

**Scientific and Technological Community Major Group position paper on the theme
of the 2020 High-level Political Forum**

***Accelerated action and transformative pathways: realizing the decade of action
and delivery for sustainable development***

May 2020

Key recommendations for the 2020 HLPF

1. The world is currently experiencing unprecedented disruption due to the COVID-19 pandemic, resulting in cascading effects and profound impacts upon health, social and economic systems worldwide, including potential long-term effects on sustainable development efforts. While the immediate priority for countries is to solve the health crisis and protect the most vulnerable, the COVID-19 outbreak offers in the longer term an important opportunity to rethink the very foundations of our societies and to move away from the existing system where inequalities in terms of vulnerability and environmental impact are structurally embedded¹. In that sense, the COVID-19 crisis must become the great accelerator of transformations towards a more sustainable, equitable and healthy world.
2. Achieving a sustainable, equitable and healthy world requires an integrated transformations approach, such as that offered in the Global Sustainable Development Report 2019 (GSDR 2019), which addresses the Sustainable Development Goals (SDGs) in a comprehensive, systemic way, rather than as a collection of discrete goals and associated targets and indicators. With just ten years to go, countries and regions urgently need to design and implement integrated, context-sensitive and attainable pathways towards achieving transformation at all levels and scales.
3. Operationalizing comprehensive and integrated transformation frameworks will require: an important contribution from the social sciences and humanities in understanding and making sense of the bearing of history, culture and context on transformations, the conditions and consequences of possible transformations, the role of subjective sense-making in our visions of the world, the ethics and responsibilities involved in deliberate transformation, and the complexity of decision-making and governance processes, including the role of science in the policy process²; collective processes to define where science is needed and where public and private investments should be prioritized to accelerate the achievement of the 2030 Agenda; and stronger and more equitable collaboration across policy, science, civil society and other stakeholder communities at all levels and scales.
4. There is a special urgency to rethink the role and importance of technology to achieve the 2030 Agenda, and how it could be reoriented in order to more meaningfully contribute to the implementation of the SDGs in a transformative way³. The UN's global Technology

¹ IDDRI. 2020. *The urgency of the crisis and a time to reflect together*. Available at: <https://www.iddri.org/en/publications-and-events/blog-post/urgency-crisis-and-time-reflect-together>

² ISSC. 2012. *Transformative Cornerstones of Social Science Research for Global Change*. Available at: <http://www.worldsocialscience.org/documents/transformative-cornerstones.pdf>

³ Walsh P.P., Murphy E. and Horand D. 2020. The role of science, technology and innovation in the UN 2030 agenda. *Technological Forecasting and Social Change*, Volume 154. <https://doi.org/10.1016/j.techfore.2020.119957>

Facilitation Mechanism should become a vehicle to assess whether the current stock of technology and knowledge is sufficient for achieving the SDGs and suitable for transfer across the globe.

5. Implementation and review of the SDGs should take into account the multiple threats, complex risks and interactions which may threaten progress if programmes are not sufficiently resilient. The conceptualization, identification and understanding of risk demands interdisciplinary integrated approaches from science, collaboration between science and policy, and cross-sectoral engagement by government. Strengthening data collection and exchange are cornerstone activities towards this end.
6. For greater coherence and impact, the implementation of five major environmental policy frameworks – the 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction, the Paris Agreement on Climate Change, the Global Biodiversity Framework, and the New Urban Agenda – should be better coordinated to form an integrated global agenda for action for an equitable, sustainable and resilient world.
7. Member States, regions and stakeholders urgently need to consider how they would respond to a situation of planetary emergency where both risk and urgency are high, in the face of mounting evidence that global environmental change will soon cross tipping points leading to cascading effects across multiple sectors and regions⁴. Learning from the COVID-19 crisis will be important as it has shown that governments can act swiftly and resolutely in a crisis, and people can change their behaviour in the face of an existential threat⁵.
8. The global institutional framework must be strengthened in order to accelerate action towards achieving the 2030 Agenda. The review of the High-level Political Forum (HLPF) is a vital and necessary opportunity to convert the Forum into a knowledge-based, coherent, and action-oriented arena through improved evaluation and analysis of evidence-based inputs⁶. In addition, the UN must take steps to ensure that the evidence-based inputs stemming from the multi-stakeholder Forum on Science, Technology and Innovation for the Sustainable Development Goals (STI Forum) better feed into the HLPF.

⁴ Lenton et al. 2019. [Climate tipping points — too risky to bet against](https://doi.org/10.1038/d41586-019-03595-0). *Nature*. Vol 575, 592-595. Doi: 10.1038/d41586-019-03595-0

⁵ Robinson M. and Reddy D. 2020. Tackling Climate Change with COVID-19 Urgency. *Project Syndicate*. Available at: <https://www.project-syndicate.org/commentary/tackling-climate-change-with-covid19-urgency-by-mary-robinson-and-daya-reddy-2020-04>

⁶ Beisheim M. and Bernstein S. 2020. *Matching the HLPF's Ambition to Performance: Prospects for the Review*. Available at: <http://sdg.iisd.org/commentary/guest-articles/matching-the-hlpfs-ambition-to-performance-prospects-for-the-review/>

Introduction

The Scientific and Technological Community (STC) Major Group greatly welcomes the theme of the High-level Political Forum 2020 "*Accelerated action and transformative pathways: realizing the decade of action and delivery for sustainable development*". With the present theme, the world is moving into a decade in which concrete action to overcome the numerous pressing challenges and obstacles to reaching a sustainable world and the identification of visionary, context-sensitive and attainable pathways towards achieving transformation will be essential.

