common themes

Participants recognised the imperative for their academies to engage on the SDGs and the importance of national context, mindful of the diversity of social and political landscapes, culture, development status and capacity of the academies themselves (which varies significantly within and across regional networks). Some accepted that retrofitting their work around the SDGs risked losing opportunities and creating complacency and inertia. In all regions, there was a genuine desire to strengthen working links between senior academies, GYA members and/or NYAs, with participants looking to IAP to help them identify ways of doing this and of building capacity generally.

Participants encouraged IAP to prepare a statement on the role of science in supporting the SDGs for academies to use nationally; to share lessons learned and good practice amongst IAP regional networks; to be advocates for NYAs in all parts of the world; and to explore how global citizenry can be better engaged with the SDGs, to minimise impact of political shocks. In the medium-to-long term, participants encouraged IAP to work with ISC and the World Data System on identifying science data needs; maintain a database of academy reports and expertise; and identify and partner with other strong science policy initiatives.

A small number of academies are now working with their respective governments on national implementation of actions to achieve the SDGs and can serve as examples of good practice to their peers. But the majority are not. It was universally agreed that a major challenge is to turn aspirational rhetoric into practical action, and that academies need to be more proactive, within their own capacities and capabilities. There was also recognition that SDGs are a positive path to regional progress, and that STI-for-SDGs action plans or roadmaps can help build STI capacity and identify what is working and what is not. A lasting contribution of Agenda 2030 could be to build science capacity and literacy around the world, but this can only be accomplished with more active engagement from scientific institutions, including the academies.

Some academies undertook to appoint focal points within their staff or membership responsible for reporting on SDG-related initiatives, progress and impact; to host an SDGs awareness workshop for their members; set up special regional committees; and to account for the SDGs more explicitly in their work programmes. Others undertook to write to their Head of Government, science and foreign ministries, or 10-Member Group representatives with a commitment or explicit offer to support SDGs' implementation, for example, by independently and constructively reviewing Voluntary National Reviews (VNRs), participating in national coordination platforms/councils, or helping to shape and integrate STI into national development plans. Many participants openly committed themselves to accounting for the SDGs in their lecture programmes; being advocates for the SDGs within their research networks and helping to embed SDGs into university curricula.

Participating policymakers called for the science community to:

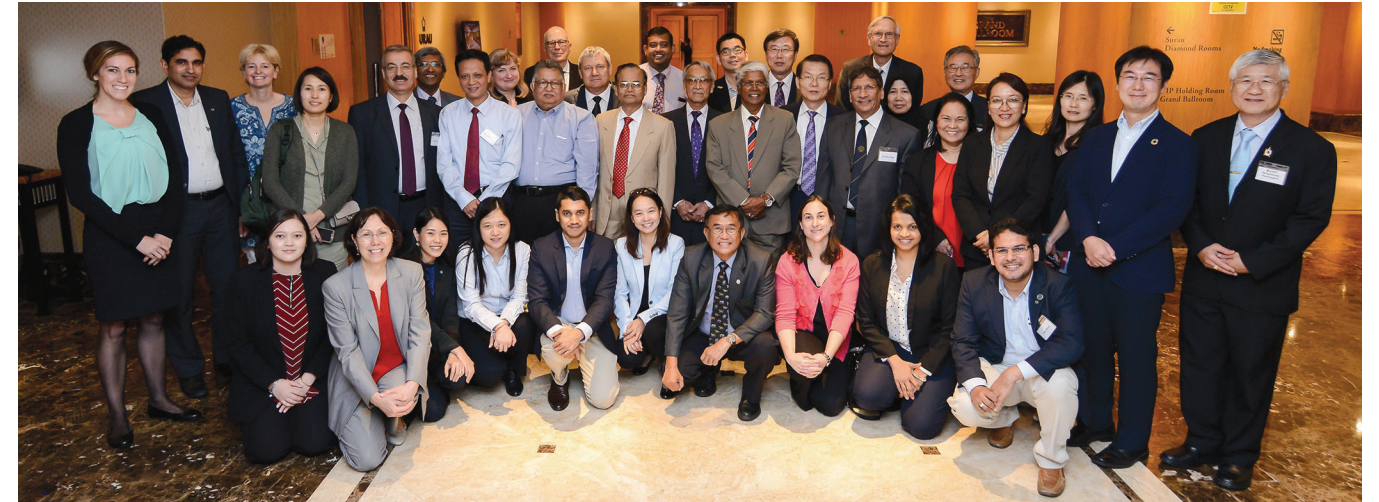
- provide timely, accessible evidence, especially around measuring impact and defining methods for “Tier 3” data;
- play a stronger advocacy role in STI for the SDGs;
- apply more rigour to measuring the direct impact of STI (“return on investment”), underpinning their work with concise economic arguments and demonstrating their own performance/impact;
- make their work more intelligible and accessible;
- feed STI, monitoring and evaluation into the Voluntary National Review process;
- develop STI-for-SDGs roadmaps; and
- be timely in their interventions and mindful of policy cycles and processes.

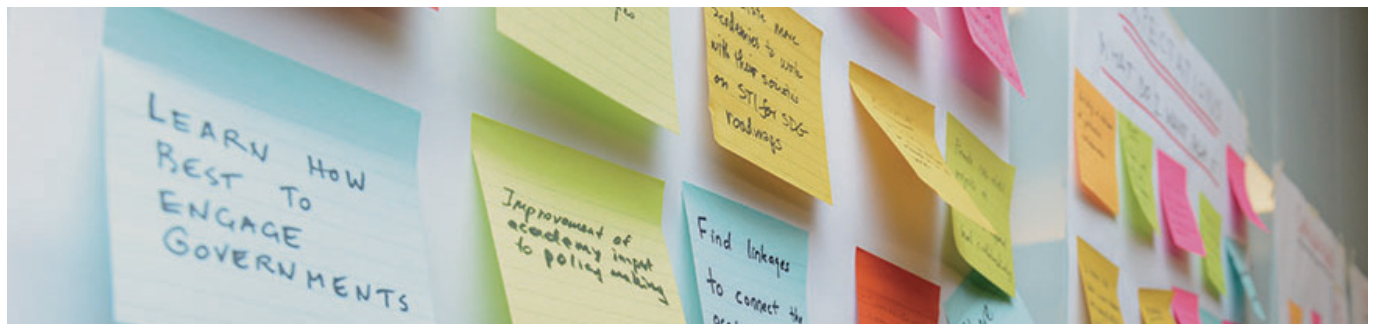
Policymakers also called for a greater effort from their own community to use evidence to inform policy; and to facilitate more cross-sectoral collaboration (scientists, government, civil society etc.) as governments develop participative, inclusive mechanisms to engage sectors on the SDGs.

The main output from each regional workshop was a set of interventions or actions, devised by participants, across three time horizons: short (0-1 year), medium (1-3 years) and long (to 2030); and at four levels: regional, national, institutional (academy) and individual. Some of these actions are feasible with immediate effect; others would require additional funding.

Appendix 4 is an aggregated version of the outputs generated by the participants at the four workshops.

Figure 4.2: Regional Workshop Photos





Engaging at the national level

Academy engagement in the Voluntary National Review process has been limited, probably due to lack of connection with parts of government responsible for these reviews, lack of transparency about how VNRs are conducted, lack of academy capacity to engage, or a combination of these. One academy reported that they had been excluded by their government from participating because they are a network of individuals rather than a network of institutions. Nevertheless, the project has raised awareness of the VNRs amongst the academies, and some have undertaken to engage in the next round.

Case Study: Thai Academy of Science and Technology (TAST)

Initiative/opportunity: *Running two HLPF side events* in 2018 (“Green Economy and Its Transformative Impacts Towards Sustainable Development in All its Dimensions” and “Sustainable Consumption and Production in Asia and the Pacific for Accelerated Achievement of the SDGs”) *and collaborating with UNESCAP* and the Thai National Statistics Office on a one-year pilot project on Ocean Accounts.

How it was initiated: The HLPF side events were initiated through regional collaborations with the Asia Pacific Roundtable on Sustainable Consumption and Production (APRSCP), UNESCAP, UN-ROAP, and ASEAN; and the pilot project through connections with the Thai National Statistics Office, UNESCAP and a TAST member located at the Ministry of Science and Technology.

How academy membership is engaging: TAST members are engaging directly in these initiatives, working on Green Technologies and Life Cycle Analysis tools for Sustainability (or STI for SCP-SDGs) and in the APRSCP.

Impact: These initiatives have raised awareness of the academy members and other scientists in Thailand. For the Asia-Pacific region, the results from both HLPF side events were shared during the 14th APRSCP (roundtable) in November 2018.

Learning: TAST has learned the importance of national and regional collaborations and building on these as new opportunities arise.

Professor Thumrongrut Mungcharoen, TAST Foundation Chair, Energy and Environment Cluster, National Science and Technology Development Agency

Case Study: National Academy of Science and Technology of the Philippines (NAST)

Initiative/opportunity: *An in-depth review of STI gaps and needs for national implementation of the SDGs*, with three sub-national meetings and one national meeting in 2017-2018 and follow-on activities, including ongoing dialogue with the legislative and executive branches of government.

How it was initiated: The Academy initiated activities with key government offices, representatives from industry, universities and cultural minorities to identify local/sub-national concerns and in doing so reach out to the remote areas of the country.

How academy membership is engaging: The members have been involved in planning meetings as well as in the implementation of the sub-national and national meetings. Reports of the progress of the various activities are made by division heads.

Impact: Since submitting a comprehensive report and recommendations to the executive and legislative bodies of government, the Academy has been proactive in outreach to decision-makers and is positive that policies for inclusive growth will be implemented as a result.

Learning: That many policies and activities need to be refined or harmonised to capture the sub-national landscape and the cultural differences in policy formulation and implementation.

Dr Rhodora V. Azanza, President, NAST

Case Study: National Academy of Sciences of Sri Lanka (NASL)

Initiative/opportunity: Reviewing Sri Lanka's Voluntary National Review 2018.

SDG implementation in the national context is complex with many agencies involved. There is inadequate inter-agency coherence, and a need to avoid duplication and maximise coordination. As an independent agency, the National Academy of Sciences is well placed to be a mediator in this exercise.

How it was initiated: By the Academy, as it saw the opportunity to be involved as an 'honest broker'.

How academy membership is engaging: The Council of the Academy is informed/updated at its monthly meetings; the Members have been informed of the VNR and have been invited to comment. It will report in March/April 2019.

Impact: SDG implementation is driven by the Government, with ongoing support from the UN. It is anticipated that the Academy's constructive review will build confidence in the review process amongst the relevant government agencies. The Academy will also suggest scenarios for further engagement of the science community to support and strengthen future national reviews.

Learning: The process is slow and requires patience. Confidence building amongst the players, including regular dialogue with relevant agencies, has been helpful, as has providing technical expertise where required for the implementation of specific SDGs.

Professor Ranjith Mahindapala, President NASL

Case Study: Royal Scientific Society (RSS), Jordan

Initiative/opportunity: RSS participation in developing "Jordan 2025: A National Vision and Strategy"

"Jordan 2025" is a 10-year socio-economic blueprint for Jordan (2015 to 2025) that is central to the implementation of the SDGs and their mainstreaming into national policies and programmes.

How it was initiated: RSS was invited by the Ministry of Planning and International Cooperation (MoPIC) to participate in the high-level committee tasked with overseeing the development of "Jordan 2025".

How academy membership is engaging: RSS members participate in the high-level committee and supporting working groups on the environment, water and energy.

Impact: RSS has helped develop scenario planning and priority setting for the SDGs, as well as key performance indicators (KPIs) based on its past and ongoing studies and applied research. Priority initiatives were set under each area, and KPIs were identified with baseline and future projected values up to 2025. In the long run, this participation will pave the road for RSS to be involved in setting other policies and the government executive development programmes (EDPs). Broadly the participation will lead to better recognition of the role of science and scientific organizations in developing strategies and policies.

Learning: Academies and science organizations are advised to volunteer to participate (or to accept when invited) in developing strategies and policies to demonstrate the role and benefits of science to policymakers. Early involvement is key to subsequent engagement in developing programmes under the strategies and policies. Academies and science organizations in turn benefit from participation in having their research and scientific studies align with government strategies and policies, international agreements and commitments.

Dr Rafat Assi, Director of Water and Environment Centre, RSS

Case Study: National Academy of Exact, Physical and Natural Sciences, ANCFN (Argentina)

Initiative/opportunity: Participation of the Academy in the Advisory Board appointed for the preparation of the 2030 National Plan of Science, Technology and Innovation. One axis of the National Plan involves the definition of a set of national challenges based on the SDGs, with 100 priorities already defined by government.

How it was initiated: The Academy was invited by the Ministry of Science, Technology and Innovation to participate on the Advisory Board, and nominated its president and vice-president.

How academy membership is engaging: Academy representatives are participating in the design of the plan with representatives from several other institutions (government, congress, universities, industry and services, financial sector, etc.). The plenary of the Academy is regularly informed about the progress of the plan.

Impact: In the short term, the allocation of funds to national challenges (from basic science to specific applied projects). In the longer term, the multi-institutional commitment and collaborative work may open other opportunities.

Learning: The absolute need for academies to get involved in science for policy actions, either demanded by the government or pushed by the academy itself.

Professor Roberto Williams, President, ANCFN

Case Study: Brazilian Academy of Sciences (BAS)

Initiative/opportunity: *Participation of the Academy in the National Commission for the Sustainable Development Goals*, responsible for national implementation of the SDGs.

How it was initiated: The National Commission must include eight representatives from civil society. The Academy was approached by its government to apply but later found that it did not meet the criteria in the call because it was not a network of institutions but rather one of individuals. In the event, the Academy took up the role, when the nominated Brazilian Society for the Advancement of Science (SBPC) stood down.

How academy membership is engaging: The Academy has established a working group to support the Academy's representative on the Commission and to embed the SDGs in academy activities, as much as possible accounting for the complexity and complementarity between the goals. Major SDG-focused academy initiatives include shaping the main annual meeting on the SDGs, hosting an international conference on poverty and inequality, and dedicated annals, with regular online and e-updates for members. With a change in government, the Academy is supporting efforts to retain and maintain the work of the National Commission.

Impact: In the short term, to enhance the awareness on the SDGs within the Academy and the national scientific community; and to continue the Commission's work throughout governmental change. In the longer term, to mobilise scientists to support implementation and to play an active advisory role to government.

Learning: There is no recipe here, but Academies need to be proactive and repeatedly reach out to their government. All governments have agreed to ambitious goals that are universal but which demand action at country level. The SDGs are deeply interconnected and require a comprehensive understanding of the inherent complexities. Science Academies can play an important role in this process, but in most cases, they will not be approached by their governments directly. Academies have to show their credentials and "force the doors open" to establish the dialogue: this must be an ongoing process. Further, as a network of recognised scientists from excellent universities and research institutions, academies can convene experts and stimulate collaboration across disciplines and perspectives, essential to the implementation, monitoring and evaluation of the SDGs.

*Dr Marcos Cortesao Barnsley Scheuenstuhl,
Executive Director of International Affairs, BAS*

Case Study: Swiss Academies of Arts and Sciences (SCNAT)

Initiative/opportunity: *Developing priority topics for sustainability research and influencing the national research agenda*. Bringing key unresolved but societally highly relevant questions concerning interrelations between several SDGs to the scientific forefront. They represent issues where Switzerland has a particular global responsibility and leverage, and where scientific inputs are particularly important for supporting informed decision making.

How it was initiated: The project was initiated by the SCNAT board on the basis of a discussion with scientists around priority activities in the context of Future Earth.

How academy membership is engaging: Interested researchers, funders and stakeholders can participate in supporting workshops and are updated regularly through various communication channels.

Impact: To create innovative project networks and partnerships between various actors from science and practice that continue jointly developing and evaluating possible action strategies and transformation options. Furthermore, we would like to give scientists, funders and other stakeholders in Switzerland an orientation for their individual and collective short- and medium-term thematic positioning and initiatives.

Learning: Collaborative efforts for tackling societal challenges can be a model for success in many contexts. Academies are institutions predestined for kicking off and facilitating such formats.

*Dr Gabriela Wuelser, Head, Network for Transdisciplinary Research (td-net)
and Swiss contact point of Future Earth, SCNAT*

Case Study: Austrian Academy of Sciences (OEAW)

Initiative/opportunity: *An international symposium “Global Sustainable Development Goals in a Mediatized World”* (April 4-5, 2019), looking at how mediatization shapes public discourse and influences the way Agenda 2030 is reflected, critiqued, and implemented. It will begin a dialogue about how the research community, including researchers at the academy’s 28 institutes, can contribute to Agenda 2030.

How it was initiated: Some of the Austrian Academy’s members, commissions, and research institutes have worked on sustainability issues for a long time. In addition, the Academy has committed itself to the principle of sustainability, both in scientific and administrative practice, in its latest development plan.

How academy membership is engaging: Academy members, including a member of the Young Academy, are on the conference programme committee and, at the OEAW General Assembly, all members and researchers at the OEAW research institutes were invited to participate. Researchers whose field of expertise is not necessarily directly linked to the SDGs are particularly encouraged to get involved.