As signalled in all recent scientific assessments, no country is on track to accomplish the SDGs, positive trends are decelerating, and some SDGs are currently retrogressing despite positive long-term developments. The growing risks of major planetary disruptions, such as the risk of the Amazon crossing a tipping point that would turn the world's largest rainforest into dry scrubland due to climate change, deforestation and fires,⁷ or the growing risk of catastrophic and irreversible disaster implying potentially infinite costs of unmitigated climate change⁸, pose existential threats. They would drastically undermine all attempts for sustainable development and erode the very foundations on which we all depend to live and thrive.

In this critical context, the STC Major Group strongly endorses the [Global Sustainable Development Report 2019](#) (GSDR 2019) and the 'transformations approach' outlined within it, which identifies six major systemic transformations⁹ that need to occur to achieve desired outcomes and to move the world onto the path to sustainability. The adoption of an integrative framework and its application at all levels will allow us to address sustainability challenges simultaneously and in an integrated manner by focusing on amplifying co-benefits and mitigating trade-offs to accelerate action.

Science is vital in comprehending and balancing the links between the social, economic and environmental dimensions of sustainable development, as highlighted in the GSDR 2019, which recognizes science and technology as an important lever for transformation to accelerate progress in achieving the SDGs, together with governance, economy and finance, and individual and collective action. To ensure that the decade of action and delivery is realized, the scientific and technological community is willing to closely collaborate with actors from all these domains and calls for a strengthened and strategic collaboration between the different levers.

The urgency to act now

- **The scientific and technological community calls for immediate and far-reaching action by governments, private sector and civil society towards achieving the SDGs, through an evidence-based systemic approach. A recent [survey of international scientists working on global change](#), conducted by [Future Earth](#), identifies five global risks that have the potential, through cascading effects, to trigger a global systemic crisis: failure of climate change mitigation and adaptation; extreme weather events; major biodiversity loss and ecosystem collapse; food crises; and water crises.** This is also widely acknowledged by the business and policy community, for example in the recent [World Economic Forum's Global Risks Report 2020](#) which – for the first time – lists environmental issues for all of its top five global risks. Our major infrastructure systems of transport, energy, water, waste,

⁷ Amigo I. 2020. When will the Amazon hit a tipping point? *Nature*. Vol. 578, 505-507. Doi: 10.1038/d41586-020-00508-4

⁸ Krogstrup S. and Oman W. 2019. Macroeconomic and Financial Policies for Climate Change Mitigation: A Review of the Literature. IMF Working Paper WP/19/185

⁹ The six entry points for transformation in the GSDR 2019 are: human wellbeing and capabilities; sustainable and just economies; energy decarbonization with universal access; food systems and nutrition patterns; urban and peri-urban development; and global environmental commons.

telecommunications and flood defences play a major role, accounting for a vast portion of energy-related carbon dioxide (CO₂) emissions whilst also having a significant impact on our natural habitats¹⁰. Thus, through the [World Federation of Engineering Organizations \(WFEO\) Declaration on Climate Emergency](#), the technological community is committing to strengthened engineering working practices and outcomes contributing to societal well-being and climate change mitigation and adaptation through sharing existing knowledge and research, capacity building and promoting climate change education at different levels and all kinds of engineering education. A global systemic crisis will not only hinder the achievement of the SDGs, but will also have potentially catastrophic consequences for humanity and the environment. The [2019 Global Assessment Report on Disaster Risk Reduction](#) underlines the need for new ways of understanding the dynamic nature of systemic risks, new structures to manage risks in complex, interconnected systems and new tools to support risk-informed decision making to enhance the ability to understand and manage systemic risks.

- **The ongoing global crisis due to the unexpected spread of COVID-19 has revealed the unpreparedness and vulnerability of developed and developing countries alike, resulting in profound health, social and economic impacts worldwide, including potential long-term effects on sustainable development efforts.** The current crisis perfectly illustrates how, in an increasingly interconnected and globalized world, a local threat can evolve to become global, with cascading effects on several components of global society which disrupt its usual functioning. Global crises require global, coordinated efforts and responses, and current events have demonstrated, once again, the value of open scientific collaboration, with experts worldwide coming together to find solutions to the current pandemic, as well as demonstrating how scientific knowledge can be a global public good¹¹. The magnitude of the COVID-19 pandemic offers an important opportunity to move away from the existing system in which inequalities in terms of vulnerability and environmental impact are structurally embedded,¹² and to rethink the very foundations of our societies to achieve a more resilient, equitable and sustainable world, including the way we deal with existing and emerging long-term threats, such as biodiversity loss, land-use change and climate change. Furthermore, the current outbreak of COVID-19, and the recent trend of greater emergence of infectious diseases, encourage us to rethink our relationship with nature to prevent the next infectious pandemic as, like almost all other recent pandemics, all available evidence points to COVID-19 originating in wildlife, and driven by increasing trade in wildlife for food. The wildlife trade, land-use change, and other global environmental changes are statistically significant drivers of emerging infectious diseases globally, and have led to an exponential increase in the risk, spread and economic impact of pandemics.