Impact: Encouraging researchers, who so far have not regarded their fields as relevant to the SDGs, will make new connections and gain different perspectives. Highlighting the mediatization of the SDGs will likely stimulate more research on this important issue.

Learning: Taking stock of what activities the OEAW is currently undertaking was an exercise that showed a surprising amount of research that is already (potentially) contributing to the SDGs. Almost all 17 SDGs were addressed by an unexpectedly diverse range of research areas within Austria alone. Thus, an Academy of Sciences, representing all disciplines, seems like the ideal place for such an initiative. In addition, in organising the symposium, the Academy has tested out new approaches (for example following green meeting guidelines, testing out more sustainable products etc.) that could lead to overall more sustainable processes within the organization.

Kathrin Humphrey, Officer for Strategy and Special Projects, OEAW

<https://www.oeaw.ac.at/sustainable-development2019/>

Case Study: Academy of Science of South Africa (ASSAf)

Initiative/opportunity: *(1) Landscaping work* to assess the extent of activity and focus on SDG-6 (water) in South Africa – identifying the key players, champions, researchers and rapporteurs. *(2) Convening a workshop of key STI stakeholders* to assist with STI roadmapping to support future VNRs and its national implementation plan to 2030, drawing on the landscaping work.

How it was initiated: By ASSAf, following conversations with several agencies (StatsSA, DST) in SA and the IAP project team.

How academy membership is engaging: Through Council and the Executive.

Impact: At the time of writing, both exercises were in the planning stage.

Learning: Already it is clear that there is a role for the academies to help map the national stakeholder landscape and convene key players, using their networks to assess the role of non-government players in supporting the SDGs.

Professor Himla Soodyall, Executive Officer, ASSAf

Case Study: South Africa Young Academy of Science (SAYAS)

Initiative/opportunity: *Mobilizing academy membership and sensitising academia.*

How it was initiated: A decision was taken by academy leadership to have an overt mention of the Academy’s desire to engage with the SDGs, to time with the development of a new Strategic Plan.

How academy membership is engaging: 1. Experts working on the SDGs are invited to Academy AGMs. 2. Where possible, all programmatic activities and fora have an SDGs perspective. 3. Continued engagement with the Senior Academy, with some young Academy members sitting on their portfolio committees.

Impact: Members either not familiar with the SDGs or who had not yet engaged with them were rallied to action. This is work in progress, and efforts are being made to engage the Academy in national implementation processes, particularly the Voluntary National Review.

Learning: Young academies can have a voice on important policy issues but need encouragement, including practical examples of how they can engage.

Edith Shikumo, Secretariat, South African Young Academy of Science (SAYAS)

Both the membership survey and the regional workshops served to identify academies engaging in the national implementation of actions to achieve the SDGs, whether by proactive intervention or government invitation. Some examples are listed here as a resource for academies and academicians who wish to engage in their own national contexts. All academies are being encouraged to share lessons learned as they engage on the SDGs: IAP will provide a learning platform to this effect.

(C) Data and monitoring and evaluation challenges

- indicators and metrics of **variable quality, missing or lacking adequate data**;
- limited understanding of the **interactions** between SDGs;
- varying degrees of **recognition of the requirement for evidence-informed policymaking** across the UN and its structures; and
- an undeveloped understanding of how SDG strategies can be translated into **SMART (specific, measurable, achievable, realistic, timely) STI-for-SDGs roadmaps**.

(2) UN processes for feeding science into the policy design, implementation and review of the SDGs are imperfect but evolving. These include:

(A) Engaging in UN fora and processes

- Relative to many other Major Groups, **the STI community is poorly represented at the UN Regional Annual Fora on Sustainable Development**, and science academies are virtually absent (including at the HLPF).
- With few exceptions, **the STI community is poorly represented in the VNR process** at the national level.
- The **STI Major Group process** is not as transparent as it could be, nor visible to, or well-understood by, large sections of the STI community, yet it is a critical pathway for feeding science into UN considerations.
- The **UN STI Multistakeholder Forum** is underfunded and needs resources to meet its objectives; its focus on technology could leave science and data behind.

(B) Synthesising scientific data for the policy community

- Science and science policy are seen as critical to the delivery of the SDGs, but STI or **“evidence” in national and regional reporting is variable**.
- **Complex systems science** requires wider recognition and understanding and is presently an under-recognised aspect of science policy advice for the SDGs.
- Ongoing work on **STI-for-SDGs roadmapping** offers the promise of coherent, standardised, systematised implementation, as long as it is not too prescriptive or regimented.

(3) There is interest amongst the academies community to do more, and pockets of good practice can be found. The project has raised awareness and understanding of the SDGs amongst national academies and their regional networks and has facilitated engagement. Greater academy traction will take more time, and new funding will need to be found.

- The project has delivered **three online outputs**¹⁰³ to help academies and scientists engage on the SDGs.
- **IAP representation** at three UN STI Multistakeholder Fora and various sessions at major international science meetings has helped build new, and strengthen existing, connections, for example with the STC Major Group and between IAP Regional Networks and UN Regional Commissions.
- **Feedback from participating senior and young academies has been positive**. By emphasising dissemination and outreach, the project has effected modest change: some academies reported that the project was a “bit of a wake-up call” and “put the SDGs on our radar.”

(4) The project has benefited from engaging both senior and young academies and facilitating more interaction between them:

- All project initiatives have engaged young and senior academy members **equally**.
- The project had a strong focus on **practical actions** and **solutions-based thinking**, borrowing good practice from the GYA.
- The GYA and National Young Academies produced a **2017 statement** on [The role of young academies in achieving the SDGs](#),¹⁰⁴ to which they attributed the influence of this project, and they have a number of SDG workstreams.

(5) The project has exposed systemic weaknesses in the way many academies operate internally, with one another and with partners:

- variable or poor connection with their own **membership**;
- variable ownership of their own **regional and global networks**;
- weak understanding of **how policy processes and policymakers work**;
- lack of preparedness in taking **inter-, cross- or trans-disciplinary approaches** and tackling societally relevant development goals; and
- a tendency to work linearly, in isolation and in a **supply-driven** way.

¹⁰³ A 2016/17 survey of all IAP members and Young Academies; a Guide to the SDGs for merit-based academies (2017); a database of SDG-relevant academy publications. <http://www.interacademies.org/36188/Results-of-the-Survey-of-the-Academies>.

¹⁰⁴ <https://globalyoungacademy.net/wp-content/uploads/2017/10/Statement-RoleYoungAcademies-SDGs-Oct2017.pdf>.

Opportunities

(1) Addressing inherent challenges

The landscape is complex, and there are many disconnects within the infrastructure, including between top-down and bottom-up initiatives. Incremental progress is beginning to come from a combination of top-down strategic planning and bottom-up initiatives by communities and citizens. Both are needed: the dynamism, innovation and enthusiasm in the latter can be a useful antidote to the inherent conservatism and inflexibility of more structured planning through roadmaps or national action plans.

The academies have **convening power** and can help bridge top-down and bottom-up initiatives, and they can also be more proactive in shaping policy implementation, especially with regard to monitoring and evaluation. Four particular challenges are increasingly urgent and must be addressed by the global science community: (1) to ensure research and research support systems, including assessment and reward structures, better align with shared global goals; (2) to improve understanding of the interactions between SDGs (synergies and trade-offs) to multiply the positive impact of specific policy interventions; (3) to prioritise the development of improved indicators, especially for weak or non-existent ones (“Tier 3”), to monitor progress on implementation more accurately; and (4) to account for the implications of **complex systems science**,¹⁰⁵ including how the SDGs can be delivered within the Earth’s finite capacity and **planetary boundaries**.¹⁰⁶

The interactions between the SDGs and between SDGs and their targets are poorly understood, and the lack of integrated data remains a crucial issue. While there are some helpful emerging tools to measure and track progress, interactions and data must be prioritised by both policy and research communities. Academies can help in data integration and can focus research on concrete examples of positive and negative interactions between SDGs.

(2) Engaging with UN processes

There are many opportunities for academies and the wider scientific community to support national and regional implementation processes, and to work with UN agencies to build systemic and sustained institutional links. IAP and its regional networks should focus on building strong working links with key parts of the UN STI-for-SDGs system that have clear and influential policy mandates.

UN Regional Commissions have indicated they need more access to expert knowledge-providers to help inform their work and encourage their respective member states to be more rigorous. This presents an opportunity for the IAP regional networks and ISC regional offices.

At the national level, the academies can help bring independent, evidence-informed perspectives to the **Voluntary National Review** process. This is currently subject to little scrutiny; so much so that parts of civil society have produced “shadow reports” to supplement or provide an alternative viewpoint to governmental reports. Without this scrutiny, there is a risk that governments will use the VNR to repackage or retrofit what they are already doing rather than demonstrating transformative change nationally. IAP can help its members advocate for the VNR process and lead national rethinking on genuine policy transformation; but they will need the international solidarity of the IAP community to do so.

Science relevant to the implementation of actions to achieve the SDGs is not limited to the traditional “sustainability sciences.” The role of technology has been highlighted by the UN STI Multistakeholder Fora. Academies could be a leading voice addressing the social implications and governance of potentially disruptive new and emerging technologies (NET) and help **support the Technology Facilitation Mechanism**.

Academies can also help support the fast-developing **STI-for-SDGs roadmaps** programme being rolled out globally with the support of several UN agencies, i.e. the creation of detailed STI action plans to achieve the SDGs that are regularly reassessed and updated, ideally involving multiple stakeholder groups. Using their convening power and independence, academies can facilitate the initiation of roadmaps by national STI stakeholders and other key constituencies; they can provide leadership on effective modes of interdisciplinary collaboration and promote the creation of research systems more conducive to addressing global goals; through their outreach programmes, they can help socialise STI for the SDGs within their respective governments, academic systems and wider publics; they can help source national examples as case studies for global actions; and they can develop their own institutional roadmaps to support national ones. In effect, academies can help **assess their own country’s readiness (or suitability) for STI-for-SDGs roadmaps** to help spur investments in countries where roadmaps are more likely to be achievable and to make a significant impact.

¹⁰⁵ See e.g. John Finnigan, Society as a complex system: can we find a safe and just operating space for humanity? *Journal & Proceedings of the Royal Society of New South Wales*, vol. 150, 31–47 (2017). (<https://royalsoc.org.au/images/pdf/journal/150-1-Finnigan.pdf>)

¹⁰⁶ Rockstrom et al (2009) A safe operating space for humanity. *Nature* 461, pages 472–475 (24 September 2009). (<https://www.nature.com/articles/461472a>)

Country “**readiness indicators**” for producing STI-for-SDGs roadmaps can include:

- ◆ Independence of scholars and research institutions
- ◆ Systemic peer review of research funding and publishing
- ◆ An established national science advisory mechanism or ecosystem
 - ◆ A government chief scientific adviser or science advisory board
 - ◆ (A) national science academy/ies covering all disciplines
 - ◆ A national young academy or other platform for collective action by early-career scientists and other scholars
- ◆ At least one ministry or government department dedicated to STI and/or science advice incorporated in all government departments
- ◆ A national research funding mechanism supporting fundamental basic and applied research that supports research that contributes to societal benefit and aligns with the SDGs
- ◆ University and/or school curricula where the SDGs are prominent
- ◆ A strong link between the national statistical office, responsible for SDG reporting, and the science community, which can help provide, interpret and review data.

There are also opportunities for the academies to **work with agencies at the local level** on science advice to policy; for example, through a focus on cities. There is a lack of research on many topics pertaining to how cities might evolve and contribute to delivering the SDGs, balancing technological solutions, innovative infrastructural design, job creation, new social behaviours and practices, e.g. the rise of industrial-scale urban and vertical agriculture, and advancing SDG-16 (peace, justice and strong institutions), especially with respect to addressing corruption.

The **Global Sustainable Development Report** process is designed as a quadrennial assessment of assessments, driven predominantly by the science community through a 15-Member Group of Scientists. IAP is helping to review the 2019 GSDR and could consider offering its services again for any successor report.

(3) Stimulating academy involvement

Academies, as honest brokers, can provide an enabling environment to help synthesise diverse sources of knowledge at the science-policy interface. They can lead the drive to reorientate research and research systems towards shared global goals. This requires stepping out of disciplinary comfort zones and the institutionalised modus operandi of discipline-bound assessment and reward structures. Academies are well placed to lead the global discussion on the future of academic science and the necessary shift in institutional arrangements and behaviours.

Academies could factor the following considerations into their own work programmes:

- more vigorous advocacy for robust, evidence-informed policymaking and policy implementation;
- promoting the importance of the SDGs across all STI disciplines;
- organising their work in a cross/multi/trans-disciplinary way to account for broad perspectives and expertise, and in doing so, synthesise information of more relevance to policymakers;
- being aware of UN policy programmes and timelines;
- identifying knowledge gaps and initiating interdisciplinary projects to solve real policy questions;
- framing their work holistically around the SDGs, and in doing so helping to understand the complex interactions between SDGs – their interdependencies, synergies, trade-offs; and
- developing monitoring and evaluation processes, indicators and metrics for assessing where things are working well and where more needs to be done.

(4) Promoting cooperation among academies

While senior academies tend to have a more strongly developed profile and track record in science policy advice, young academies are more flexible and open to new approaches and partnerships and are highly motivated towards facilitating societal change. By working together, the academies can draw on their respective strengths and be more effective as intergenerational agents for change.

(5) Turning rhetoric into action

Academies need to be proactive in contributing to societal agendas and engaging potential users of their expertise. This means sustained dialogue with policymakers and key influencers and mobilising their own members to capitalise on their diverse expertise. Academies can also assist by constructively critiquing materials in the public domain, produced by other sectors including the UN, governments, NGOs, and civil society.

IAP is only as strong as its weakest regional network; regional networks rely on the engagement of their national members; and national members on their own academicians. Disconnects in any part of this infrastructure undermine the value of the academies and their potential influence. Effective academies need to engage their members in their initiatives so they maximise the expertise, experience and insight available to them. Individual academy members need to get involved in their academy’s business and identify with their academy when serving advisory or ambassadorial roles.

- 2.3 To consider **aligning its business with the UN timetable for review of the SDGs** to ensure its interventions, such as major interregional projects, are timely. This includes the review agenda of the High-Level Political Forum (HLPF) and the quadrennial Global Sustainable Development Report (GSDR).
- 2.4 To play a stronger **advocacy role for championing a strong, independent, adequately resourced science advisory mechanism to the UN** that draws on existing global science networks including IAP and ISC.
- 2.5 To lead debate on the **reorientation of research and research support systems** towards shared global goals, open science, inclusion, championing interdisciplinary working and challenging the institutionalised modus operandi of discipline-bound assessment and reward structures.
- 2.6 To support its **regional networks and national members in their efforts** to engage with their respective SDGs implementation processes.
- 2.7 To strengthen its **collaboration with the Global Young Academy (GYA)** and encourage its four regional networks to **systematically engage local GYA members and National Young Academies (NYAs) in their core business**. This would bring mutual benefit: provide a platform for the GYA and NYAs to have a voice; strengthen policy work by bringing in more interdisciplinary and intergenerational perspectives; and revitalise IAP members with new ideas and methodologies. For example, IAP and the GYA could consider working together on the governance and the socio-economic and environmental impact of new and emerging technologies, as a funding priority for a new major project.
- 2.8 Subject to additional resourcing, to position itself as **an accessible and efficient conduit of knowledge and expertise**, for example by:
- developing a more navigable website with up-to-date contact details for its leadership, executive and membership and short, non-technical summaries of its publications with contact details for lead authors as key experts;
 - framing its work around the SDGs and their targets;
 - developing its online database for SDG-relevant academy output with the help of its members and integrating this into UN global and regional knowledge platforms;
 - encouraging academies to develop their own roadmaps for how their institutions can contribute to harnessing STI for addressing SDGs.
- 2.9 To build a **stronger culture of accountability**, focusing on **outcome and tangible impact**. IAP should continue to develop, refine and share good practice guidelines for strong governance and operations; seek evidence of engagement with policymakers and the public, and of impact, as a pre-condition of funding of regional networks; and draw on existing press office capacity in academies to develop a media training programme for academy leadership and chairs of working groups.
- 2.10 To **revisit and refresh its guidance for new and nascent academies** in light of this project.

3. Recommended actions for IAP regional networks and national members

- 3.1 Working with ISC Regional Offices, to **build and strengthen strategic links with their respective UN Regional Commissions** and to participate in Annual Fora on Sustainable Development (AFSD), to bring more evidence to their proceedings and help their members connect with national government representatives, regional agencies and funders. IAP annual funding could be used to develop these connections.
- 3.2 To familiarise themselves with the Voluntary National Review (VNR) process and to lend their support as “critical friends” so that VNRs are more evidence-informed. Academies can play **stronger convening roles**: bringing together academic experts from all disciplines and practitioners from different sectors to bridge disconnects, as independent and trusted brokers.
- 3.3 To **implement the more practicable and impactful ideas generated at the regional workshops** hosted by this project. This could include establishing focal points for engagement with the SDGs who are responsible for liaising, coordinating and maintaining links with key organisations and are accountable to their respective boards or councils; maintaining databases of their members with expertise relevant to each SDG; supporting national delegations to UN policy summits and fora; engaging on national STI-for-SDGs roadmapping exercises; and adopting the imperatives of open science (such as open data, diversity, inclusion and co-design). Regional networks and national academies could also re-orientate their strategies around the SDGs, but should **consider the SDGs holistically**, thinking about policy options for specific SDGs that will have minimal deleterious impact on any of the other SDGs. They can help to **better understand and articulate the interactions between the SDGs**.
- 3.4 To **develop their own roadmaps** and give due consideration to the issues raised in this report, including those discussed in Appendix 2 concerning the evolution of their own academies.