¹⁰ WFEO Declaration on Climate Emergency. Available at: https://www.wfeo.org/wp-content/uploads/declarations/WFEO_Declaration_on_Climate_Emergency_2019.pdf

⁸ Li Q., Guan X., Wu P., Wang X. et al. 2020. Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus-Infected Pneumonia. *The New England Journal of Medicine*. Available at: <https://www.nejm.org/doi/10.1056/NEJMoa2001316>

⁹ Cascella M., Rajnik M., Cuomo A., Dulebohn S.C. and Di Napoli R. 2020. Features, Evaluation and Treatment Coronavirus (COVID-19). StatPearls [Internet]. Available at: <https://www.ncbi.nlm.nih.gov/books/NBK554776/>

¹⁰ Sohrabia C., Alsafi Z., O'Neill N., Khan M., Kerwan A., Al-Jabir A., Losifidis C., Agha R. 2020. World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *International Journal of Surgery*. Vo. 76, pp: 71-76. Available at: <https://doi.org/10.1016/j.ijsu.2020.02.034>

¹¹ Mesfin M. 2020. It Takes a World to End a Pandemic. Scientific Cooperation Knows No Boundaries — Fortunately. Foreign Affairs. Available at : <https://www.foreignaffairs.com/articles/2020-03-21/it-takes-world-end-pandemic>

¹² IDDRI. 2020. The urgency of the crisis and a time to reflect together. Available at: <https://www.iddri.org/en/publications-and-events/blog-post/urgency-crisis-and-time-reflect-together>

Science and technology – a lever to accelerate transformations in support of the 2030 Agenda

- The SDGs have increasingly become a rallying point; the scientific and technology community is widely mobilising, from local to global levels, to respond to the pressing and complex global sustainability issues that require interdisciplinary and transdisciplinary research approaches to better understand their multiple underlying drivers, interdependencies and complexities¹³ and to produce solutions needed at different scales. Research funding programmes such as [LIRA 2030 Africa](#), [Transformations to Sustainability \(T2S\)](#), and initiatives such as [Future Earth](#) and its ‘[SDG labs](#)’ and [Knowledge-Action Networks](#), or the [T-Labs](#) processes refined by the [PATHWAYS consortium](#), are examples of doing science with society by bringing together researchers, policy-makers and other societal actors to produce more relevant, context-specific knowledge that responds to societal needs and develop solutions to complex local and national problems. The interdisciplinary initiative [The World in 2050 \(TWI2050\)](#), led by the [International Institute for Applied Systems Analysis \(IIASA\)](#), has been set up to produce the scientific knowledge needed to understand the requirements of desirable and feasible sustainable development pathways and analyse the options, feasibility and consequences (socially, economically and environmentally) of transitioning to pathways to sustainable development¹⁴. There is an urgent need to synthesize and scale up the knowledge produced by different existing initiatives such as those mentioned above in order to serve their ultimate goal of providing answers and solutions to grand societal challenges, as well as achieving a sustainable and equitable world.
- Recent findings on knowledge co-production stemming from research projects supported by the [LIRA 2030 Africa programme](#) have been collected in a report titled [“Advancing the 2030 Agenda in African cities through knowledge co-production”](#). These show that the novel methods of producing knowledge together with various stakeholders, including policy and practice communities, are essential for the local implementation of the 2030 Agenda. Working with different stakeholders helps researchers to have a better understanding of local needs and interests, to gain a holistic understanding of problems, and to co-produce locally grounded knowledge and solutions. By fostering new place-based partnerships across different sectors, knowledge co-production helps anchor SDGs in the local context, and increases the responsiveness of communities to the global agenda. By providing a space for stakeholders to express their constraints and aspirations, it promotes better participation of groups that are usually silenced and formally excluded in the implementation of the SDGs. This makes the knowledge production process more inclusive. By bringing contending actors and sectors together, it helps identify interconnectedness between the SDGs, and ways to achieve them. Finally, knowledge co-production helps to leverage the expertise, skills and resources required to implement the SDGs¹⁵.
- Science and technology play a crucial role in identifying positive synergies between the SDGs and targets, which have the potential to generate a virtuous circle leading to accelerated action and implementation. A growing body of research shows the huge potential of addressing SDGs in an integrated way and leveraging co-benefits across SDGs.

¹³ Mauser W. et al. 2013. Transdisciplinary global change research: the co-creation of knowledge for sustainability, *Current Opinion in Environmental Sustainability*, Volume 5, Issues 3–4, Pages 420–431. <https://doi.org/10.1016/j.cosust.2013.07.001>

¹⁴ IIASA. 2015. The World in 2050 (TWI2050) - Interactive Science Meeting. Available at: <https://iiasa.ac.at/web/home/about/events/150310-TWI2050.html>

¹⁵ International Science Council (ISC), 2020. Advancing the 2030 Agenda in African cities through knowledge co-production: Urban experiments led by early-career African scientists. International Science Council, Paris. DOI: 10.24948/2020.0

Examples from the [Sussex Sustainability Research Programme](#) (SSRP) include the utility of linking nutrition and human rights considerations to bring together SDGs 2 and 16 and new research on climate-smart agriculture in Africa¹⁶ that has generated ideas on how to make the climate goal consistent with goals relating to inequality (SDG 10) and justice (SDG 16) and the possible contribution of agriculture in peri-urban areas to end hunger and contribute to conservation of terrestrial ecosystems SDGs. The [Low Energy Demand study](#) conducted by IIASA has built a low energy demand scenario for meeting the 1.5°C target which results in multiple co-benefits for a whole range of SDGs, including SDG 2, 3, 7¹⁷. [Future Earth's Science-Based Pathways for Sustainability](#) is an example of an initiative enhancing decision-makers' implementation of SDGs through the co-design of pathways to achieve the four life-supporting SDGs at the national, regional and global levels while accounting for all the SDGs. Likewise, the [Earth Commission](#) is developing an integrated approach to defining the boundary conditions for a stable Earth system to support a safe and just operating space for life on Earth. This approach takes account of the interactions – synergies and trade-offs – between systems to underpin the setting of specific science-based targets for nations, cities and businesses. Sectoral approaches that focus on pursuing single goals, while ignoring potential negative interactions, will not only slow down progress towards the 2030 Agenda, but may additionally reverse positive developments made towards other goals. To rapidly advance towards the transformation required, administrations at all levels need to adopt integrated approaches and work closely with the scientific and technological community to properly take advantage of co-benefits, while identifying and managing trade-offs.

- **To enhance decision makers' understanding of the interconnected nature of the SDGs and the implications of the interdependencies for their achievement, numerous qualitative and quantitative tools have been developed.** [The Stockholm Environment Institute's](#) (SEI) [SDG Synergies Approach and Tool](#) is one approach that has successfully supported decision-making for greater policy coherence. SDG Synergies aims to guide decision- and policy-making processes that require consideration of multiple objectives and that would benefit from a systemic perspective. The approach has been applied in multi-stakeholder processes with government and UN partners, at national and regional levels, in Mongolia¹⁸, Sri Lanka¹⁹ and in several initiatives in Colombia^{20 21 22}. A recent [GIZ report](#) presents an overview of various existing tools to map and broaden the understanding of the linkages across the SDGs, along with tools which facilitate the analysis of interlinkages between the SDGs and

¹⁶ Newell, P. et al. 2019. Climate Smart Agriculture? Governing the Sustainable Development Goals in Sub-Saharan Africa. *Frontiers in Sustainable Food Systems*, Vol. 3, Article 55.

<https://doi.org/10.3389/fsufs.2019.00055>; Newell P., O. Taylor and C. Tonui. 2018. Governing Food and Agriculture in a Warming World, *Global Environmental Politics* 18 (12), pp 53-71.

¹⁷ Grubler, A., Wilson, C., Bento, N. et al. 2018. A low energy demand scenario for meeting the 1.5 °C target and sustainable development goals without negative emission technologies. *Nat Energy* 3, pp. 515–527. <https://doi.org/10.1038/s41560-018-0172-6>

¹⁸ Barquet, K., Trimmer, C., Sturesson, A., Joyce, B. and Jambal, D. 2019. Piloting the SDG Synergies Approach in Mongolia. Stockholm Environment Institute, Stockholm. Available at: <https://www.sei.org/publications/sdg-synergies-mongolia/>

¹⁹ SEI. SDG interactions in Sri Lanka. Available at: <https://www.sei.org/projects-and-tools/projects/piloting-sdg-synergies-sri-lanka/>

²⁰ SEI. Supporting SDG integration in Colombia. Available at: <https://www.sei.org/projects-and-tools/projects/sustainable-development-goals-colombia/>

²¹ Yehle, E. and Lobos Alva I. 2019. A new tool helps stakeholders quickly visualize SDG interactions in Colombia. Available at: <https://www.sei.org/featured/visualize-sdg-interactions-colombia/>

²² SEI. Integrating SDGs-NDCs and OECD commitments in Colombian mining and energy sectors. Available at: <https://www.sei.org/projects-and-tools/projects/integrating-sdgs-ndcs-and-oecd-commitments-in-colombian-mining-and-energy-sectors/>

other global agreements, such as the [NDC Footprints](#) or the [SDG Climate Action Nexus](#). Such tools are essential for efficient policy formulation and implementation, facilitating incorporation of the various facets of sustainable development and providing a framework for countries, scientists and stakeholders to discuss and unpack the holistic nature of the SDGs. Efforts are underway by [International Network for Government Science Advice](#) (INGSA) to increase the policy relevance of SDGs interactions analysis to support policy framing, prioritisation, policy development and evaluation. Engineers are, furthermore, developing a score card to evaluate infrastructure by country and region, essential for progressing the national roadmap for the SDGs²³.