4. Recommended actions for the Global Young Academy (GYA) and National Young Academies (NYAs)

- 4.1 To familiarise themselves with the **Voluntary National Review (VNR) process** and lend their support as “critical friends” so that VNRs are more evidence-informed. Their innovative methodologies, interdisciplinarity and connections with their local research communities and academia (schools and HEIs) are key strengths.
- 4.2 To continue to **strengthen their alumni systems** and refine local knowledge platforms to share learning. They could also focus on **institutional strengthening** and build progressive strategies to mitigate membership turnover. The GYA could usefully seek additional resources to provide a regional support role for regional networks of NYAs.

- 4.3 To further develop **(i) communications and media training** for GYA/young academy leadership and chairs of working groups to build a cadre of ambassadors for the academies, and **(ii) science advice to policy training**, supplementing the efforts of INGSA, the Joint Research Centre (JRC), American Association for the Advancement of Science (AAAS) and others, and complementing the efforts of universities focusing their research and teaching on the SDGs.
- 4.4 To play an important part in **communicating the value of the SDGs to a wider audience** of youth and lay public, through outreach programmes, blogs and social media.
- 4.5 To give due consideration to the voluntary action plans prepared under this project and **implement the more practicable ideas**.

5. Recommended actions for the wider science community

- 5.1 Leading organisations of established international science fora are encouraged to consider **more strategic, impactful agendas** that cross-reference with key UN mechanisms and timeframes and foster a more diverse participation, including policymakers. For example, they could support the Technology Facilitation Mechanism and engage UN bodies with clear policy mandates. They can also play a **stronger advocacy role** for resources and incentives for scientific research and problem-solving targeted at the SDGs, and for the imperative of open and inclusive science.
- 5.2 Scholars could **present their own research in the context of the SDGs and their targets**, mindful of the interactions between them, and thinking about the users of their findings and how they might best reach them.
- 5.3 Scholars can **get involved in SDGs-orientated activities** organised by their own academic networks and societies – their research institutions, universities, senior or young academies, scientific unions – or civil society or local community initiatives. They can conduct interdisciplinary courses relevant to the SDGs and publish their ideas in popular journals and via social media.
- 5.4 Scholars can look to the GYA and their national young academy, if they have one, as a vital part of their own **professional development**. They can join the International Network of Government Science Advice (INGSA), whose open membership attracts a wide spectrum of current and prospective practitioners to share experience, build capacity and develop effective approaches to using science to inform policy.

The checklist on page 10 – “How you can support the implementation of the SDGs” – will help interested scientists get started or find out more.

APPENDIX 1: Practitioner guests at Project Working Group meetings

First Working Group meeting, New York, August 2016

Dr Susan Avery

President and Director Emeritus
Woods Hole Oceanographic Institution (WHOI)
USA

Dr William Colglazier

Editor-in-Chief
Science & Diplomacy; and Senior Scholar, Center for Science Diplomacy
American Association for Advancement of Science (AAAS)
USA

Second Working Group meeting, Paris, February 2017

John Crowley

Chief of Section for Research, Policy and Foresight
UNESCO Division of Social Transformations and Intercultural Dialogue

Sir Peter Gluckman

Co-Chair, International Network for Government Science Advice (INGSA)
Chief Science Advisor to the Prime Minister of New Zealand

Dr Heide Hackmann

Chief Executive Officer
International Council for Science

Dr Flavia Schlegel

Assistant Director-General Natural Sciences
UNESCO

Third Working Group meeting, Beijing, November 2017

Professor Mooha Lee

Executive Director, AASSA (IAP Regional Network, Asia)

Professor Jeremy McNeil

Co-Chair, IANAS (IAP Regional Network, Americas)

Jackie Olang-Kado

Executive Director, NASAC (IAP Regional Network, Africa)

Professor Moritz Riede

Former Co-Chair, The Global Young Academy (GYA)

Professor Yi Wang

Institute of Science and Development
Chinese Academy of Sciences

Dr Xiong Xiaoping

Energy Research Institute, National Development and Reform Commission
Chinese Academy of Sciences

Dr Liu Yanhua

National Expert Panel on Climate Change
Chinese Academy of Sciences

Professor Dong Zhanfeng

Chinese Academy for Environmental Planning

Professor Linxiu Zhang

Center for Chinese Agricultural Policy
Chinese Academy of Sciences

Fourth Working Group meeting, Bern, September 2018

Till Berger

Deputy Chief, Sustainable Development Section
Federal Government of Switzerland

Monika Linn

Principal Adviser to the Executive Secretary
Chief of the Sustainable Development and Gender Unit
UN Economic Commission for Europe (UNECE)

Professor Peter Messerli

Director, Centre for Development and Environment (CDE)
University of Bern

Co-Chair, Group of 15 Independent Scientists drafting the
UN Global Sustainable Development Report 2019

Dr Gabriela Wülser

Head, Network for Transdisciplinary Research (td-net)
and Swiss contact point of Future Earth
Swiss Academies of Arts and Sciences (SCNAT)

Informal reviewers

Dr Kristiann Allen, Chief of Staff, Office of the Prime Minister's
Chief Science Advisor, New Zealand

Dr John Boright, Executive Director, Office of International Affairs,
US National Academies

Anna-Maria Gramatté, Project Officer,
Global Young Academy (GYA)

Professor Rees Kassen, Research Chair, University of Ottawa
and former GYA Co-Chair

APPENDIX 2: The role of academies in the 21st century

In Working Group and regional network meetings, participants (predominantly academicians) have given thought to how their institutions may need to change to become more effective advocates for science and its application to societal challenges, and continue to be relevant in the 21st century.

The think piece below was prepared by the Project Working Group in readiness for the IAP Triennial Conference and General Assembly on 9-11 April 2019, themed on Science and the SDGs: the role of academies. It explores how academies - who wish to be effective practitioners in science policy advice - may need to adapt to better support policy demands, including the implementation and realisation of the SDGs. It complements work by other leading thinkers in this space¹⁰⁵ and is designed to stimulate discussion amongst the academies.

Summary

In an increasingly complex world, with an unprecedented pace of social, political and technological change, and ever-mounting social, economic and environmental pressures, it has become imperative to review merit-based academies and their role in society. This think piece explores how learned academies (of any discipline of scholarship) can adapt to better support a variety of demands and be vital, relevant organisations in the 21st century.

Introduction

The oldest merit-based learned societies (hereafter referred to as 'academies') have existed for over 350 years, which is a tribute to their usefulness and sustainability. Many more were established in the nineteenth century, coinciding with an upsurge in the social awareness of science and the rise of modern nation states, particularly in Europe. In the late 20th and early 21st centuries, new academies were created in Asia, the Americas and Africa, and a handful continue to be established every year in all parts of the world, modelled predominantly on their predecessors. Collectively, the academies have produced a wide range of advisory reports for global, regional and national policymakers, and learned lessons along the way. Nevertheless, the effectiveness (and recognition) of academies as independent advisory bodies is highly variable and some, both old and new, report an aging and declining membership and a sense of increasing marginalisation in the affairs of the world.

Many factors may contribute to this trend. One is that the knowledge landscape, once dominated by learned societies, now has many and diverse actors. Another is that the rise of new modes of ideas exchange, such as the internet, have eroded the primacy of academic meetings, conversations and journals as a way to stay informed. There is also a demand for more participative, democratic decision-making, putting pressure on science and opening it up to closer scrutiny and surveillance, and in turn making it increasingly vulnerable. A post-modern scepticism of knowledge and elites has made venerable institutions, their traditions and members, seem out-of-touch and self-serving. This century also brings unprecedented opportunities for academies, including the urgent need for more effective and sustainable policy at all levels, and new, fast ways of acquiring, disseminating and exchanging knowledge.

¹⁰⁵ For example: Sir Peter Gluckman, Dr Bill Colglazier

How might academies, whether new or old, big or small, rich or poor, adapt to the changing world of the 21st century, so that they can continue to use science to serve society equitably and sustainably, and contribute to improving the quality of life through the generation and application of knowledge?

The perception of merit-based academies

In general, if academics, researchers and other intellectual workers were to rank the institutions crucial to their daily work, they would probably start with their employers, followed by funders and professional bodies, with academies further down on the list. This ordering would likely have been quite different a century ago, when academies may have filled several of those roles. The low contemporary priority given to academies by both academy members and society in general is reflected in the frequently disappointingly low response to academy initiatives. With some notable exceptions, a declining fraction of research publications take place through journals owned and run by learned societies. Commercial publishers and, increasingly, open access platforms, have a significant share.

Some young scientists are unaware of their national academies or doubtful about their utility. Even those who are engaged by academies have some scepticism. An informal survey of Global Young Academy (GYA) membership and national young academies in 2017 revealed that few consider senior academies to be fully fit-for-purpose i.e. vital members of their national science systems, championing science and providing evidence-informed advice to decision-makers. Yet it is striking that over 35 national young academies have been set up in the last decade, as vehicles for young scientists to have a collective voice in society. Young academies differ from senior academies in three important respects: (1) they are composed of early- to mid-career researchers of a typically wider array of scholarly disciplines; (2) membership is typically limited to 4-5 years (rather than lifetime); and (3) members commit to bringing science to society. Their strengths are different but complementary to senior academies, and both share common challenges, such as how to engage their respective members in their work.

In only a relatively small number of countries are academies seen as the first source of technical knowledge and advice to governments, and it is even rarer for the private sector to approach academies for advice. The IAP project that stimulated this think piece found that academies had not been engaged by their respective national governments to help assess progress on the implementation of the Sustainable Development Goals, and that academies were largely unaware of this process.¹⁰⁶ Academies are involved only indirectly, if at all, in the nomination of researchers to serve on major international assessment bodies. However, the European Academies of Science Advisory Council (EASAC) was awarded Think Tank of the Year (2018),¹⁰⁷ demonstrating that academies and academy networks with strong leadership, a professional secretariat, an engaged membership and a commitment to communications and outreach can play valuable roles in their national and (where they exist) regional science advisory systems.

Members of the general public are frequently unaware that academies exist, or the role they play. Academies are only rarely recognised as major conduits of information between learned people and citizens, through the solicitation of advice and the organisation of public lectures

or exhibitions. The public today is more likely to get their information from the internet or the media. While many academies have a web and social media presence, they are either not using it to maximum effectiveness, or this mechanism, by itself, is not enough. The deliberative and evidence-based voice of academies seems to be lost in the cacophony of competing opinions.

Various models of merit-based academies

Academies worldwide have tended to become more ‘corporate’ in their governance and management over time. This brings advantages in professionalism and accountability but is one of the factors that may tend to distance or disengage academy members from a sense of ownership. However, far from being homogeneous, the few hundred academies that exist in the world are diverse in terms of their stated aims and the way in that they operate. Table 1 summarises some of the variants which can be found.

Table 1: Example alternative models of academy operation. For each attribute (rows), the models (columns) successively represent the widely perceived ‘standard’, or ‘classical’ model, and two degrees of modification. Few academies occupy a single column of this table. Individual academies may include elements of various degrees of deviation from the ‘standard model’, mixed with elements of traditional and idiosyncratic elements based on their particular history or location. All operating rules summarised above exist in at least one academy, somewhere in the world. This think piece is not advocating a particular model, merely pointing out that apparently successful variation exists.

	The classical model	An adapted model	A transformed model
Purpose	Promotion of the fields which they represent and honouring the most successful practitioners	Evidence-based decision-making and the promotion of knowledge are a core part of their mission	Ensuring that the most widely-trusted knowledge informs decision-making
How are members appointed?	Nominated and evaluated by those already in the academy on the basis of exceptional merit in matters of learning, as determined by their peers	Nominated by anyone (including themselves), transparent selection process based on merit in both research and service. Deliberate attention to diversity and interdisciplinarity	Automatic inclusion based on defined merit-based criteria (e.g., PhD, H-index >30, top 5% of field), across all fields, age cohorts, genders and origins
For how long do members belong to the academy?	For their lifetime, with no consequence for inactivity in research or service	In a young academy, 4-5 years. In a senior academy, voting membership to 70 or 75; thereafter honorific only unless elected to a formal position	As long as they remain active, with increasing levels of recognition based on both service and recognition of intellectual contribution
How is the academy funded?	Bequests, endowments, donations, member subscriptions, partial state subsidy	State subsidy for core operations, contracts for studies requested of the academy, endowments for special projects they initiate	Entirely out of public funds, or entirely on the basis of contracts
What disciplines are included?	Separate academies for sciences, humanities, engineering and health	Unified or federated academies for all endeavours with a rationalist epistemology	Unified academy for all knowledge systems, including indigenous knowledge
Geographic scope	National, sometimes subnational, a few regional or global	National, but with voluntary regional or global cooperation/function	Globally coordinated, but locally organised

¹⁰⁶ InterAcademy Partnership: Results of the Survey of the Academies. <http://www.interacademies.org/36188/Results-of-the-Survey-of-the-Academies>. Accessed 8 March 2019.

¹⁰⁷ The Public Affairs Awards Europe celebrate the best of public affairs in Europe. <http://news.prca.org.uk/the-public-affairs-awards-europe-celebrate-the-best-of-public-affairs-in-europe/>. Accessed 8 March 2019.

Considerations for merit-based academies

- 1. Balance the immediacy and context relevance of being locally or nationally organised with the imperative to act collectively at regional and global scale on issues of shared concern.** A ‘federated’ model, which offers a great deal of autonomy for individual academies within their own domains, combined with an effective mechanism for coordinated action where required, would appear to be a robust and acceptable mode of collaboration for many academies. The InterAcademy Partnership (IAP) and its regional networks are examples of this coordinated action, but their collaborative potential has not yet been fully realised. Typically, these networks depend on the support of one or two academies, do not have sufficient resources to make a significant impact and are not seen as particularly relevant (or even visible) by their academy membership and their respective Fellows. Participating academies must consider how they can make such a loose and voluntary arrangement rapidly responsive, coherent and efficient.
- 2. Maintain quality while increasing inclusivity.** The perception that academies are elitist, closed clubs, prone to disciplinary chauvinism, sexism, racism and nationalism can be dispelled by ensuring that the entry criteria do not introduce unintended biases, and that the process of member selection is transparent, balancing merit and opportunity.¹⁰⁸ Many academies expend an inordinate part of their energy in policing the entry gates. Despite the rigour of their processes, academies are notoriously poor at identifying the influential thinkers until they have been widely recognised elsewhere. The special attribute of academies, which gives them their credibility and access to power, is that they are seen to comprise individuals who have demonstrated exceptional talent in the intellectual sphere. Learned societies need to ensure that this is indeed the case, but they should consider less ponderous and more sensitive ways of doing so. The existence of substantial disparities between the demographic composition of academy membership and that of the broader community is a signal that explicit or implicit selection barriers may exist. Knowledge takes time to accumulate in individuals, so academicians will generally be older than the population average; nevertheless, academies often engage with potential members too late in their careers. Creating and supporting Young Academies, and developing a progression pathway from young to senior academies, is one solution to this tendency.
- 3. Encourage disciplinary inclusiveness and interaction.** There is a worldwide trend towards placing less emphasis on disciplinary purity, and more on the advantages of including a diversity of perspectives under one roof. Some academies have embraced both natural sciences and humanities, and a few have incorporated indigenous knowledge-holders. Where individual academies exist for different disciplines, their collaboration can convey more coherent and compelling messages on critical issues of public policy. The needs of knowledge generation in the 21st century require inter- and transdisciplinary approaches, in addition to disciplinary depth: societal problems necessarily require interdisciplinary perspectives and solutions, which requires close cooperation, mergers or federated models.
- 4. Revitalise the service mission of academies.** In order to thrive, academies need to engage with the broader community, have a greater awareness of policymaking and context, and take a key role in the provision of knowledge-based advice. Academies that fail to do so are perceived as out-of-touch, inward-looking, and self-serving. Particularly among younger researchers, the application of their learning for the greater good is a powerful motivator. The traditional way in which academies served society – by providing knowledge-based advice – is no longer their exclusive domain, so what is the particular value academies can add? Firstly, their emphasis on merit in their membership means that the advice has credibility. Second, academies have convening power and access to decision-makers, which other institutions may lack. Third, the fact that participants in academy-based science-policy advice processes are unpaid, and secure in their careers and academy recognition, means that they can exercise independence of thought and perceived neutrality on contentious issues. Finally, the accumulated experience represented in academies can bring deliberative power to complex problems. To deliver this value proposition, academies must be proactive in helping to identify and respond to societal needs and in pulling together the knowledge required to address them.
- 5. Advocate rationality in a post-truth world.** The fundamental tenets on which learned academies were founded are under attack in many parts of the world. The academies should not stand by idly while this happens. The notion that academies speak truth to power can persist only if the idea of truth is recognised; similarly, evidence-informed decisions need to have some mechanism for deciding which bodies of evidence are relevant, and how much confidence can be associated with them. Academies should use all the pathways and tools of modern communication to ensure that their message stands out because of its thoughtfulness and impartiality.