- **Integrated, systemic transformation frameworks, such as the one proposed by the GSDR 2019, are a major step forward in providing clear evidence-based assessments of the key systemic points of intervention to achieve the SDGs, and provide an overall framing narrative for the SDGs that reduces the complexity of the 2030 Agenda and supports a coherent approach to implementation that takes full account of the dynamic and integrated nature of the SDGs.** The [TWI2050 report](#) and [Sachs et al. \(2019\)](#) provide similar actionable transformation frameworks, with each of the six transformations outlined describing a major change in the organization of societal, political and economic activities that would transform resource use, institutions, technologies and social relations to achieve key SDG outcomes²⁴. Sachs et al. (2019) emphasize a set of prerequisites for defining pathways and strategies within each transformation, as well as for implementation and monitoring purposes, amongst which developing tools to design practical and context-specific pathways within each transformation; defining, based on the integrated pathways, time-bound benchmarks critical for understanding how to implement the set of transformations; co-designing the pathways with a broad range of communities and sectors at all levels and scales, which is crucial for identifying perceived trade-offs, ensuring technical feasibility of the long-term pathways and securing broad public support for their implementation; and mobilising relevant data and monitoring frameworks, along with sharing lessons and best practices amongst all actors.
- **Insights from social science research for sustainability show that any transformation framework must take into account the dynamic, interdependent and multi-level nature of social and environmental systems, not least the close relationship between sustainability and equity, and questions of power and politics.** Operationalizing such frameworks such as those offered in the GSDR 2019 and TWI2050 report will require transformative alliances between researchers, governments, business, civil society, and other actors, to ensure that chosen pathways enable those who typically have less power to be meaningful actors in the visioning and process of change. Creating enduring transformative change will require, simultaneously, concerted top-down strategies, such as changes in the rules that govern the global economy and redistributive measures such as labour and market regulations, progressive tax regimes, universal health and education access, as well as bottom-up experiments and collective actions including community-based management of land, forests, fisheries or waste, which are needed to achieve and sustain impact²⁵. Furthermore, different combinations of state-led, market-led, technology-led and citizen-led strategies towards

²³ WFE0 Biennial Report 2017 – 2019, p. 48. Available at: https://www.wfeo.org/wp-content/uploads/governing_documents/WFE0_Biennial_Report_2017-2019.pdf

²⁴ Sachs, J.D., Schmidt-Traub, G., Mazzucato, M. et al. 2019. Six Transformations to achieve the Sustainable Development Goals. *Nature Sustainability*, Vol. 2, pp. 805–814. <https://doi.org/10.1038/s41893-019-0352-9>

²⁵ Leach M. et al. 2018. Equity and sustainability in the Anthropocene: a social–ecological systems perspective on their intertwined futures. *Global Sustainability*, Vol. 1, e13, pp. 1–13. Doi: 10.1017/sus.2018.12

sustainability transformations will need to be adapted to national and regional settings to reflect the diverse nature of economies, societies and political systems.²⁶

- **Moving towards sustainability ultimately requires intentional, profound and systemic societal transformation; a reformist approach will be insufficient to achieve the SDGs, given the deep change in values, norms, practices and institutions that we will need to bring about.** A vast body of scientific knowledge on social change stemming from the arts, humanities and social sciences already exists and it includes evidence on large-scale systems change; historical dependencies; practices and processes for change; individual, cognitive, systemic, cultural, corporate, legislative, power and political dimensions that inhibit or enable change; normative aspects and working with uncertain futures²⁷. However, there is still little understanding of how transformations can be catalysed, fostered or steered, at a sufficient scale and speed, in vastly different contexts, to achieve sustainable global development. Growing international communities of social scientists – notably the [Transformations to Sustainability programme](#) – are studying the social and cultural dimensions of the necessary transformations in comparative, North–South configurations and advancing knowledge about socio-ecological transformations in real-world problem settings all over the globe. Such case-based, internationally co-produced knowledge about the social change must complement systemic transformation approaches. There is an urgent need for researchers to work with decision makers and other societal actors to identify knowledge needs in relation to social transformation and to assess and translate the already considerable and still growing body of knowledge on social change into actionable evidence in the service of the 2030 Agenda. In 2020 the ISC will initiate collaboration between the various actors and initiatives in international social transformations research to identify ways forward for the field and to develop perspectives and recommendations on how to mainstream the social sciences and humanities in sustainability research and policy.
- **Sustainable development initiatives need to take account of the multiple threats and complex risk interactions that may threaten progress if programmes are not sufficiently resilient; development policies, priorities and plans also need to recognize, assess and address the inherent social, economic and environmental trade-offs²⁸ to avoid altering the vulnerability, exposure and capacities of particular populations.** Actions undertaken to achieve specific SDGs need to take into consideration the trade-offs in risk creation and reduction that could emerge, thus it is important that the implementation of the 2030 Agenda is made in conjunction with the Sendai Framework and Paris Agreement, which can serve as a foundation for risk reduction and building resilience, and other global frameworks such as the Global Biodiversity Framework and the New Urban Agenda, which are also central²⁹. As highlighted in a [statement by the STC MG for the Sendai Framework](#), the conceptualisation, identification and understanding of risk demands interdisciplinary integrated approaches from science, collaboration between science and policy, and a cross-sectoral approach from governments. Strengthening data collection to consider multiple threats and trade-offs to manage and reduce risk, and data exchange through innovative platforms to support analysis and synthesis of risk occurrences and possible entry points for disrupting risk-producing processes are cornerstone activities to understand the risk