¹⁰⁸ Tickner, J. and Baum, J (2016) Membership selection procedures for young academies: experiences of the Global Young Academy 2010-2016. Internal paper approved by GYA Executive Committee, 15 May 2016

APPENDIX 3: Key global scientific advice organisations

Table 1: Key Global Scientific Advice Organisations

Organisation/network	Membership / representation	Role
International Science Council [formerly ISSC and ICSU] ¹⁰⁹	Global. National scientific bodies (141 members), international scientific Unions (39 members), and affiliated regional and international organisations (30 members).	Its mission is to strengthen international science for the benefit of society. ISC has a voice in UN negotiations, playing a leading role in coordinating scientific and technological communities within the UN major group system; it has MOUs with leading UN agencies. ISC is a member of Future Earth.
International Network for Government Science Advice (INGSA) ¹¹⁰	Mixed types of self-identified institutions and individuals. Regional chapters. Under the aegis of ISC.	To share perspectives and increase cooperation among science advisors to national heads of state, legislatures and regional bodies around the world. Does not provide science advice per se.
Foreign Ministers' Science and Technology Advisory Network (FMSTAN) ¹¹¹	A network of S&T advisors to foreign ministers (at time of writing, 20). They are not necessarily scientists but are science literate and know where to source expertise.	To raise awareness of S&T for diplomacy; share good practice; strengthen S&T advisory capacity.
Future Earth ¹¹²	Global. Fifteen-member governing council composed of representatives from ISC, UNESCO, UNEP, United Nations University (UNU), Sustainable Development Solutions Network (SDSN), the STS Forum, and the World Meteorological Organisation. Advisory committee led by international team of high-level representatives from scientific and stakeholder communities. Operations and projects conducted through five Global Hubs, Regional Centres and Offices, and National Networks.	A 10-year international research initiative on global environmental change, which is mobilising thousands of scientists while strengthening partnerships with policy-makers and other stakeholders to provide sustainability options and solutions in the wake of Rio+20. It runs a Knowledge-Action Network on the SDGs, designed to enhance communication, promote awareness of the SDGs and the scientific challenges in reaching them, and strengthen the science-policy interface at all levels of governance.
InterAcademy Partnership (IAP) ¹¹³	Global. Over 140 academies of science, engineering and medicine from over 100 countries. Four regional networks.	IAP supports capacity building efforts of nascent, new and struggling academies. It also provides independent expert advice on scientific, technological and health policy issues to national governments and international organisations such as the United Nations through reports and statements.
Global Young Academy (GYA) ¹¹⁴	Global. 200 members and 216 alumni, together representing 83 countries.	GYA's mission is to give a voice to young scientists around the world through developing, connecting, and empowering young researchers to lead international, interdisciplinary, and inter-generational dialogue with the goal of making global decision-making evidence-informed and inclusive.

¹⁰⁹ <https://council.science/>

¹¹⁰ <https://www.ingsa.org/>

¹¹¹ <https://www.ingsa.org/divisions/fmstan/>

¹¹² <http://www.futureearth.org/>

¹¹³ <http://www.interacademies.org/>

¹¹⁴ <https://globalyoungacademy.net/>

Table 1: Key Global Scientific Advice Organisations *cont.*

Organisation/network	Membership / representation	Role
The World Academy of Sciences (TWAS) ¹¹⁵	Global science academy of 1,222 elected Fellows in over 90 countries.	TWAS supports research, education, policy and diplomacy through fellowships, research grants, visiting scientist positions, international and regional science conferences, awards and prizes, and five Centres of Excellence that provide opportunities to researchers from the developing world. TWAS also serves as a partner on numerous global science policy projects.
Global Science Forum of the Organisation for Economic Cooperation and Development (OECD) ¹¹⁶	Global. 33 countries (either OECD members or Key Partners) and the European Union (EU).	Science policy officials and research community leads from OECD member governments, preparing analyses and actioning recommendations on high-priority science policy issues requiring international co-operation.
Global Research Council ¹¹⁷	Global. Virtual.	National science funding agencies and research councils exchanging perspectives and promoting cooperation on issues of common interest, such as research integrity and open access publishing.

Note: This table is not comprehensive: there are other international organisations that conduct policy-oriented research and provide policy advice on global issues that are too large or too complex to be solved unilaterally, including the International Institute for Applied Systems Analysis (IIASA).

¹¹⁵ <https://twas.org/>

¹¹⁶ <http://www.oecd.org/sti/inno/global-science-forum.htm>

¹¹⁷ <https://www.globalresearchcouncil.org/>

APPENDIX 4: Examples of actions/interventions for academies and academicians identified at regional workshops

Level of action	SHORT-TERM; 0-12 months	MID-TERM; 1-3 years	LONG-TERM; To 2030
REGIONAL <i>What can the academies/network do at the regional level?</i>	<ul style="list-style-type: none"> Prepare and send a letter to all Heads of Govt in the region to offer network's support. Develop relations with UN Regional Commissions, including ways to support their Annual Fora on Sustainable Development and check on UN RC website for T&D and funding opportunities. Support the ISC Regional Office in its STC Major Group role. (Re)align recent, current and future regional network initiatives and strategic plans with the SDGs. Prepare a statement on the role of science in supporting the SDGs for opinion-formers at country and (where applicable) regional government levels. Communicate and be proactive in the promotion of the SDGs in all business. Build GYA & NYAs systemically into IAP network business to mutual benefit. 	<ul style="list-style-type: none"> Establish regional communication platforms, including info on funding, expertise, projects, etc. Host a regional meeting on the SDGs with wide-ranging stakeholders. Constructively critique UN regional review of SDGs implementation, and other outputs, from a scientific perspective. Link IAP reports database with UN regional databases and helpdesks. Build a database of regional expertise. Collate success stories and share with members and wider publics. Use distinguished scientists in the region to advocate for STI for the SDGs. Engage the World Bank and Regional Development Banks on SDGs outreach. 	<ul style="list-style-type: none"> Produce interregional FNSA-like reports on interrelated SDGs. IAP, regional network and ISC Regional Office produce guidelines on integrating STI into SDGs and future global policy framework. Reflect on the post-2030 agenda and how academies can position themselves to be part of the next process. Work on SDG indicator systems for futures work/forecasting. Inform a 2050 Agenda.
NATIONAL <i>What can my academy do at the national level as part of the national science system?</i>	<ul style="list-style-type: none"> Academies socialise SDGs within national scientific community and play leading advocacy role. Help develop new/align existing national STI plan (or road map) with the SDGs. Assess national progress, supporting VNR process where in progress, and help identify national priorities for action. Where they do not already exist, academies create inclusive, interdisciplinary national working groups on SDGs; where they do, join them. Build better connections with universities, the private sector and other professional bodies, around achievement of the SDGs: how can we help each other? Contextualise the SDGs in local language. Communicate socially relevant scientific research in the country to government. 	<ul style="list-style-type: none"> Engage/mobilise national science community to support and/or review VNRs so that they are more rigorous and accountable. Help develop an SDG-oriented national research agenda. Work in partnership with other national stakeholders to raise SDGs awareness. Build strong relations with focal/lead ministries. Work with ministries of S&T to build SDGs into government implementation mechanisms; convene meetings of all relevant ministries. Encourage the election of scientists and engineers to public office. Work with universities and schools to raise awareness of SDGs. Advocate for universities to re-orientate their curricula around the SDGs and/or work together on SD. 	<ul style="list-style-type: none"> Develop an induction/training programme in evidence-informed policymaking for new officials in government/civil service. Revisit and review VNRs and/or the GSDR reports for evidence of impact. Influence universities' policies to ensure/incorporate support for scientists to do policy work as part of their workload beyond teaching, research & publications. Advocate for policy engagement to be equally weighted in career progression along with publications and teaching. Develop an outreach programme for school children on the value and benefits of science, with other education stakeholder groups and tailored to national needs and context.