²⁶ Scoones, I., Leach M. and P. Newell (eds). 2015. *The Politics of Green Transformations*. London: Routledge

²⁷ Fazey I. et al. 2018. Ten essentials for action-oriented and second order energy transitions, transformations and climate change research. *Energy Research & Social Science*, Vol. 40, pp 54-70.
<https://doi.org/10.1016/j.erss.2017.11.026>

²⁸ Opitz-Stapleton S., Nadin R. and J. Kellett. 2019. Risk-informed development. From crisis to resilience. Overseas Development Institute. Available at: <https://www.odi.org/publications/11314-risk-informed-development-crisis-resilience>

²⁹ Ibid.

landscape and align policy for implementation of the Sendai Framework targets, and other major global agreements as part of resilient and sustainable development.

- **Integrated solutions are identified - in the GSDR 2019 and elsewhere - as key to SDG implementation. Yet understanding such integration in politically, socially and ecologically complex settings remains a pressing research need.** This is especially so in the context of tightly coupled socio-ecological systems where lives, livelihoods and cultures are intertwined with dynamic natural processes, for example delta systems that comprise unique hydrological, geomorphological, cultural and socio-economic units with common yet differentiated SDG challenges³⁰. Understanding and guiding SDG implementation in such contexts requires research that is transdisciplinary, participatory and integrative.

Supporting science and technology to deliver

- **Existing and emerging scientific knowledge and breakthrough tools, approaches and solutions must be widely circulated and shared to fully reveal their transformational potential.** Widespread dissemination of vetted and advanced knowledge and technology and their adaptation to specific local and regional contexts, along with local capacity building, are required to shift from current derailing trends to an inclusive and sustainable global development. Open science and open access are critical to this end, notably for developing countries characterized by insufficient scientific and research capacity and limited access to high-quality, timely and reliable data. Additionally, reinforcing North-South, South-South and triangular research cooperation is essential to support the development of context-specific solutions and knowledge-based transformation pathways in developing countries. The [African Open Science Platform](#) is a powerful example of a successful South-South collaboration promoting capacity-building across African states.
- **Expanded capacity building - technical, institutional, and community - from local to global levels is needed.** Efforts are ongoing by the [World Federation of Engineering Organizations](#) (WFEO) in collaboration with the [International Engineering Alliance](#) (IEA) to support capacity building for engineers to develop sustainable infrastructure in Africa and Asia³¹ while other efforts on climate change education in Small Island Developing States in collaboration with the UNESCO Office of Climate Change Education, concern building capacity at the primary and secondary school level for resilience against climate change impacts in the future³². Additionally, the WFEO Committee on Engineering Capacity Building and Committee on Women in Engineering provide good examples of technical and community capacity building, and the UN should encourage similar efforts. WFEO's Engineering 2030 Plan commits to expanded efforts to strengthen engineering education and capacity building worldwide to support implementation of the SDGs.
- **Meeting the 2030 Agenda requires unprecedented levels of funding in research and development aimed at orienting scientific knowledge production towards attaining the SDGs. To advance necessary transformations and identify and address complex challenges, such as those raised by the implementation of the 2030 Agenda, funding communities need to support international research that transcends disciplinary boundaries and co-**

³⁰ Living Deltas Research Hub: <https://www.livingdeltas.org/resources.html>

³¹ Declaration Global Engineering Education Standards and Capacity Building for Sustainable Development. Available at: http://www.wfeo.org/wp-content/uploads/declarations/UNESCO_IEA_WFEO_Declaration_Global_Engg_Education.pdf

³² WFEO Biennial Report 2017 – 2019, p. 50. Available at: https://www.wfeo.org/wp-content/uploads/governing_documents/WFEO_Biennial_Report_2017-2019.pdf

designs and co-produces context-specific transformational pathways with practitioners, policy-makers and other stakeholders. In this regard, a group of science and development funders that met at the [Global Forum of Funders](#), convened by the ISC and a consortium of partners in July 2019, have initiated a Decade of Global Sustainability Science Action, which aims to further the impact of investments in SDG-related research. In the coming months, the international scientific community will develop science interventions to accelerate the contribution of science to the achievement of the 2030 Agenda, which will be funded throughout the Decade of Global Sustainability Science Action using collaborative mechanisms set up by the various funders. The WFEO and the [Federation of Engineering Institutions of Asia and Pacific](#) (FEIAP) and their existing sponsors are seeking more funding to promote and popularize the knowledge and skills of sustainable development among engineers and to bring the concepts of sustainable development into engineering practice as a necessary element.