Level of action	SHORT-TERM; 0-12 months	SHORT-TERM; 0-12 months	MID-TERM; 1-3 years	
INSTITUTIONAL <i>What can my academy do at the institutional level?</i>	<ul style="list-style-type: none"> Be a more proactive member of the regional network. Identify focal points / correspondents for the SDGs and use them to monitor developments, identify opportunities and engage with others. Map existing activities to SDGs and reference future work around them (and use SDGs icons). Populate the IAP SDGs-project database. Constructively critique VNRs. Promote / socialise the SDGs on academy website, on social media and use the Young Academies as conduits for outreach. Raise awareness of SDGs amongst academy Councils, academy membership and through their research communities. Frame and prioritise (senior and young) academy initiatives around the SDGs. Strengthen senior-young academy cooperation. Deep dive on particular issues where academies have expertise (while considering impacts on other goals). Establish task teams/champions/focal points for the SDGs to embed them across academy programmes. Senior-young academies collaborate on <ul style="list-style-type: none"> social media dissemination of reports/activities; project working groups; policy briefs on recent / upcoming reports; mentoring, coaching and shadowing programmes e.g. a young scientist joining a senior scientist's meeting with a minister. Prepare one slide summaries and/or short non-technical summaries of academy reports for policymakers. 	<ul style="list-style-type: none"> Invite Ministers from lead ministries to meet academy leadership to discuss cooperation. Work more readily across disciplines. Set engagement standards/expectations for academy members. Research academy membership for those still active in relevant research and engage them; draw on a wider pool of academicians for academy work. Review and improve internal communication processes to better engage members. Use VNRs as prompts/steer for academy work. For each SDG, produce a one-pager that includes status, gaps, etc. and disseminate. Encourage public participation in academy discussion meetings. 	<ul style="list-style-type: none"> Build SDGs awareness through seminars, meetings, conferences. Appoint sustainability managers to make academy buildings and activities zero environmental footprint. Set up GYA alumni committee to bridge short term of members and provide institutional memory. Young and senior academies be part of each others' boards/leadership structures. Help disseminate and further develop work on SDGs interactions and grey literature, and use this to inform research priorities. Support academicians in influential positions and encourage them to raise the profile of academies within governments. Consider a reward scheme to incentivise members to get involved. Implement policy writing training for academicians. 	
			MID-TERM; 1-3 years	
		<ul style="list-style-type: none"> Develop an institutional strategy for engaging with the SDGs on a national level. Incorporate SDGs into existing/new strategic plans. Facilitate/lead development of national, flexible roadmaps, framed around national priorities. Build strategic partnerships with other parts of academia, government and business sector to strengthen advocacy for STI for the SDGs. Gather anecdotes/personal narratives on SDG successes nationally and use these to motivate further action; translate best practice/success stories into local language and publicise. Develop "three-minute thesis" style distillations of existing SDG-related academy reports. 	LONG-TERM; To 2030	
			<ul style="list-style-type: none"> Help develop robust national STI plans that will survive changes in government. Continue to build strategic partnerships, not only with scientific organisations and institutions but with non-governmental and non-scientific organisations and agencies involved in SDGs implementation. Conduct internal and external reviews/evaluations of academy impact so that it is more accountable. Embed academicians in parliamentary advisory committees. 	

Level of action	SHORT-TERM; 0-12 months	MID-TERM; 1-3 years	LONG-TERM; To 2030
INDIVIDUAL <i>What can I do? I will.....</i>	<ul style="list-style-type: none"> Promote / socialise the SDGs on my social media; on my academy web pages; in local/national media; within my academy; within my research community. Talk to my research colleagues and networks about ways to better support the SDGs. Cross-reference the SDGs in my lectures/conferences. Explicitly link my proposals (for funding, grants) and publications to the SDGs. Become a champion for them within my own academy and within my own research community. Conceptualise my work in terms of the SDGs in all my presentations at conferences, etc. Communicate the outcome of this workshop to my academy and my peers. Change my lifestyle and live a greener life. Talk to my Head of Department/University about SDGs. Listen to others' experiences and engage more readily with social scientists and public. Help build my own and others capacity on science for policy. 	<ul style="list-style-type: none"> Write a provocative paper/article/OpEd on the SDGs for local/national/specialist media. Be an SDG champion in my academy and/or research network and continue to use social media and websites to raise SDGs awareness. Use virtual meetings/networks more effectively. Help train young academicians in policy writing. Revisit my own research work and better align around the SDGs. Encourage my academy to also recognise policy engagement as a criterion for entry and ongoing membership. 	<ul style="list-style-type: none"> Participate in national activities on the SDGs. Build effective relations with politicians to help scientists have a voice in informing policy decisions (alongside economists and lawyers). Become the national minister for the SDGs. Become an individual expert reviewer for my country's VNR.

APPENDIX 5: List of Acronyms

AASSA:	Association of Academies and Societies of Sciences in Asia
AFSD:	Annual Fora on Sustainable Development
ANCEFN:	National Academy of Exact, Physical and Natural Sciences/ Academia Nacional de Ciencias Exactas, Físicas y Naturales
APRSCP:	Asia-Pacific Roundtable on Sustainable Consumption and Production
ASEAN:	Association of Southeast Asian Nations
ASSAf:	Academy of Science of South Africa
BAS:	Brazilian Academy of Sciences
BWG:	Biosecurity Working Group
CSR:	Corporate Social Responsibility
CSTD:	Commission on Science and Technology for Development
DFID:	Department for International Development
DST:	Department of Science and Technology
EASAC:	European Academies' Science Advisory Council
ECA:	Economic Commission for Africa
ECLAC:	Economic Commission for Latin America and the Caribbean
ECOSOC:	Economic and Social Council
EDP:	Executive Development Programmes
EGM:	Expert Group Meetings
EU:	European Union
FAO:	Food and Agriculture Organisation
FMSTAN:	Foreign Ministers' Science and Technology Advisory Network
FNSA:	Food and Nutrition Security and Agriculture
GO-SPIN:	Global Observatory Science Policy Information Network
GRC:	Global Research Council
GSDR:	Global Sustainable Development Report
GYA:	Global Young Academy
HDI:	Human Development Index
HLPF:	High-Level Political Forum
IANAS:	Inter-American Network of Academies of Science
IAP:	InterAcademy Partnership
IAS:	Institute for Advanced Study
IATT:	Inter-agency Task Team
ICSU:	International Council for Science
IIASA:	International Institute for Applied Systems Analysis
INGSA:	International Network for Government Science Advice
IPBES:	Intergovernmental Panel on Biodiversity and Ecosystem Services
IPCC:	Intergovernmental Panel on Climate Change
ISC:	International Science Council
ISSC:	International Social Sciences Council
KAST:	Korean Academy of Science and Technology
KPI:	Key Performance Indicator
LDC:	Least Developed Countries
MENA:	Middle East and North Africa
MoPIC:	Ministry of Planning and International Cooperation
MOU:	Memorandum of Understanding

NASAC: Network of African Science Academies
NASSL: National Academy of Sciences of Sri Lanka
NAST: National Academy of Science and Technology of the Philippines
NET: New and Emerging Technologies
NGO: Non-Governmental Organisation
NYA: National Young Academy
OECD: Organisation for Economic Cooperation and Development
R&D: Research and Development
RSS: Royal Scientific Society
SA: South Africa
SBPC: Brazilian Society for the Advancement of Science/
 Sociedade Brasileira para o Progresso da Ciência
SCNAT: Swiss Academies of Arts and Sciences
SCP: Sustainable Consumption and Production
SD: Sustainable Development
SDG: Sustainable Development Goals
SDSN: Sustainable Development Solutions Network
SEP: Science Education Programme
SMART: Specific, Measurable, Achievable, Realistic, Timely
STAG: Science and Technical Advisory Group
StatsSA: Stats South Africa
STC: Scientific and Technological Community
STI: Science, Technology and Innovation
STI MS: Science, Technology and Innovation Multistakeholder Forum
STIP: Science, Technology and Innovation Policy
T&D: Training and Development
TAST: Thai Academy of Science and Technology
TFM: Technology Facilitation Mechanism
TWAS: The World Academy of Sciences
UN: United Nations
UNCTAD: United Nations Commission on Trade and Development
UNDESA: United Nations Department of Economic and Social Affairs
UNDP: United Nations Development Programme
UNECA: United Nations Economic Commission for Africa
UNECE: United Nations Economic Commission for Europe
UNECLAC: United Nations Economic Commission for Latin America and the Caribbean
UNEP: United Nations Environment Programme
UNESCAP: United Nations Economic and Social Commission for Asia and the Pacific
UNESCO: United Nations Educational, Scientific and Cultural Organisation
UNESWA: United Nations Economic and Social Commission for Western Asia
UNISDR: United Nations Office for Disaster Risk Reduction
UN-ROAP: United Nations Regional Office for Asia-Pacific
UN SAB: United Nations Scientific Advisory Board
UNU: United Nations University
USP: Unique Selling Point or Proposition
VNR: Voluntary National Review
WFEO: World Federation of Engineering Organisations
WG: Working Group



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