- **The science-policy nexus needs to be reinforced at all levels of governance to strengthen the scientific and technical input into policy-making for SDG implementation.** Mechanisms to efficiently translate robust scientific knowledge into actionable evidence to inform decision making and to identify policy needs that require scientific inputs must be systematically structured into local, national, regional and global policy-making processes for the SDGs³³. Building science, technology and innovation (STI) roadmaps is a crucial element to support the implementation, delivery and evaluation of the SDGs through deepening the understanding of the complex and interlinked nature of the SDGs and making better use of STI to increase the prospect of significant impact³⁴. Despite widespread recognition of the role of STI in achieving the SDGs, in 2018 the IATT reviewed 64 Voluntary National Reviews (VNRs) and concluded that countries have not made major progress in integrating STI strategies in their national sustainable development strategies³⁵. African scientists, policy-makers and stakeholders working on SDGs will be convened by the [ISC Regional Office for Africa](#) in 2020 to discuss various scientific initiatives promoting an integrated implementation of the SDGs and to develop a shared understanding of the state of play in Africa regarding the mobilisation of science for the SDGs.
- **Current debates draw attention to the need to rethink the role and importance of technology to achieve the 2030 Agenda, and how it could be reoriented in order to more meaningfully contribute to the implementation of the SDGs in a transformative way³⁶. The current direction of technical change is not oriented towards contributing to the global public good, hence it is largely unsustainable for inclusive societies, good governance and the environment^{37, 38}.** Governments have a number of levers available to them to reorient STI to support the SDGs, for instance through setting criteria on foreign direct investment, embedding SDG requirements in public procurement, national research funding, funding of non-profit and government agencies, supporting social enterprise funding for the

³³ Pihl E., Martin M.A., Blome T., Hebden S., et al. 2019. 10 New Insights in Climate Science 2019, Future Earth & The Earth League, Stockholm.

³⁴ Falk J., Gaffney O., Bhowmik A. K., Bergmark P. et al. 2019. Exponential Roadmap 1.5. Future Earth, Sweden.

³⁵ Walsh P.P., Murphy E. and D. Horand. 2020. The role of science, technology and innovation in the UN 2030 agenda. *Technological Forecasting and Social Change*, Volume 154. <https://doi.org/10.1016/j.techfore.2020.119957>

³⁶ Walsh P.P., Murphy E. and Horand D. 2020. The role of science, technology and innovation in the UN 2030 agenda. *Technological Forecasting and Social Change*, Volume 154. <https://doi.org/10.1016/j.techfore.2020.119957>

³⁷ Ibid.

³⁸ Future Earth. 2020. The Digital Disruptions for Sustainability Agenda (D²S Agenda). <https://sustainabilitydigitalage.org/d2s-agenda/>

development of technologies that have social and environmental benefits, regulations for sustainable consumption and production (e.g. packaging, recycling, carbon and water footprints, energy efficiency and emissions). Furthermore, developing technologies targeted at SDG implementation will require significant financial investment, which needs to be government-enabled at all levels and to involve the private sector, NGOs and other stakeholders.³⁹

Strengthening the global institutional framework to accelerate action and delivery

- **The High-level Political Forum (HLPF) should contribute to generating constructive discussions and knowledge about the positive and conflicting interlinkages between the SDGs, hence promoting a change of practices and stimulating policy coherence.** A [recent study conducted by IDDRI](#) providing an initial assessment and conditions for success of the 2030 Agenda suggests that, in order to meet its ambitious aspirations, the HLPF should strengthen its political leadership and focus more on the effectiveness of policies, on the interrelated nature of the SDGs with their ensuing synergies and trade-offs, and on emerging topics that need greater political visibility. In particular, the HLPF can provide a platform for countries and stakeholders to share approaches to leveraging co-benefits and discuss commonly found trade-offs and international spill-overs that require international cooperation. A [SWP working paper](#), offering a comprehensive review of the different proposals currently under debate for the HLPF reform, suggests allocating more time to the interactive debate of the thematic and SDG reviews and also the Voluntary National Reviews (VNRs). Providing a greater number of slots for Major Groups and other stakeholders (MGoS) would allow for more meaningful input from the different constituencies.
- **The GSDR 2019 transformation framework provides a solid scientific basis to address co-benefits and trade-offs, hence the thematic and SDG reviews should be based on the GSDR's logic of identifying "entry points" and "levers",** as suggested in an [article published by IISD](#)⁴⁰. Based on this approach, each annual HLPF session could be organized around two of the six entry points set out in the GSDR 2019, and include an in-depth review of the SDGs that are central to the selected combination of entry points, while focusing on relevant interlinkages to all other SDGs. Criteria to decide on every year's combinations of entry points could include distance to SDG targets, alignment with other relevant international processes, coverage of all three dimensions of sustainable development and coverage of relevant interlinkages. In addition, it is recommended that the proposed systems approach should be complemented by discussions, within the selected entry points, of the role of the four levers identified in the GSDR⁴¹, aimed at attributing concrete tasks and responsibilities to relevant actors from each lever which could potentially ensure coordinated efforts and build coherence across sectors, leading to maximised impact and desired outcomes.
- **The review of the HLPF is an opportunity to convert the Forum into a knowledge-based, coherent and action-oriented forum.** Data available in the many reports prepared by various UN bodies, experts and stakeholders, and in the VNRs and reports resulting from the regional fora on sustainable development, is not utilised to inform policy-relevant

³⁹ Walsh P.P., Murphy E. and D. Horand. 2020. The role of science, technology and innovation in the UN 2030 agenda. *Technological Forecasting and Social Change*, Volume 154.

⁴⁰ Beisheim M. and Bernstein S. 2020. Matching the HLPF's Ambition to Performance: Prospects for the Review. Available at: <http://sdg.iisd.org/commentary/guest-articles/matching-the-hlpfs-ambition-to-performance-prospects-for-the-review/>

⁴¹ Four levers in the GSDR 2019: governance, economy and finance, individual and collective action, and science and technology.

discussions at the HLPF. A set of recommendations that aim to improve evaluation and analysis of evidence-based inputs to better support policy implementation have been put forward by the authors of the IISD article. Among the recommendations is the suggestion of holding a preparatory meeting called “HLPF Spring Meeting” to analyse data and key messages resulting from the various reports, which could then be utilised in preparing the discussions for the HLPF main session in July. Additionally, the article suggests that to better inform the discussions, a highly respected scientist should be designated as “Sherpa”, to create a year-round preparation process for each main panel of the HLPF and to bring relevant findings to the attention of panellists and support evidence-based policy recommendations.

- **In the context of an apparent gap between the lack of progress highlighted by global reviews, and the more positive assessment often offered in VNRs, more frequent, and more rigorous review is needed.** Voluntary Local Reviews⁴² (VLRs) and other forms of reporting by non-state actors can usefully supplement global, regional and state level reporting. More attention could also be paid to how some countries are using VNRs to catalyse new and significant implementation efforts. Strengthening the role of national scientific communities in the VNR process, and in emerging VLRs, could significantly advance these processes.
- **The Technology Facilitation Mechanism (TFM), set up to promote STI access, transfer and capacities across nations to achieve sustainable development, should move from addressing the role of technology for the SDGs to assessing whether the current stock of technology and knowledge is sufficient for achieving the SDGs and suitable for transfer across the globe,** as indicated by [Walsh et al. \(2020\)](#). The authors emphasize that the existing stock of technology is seen as something that is naturally benign and can be accessed, transferred and applied to the SDGs across nations. However, in some cases, technology, as the main engine for economic growth and concentrated in the hands of a limited number of companies, has led to detrimental effects for sustainable development. Hence, utilizing existing technology rather than designing it specifically to support transformative actions for sustainable development can lead to unintended lock-in consequences and unsuitable pathways. The TFM should, besides assessing existing technologies, encourage governments, in cooperation with all stakeholders, to pull technological change in the direction of sustainable development and stimulate finance and markets for a new generation of SDG-oriented STI that are inclusive, sustainable and promote good governance at all levels.
- **The evidence-based inputs stemming from the multi-stakeholder Forum on Science, Technology and Innovation for the Sustainable Development Goals (STI Forum) should better feed into the HLPF.** The STI Forum should primarily focus on the development of STI for SDG roadmaps at subnational and national levels and become a platform for collective learning through exchange of experiences and best practices in orienting STI capabilities towards achieving the SDGs. Holding the proposed “HLPF Spring Meeting” back-to-back with the STI Forum could ensure better visibility and strengthened input into the HLPF processes. An additional measure could be to review the STI roadmaps together with the Voluntary National Reviews (VNRs) at the HLPF, as a way of encouraging Member States to develop their own roadmaps and bolster the connection between the two fora.
- **Mid-term review of the SDGs and the Sendai Framework, as well as the Global Stocktake as part of the implementation of the Paris Agreement, are major opportunities to**

⁴² IGES. Online Voluntary Local Review (VLR) Lab. Available at: <https://www.iges.or.jp/en/projects/vlr>

strengthen the integration of these global agreements as one agenda towards a fair, sustainable and resilient world. [A group of experts convened by the International Science Council](#) has put forward a set of recommendations for countries to strengthen coherence across the three global framework agreements and enhance governments' ability to deal with cascading and systemic risks. Recommendations include focusing planning and implementation on a cross-cutting issue (e.g. poverty reduction which can improve resilience and capacity for adaptation and risk reduction) for maximum early impact in all three agreements; identifying and modifying policies which are undermining or contradicting the agreed aims; developing understanding on how co-benefits can be achieved through the integration of the three agreements; and integrating monitoring and reporting requirements, as well as policy implementation processes.

- **The emergence of planetary risks that are complex and require strong international collaboration, and the increasing likelihood of crossing tipping points with catastrophic consequences, require a major overhaul of international institutions and new collaborations in order to address these systemic risks. This includes a profound reflection on how scientific inputs and advice are solicited and integrated into deliberation and decision-making at the international level. How would the UN system effectively mobilise science inputs for decision-making in the case of a global emergency?**

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