Global Sustainable Development Report 2023

Advance, Unedited Version
14 June 2023

INFORMATION FOR MEMBER STATES AND STAKEHOLDERS

Background

Paragraph 85 of the outcome document of Rio+20 ("The Future We want") lists functions for the high-level political forum on sustainable development (HLPF), including to "strengthen the science-policy interface through review of documentation, bringing together dispersed information and assessments, including in the form of a global sustainable development report, building on existing assessments".

In July 2016, in the Ministerial Declaration of the HLPF, UN Member States agreed that the GSDR would become a quadrennial report drafted by an independent group of scientists (IGS) supported by a task team of six UN agencies (DESA, UNCTAD, UNDP, UNEP, UNESCO, and the World Bank). The members of the IGS were appointed by the Secretary-General (see Annex I for members of IGS).

The GSDR, which will be launched at the SDG Summit in September 2023, is meant to advance implementation of the Sustainable Development Goals (SDGs) and to serve as a major input to Member States' follow up and review of the 2030 Agenda at the half-way point.

Preparation

The IGS undertook a series of consultations to collect regional and cross-disciplinary perspectives (see Annex II for consultations and partners). After preparing a draft, the IGS presented the report to the scientific community for a technical review. This review was generously coordinated by the International Science Council (ISC) and included reviewers from ISC as well as the World Federation of Engineering Organizations, the Global Young Academy, the InterAcademy Partnership, and the International Council for Philosophy and Human Sciences. For the full list of reviewers please see Annex III.

The GSDR is an independent report and while the IGS have considered all feedback from Member States and stakeholders, they have incorporated changes at their discretion. **The current draft is an advance and unedited version that is undergoing editing, factchecking, design, layout. The final version will be available in September 2023.**

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Introduction

Transformations are possible, and inevitable. This report is an invitation to embrace transformations with the urgency needed to accelerate progress toward the SDGs. Four years have passed since the 2019 *Global Sustainable Development Report* (GSDR) was published and even then, the world was not on track to achieving the Sustainable Development Goals (SDGs). Since 2019, challenges have multiplied and intensified. The world has moved forward on some fronts, such as the deployment of zero carbon technologies as one of many climate mitigation strategies. Progress has been halted in many areas partly as a consequence of a confluence of crises – the ongoing pandemic, rising inflation and the cost-of-living crisis, and planetary, environmental and economic distress, along with regional and national unrest, conflicts, and natural disasters. As a result, overall progress towards the 2030 Agenda and the SDGs has been severely disrupted in the last three years, yet every inch of progress matters and counts.

Strive not for one, but for all securities. The resilience and well-being of planet, people, environment, and ecosystems are degraded. A better future does not rest on one source of security, but on all necessary securities, including geopolitical, energy, climate, water, food, and social security. Strategies to embrace transformations should therefore be based on the principles of solidarity, equity and well-being, in harmony with nature.

Working as a human collective, time and resources must be used as judiciously and effectively as possible. The world is changing at an accelerated rate. Halfway to 2030, there is an ever-greater urgency to build momentum, embrace solidarity, and speed up progress on the SDGs. To do that, decision-makers need to use time and resources —human, knowledge, financial, and institutional, among others— as judiciously and effectively as possible, and take a systematic and strategic approach to drive and accelerate transformations.

Embracing transformations to achieve the SDGs

This report provides a synthesis of the key transformative shifts needed across different entry points (human wellbeing and capabilities, sustainable and just economies, food systems and healthy nutrition, energy decarbonization with universal access, urban and peri-urban development, and global environmental commons), as well as a framework for understanding how those transformations may unfold over time. It also presents practical examples and tools for fostering leadership and enhancing human capacities to engage with the acceleration mindset required to achieve the SDGs – locally, nationally and globally. The report synthesizes existing knowledge to cover three overarching themes.

First, it highlights key transformations needed in different sectors and provides examples of interventions from the literature that has modelled different scenarios for SDG progress. It then provides a stylized model to help unpack and understand the transformation process over time and outline the roles of different levers in facilitating various stages of transformation through a systematic and structured approach. As history has shown, transformations are inevitable, and this report emphasizes that deliberate and desirable transformations are possible – and indeed, necessary.

Second, through a series of examples, the 2023 GSDR illustrates how transformations have been facilitated in the past and in recent times. This knowledge can incentivize and support strategic decision-making by different societal actors, both in terms of better conceptualizing and framing the desired transformations in their context and in the use of levers to enact transformations. The nature and process of transformations towards the SDGs will vary from context to context. Each context requires a critical appraisal, based on evidence of the most strategic approach to transformation in that setting. This must be implemented with a system of oversight and feedback loops to continually monitor implementation and progress, learn from experience, and make changes as needed. This report is not prescriptive but rather provides an illustrative framework that can underpin strategic actions for accelerating transformation.

Finally, the report outlines how the knowledge enterprise has to evolve to best serve transformation processes. This will be achieved by both generating knowledge from a broader spectrum of society and connecting that knowledge to decision-making in a more robust and inclusive manner. With all this, the Report is a tool that can be used to tap the potential of key strategic transformations for multiple SDGs, acknowledging their interlinkages.

The 2023 Global Sustainable Development Report has six chapters. Chapter 1, asks 'where are we now?' and, reflecting on where the world is at the halfway point to 2030, highlights the need for resilience and acceleration. Chapter 2 asks 'where are we heading?' and frames the future, from urgency to agency, reviewing new knowledge for understanding the interlinkages between the SDGs and international SDG spillovers. Chapter 3 focuses on 'what needs to be done?', reviewing scenario projections for the SDGs alongside key shifts and interventions to accelerate transformations through the six entry points introduced in the 2019 GSDR. Chapter 4 considers 'how can it be done?' with a framework that can guide strategic action. It unpacks the dynamics in different phases of transformations towards sustainable development, with examples from historical and recent experience. Chapter 5 is about the unifying role of science, the importance of knowledge from a broader spectrum of society, both in the production of socially robust science, and in connecting science to policy making. Finally, Chapter 6 is a call for action inviting a reflection on the steps ahead, to accelerate transformative action, improve the underlying conditions for transformation, and use science to drive the world forward.

Chapter 1. Half-way to 2030

At the half-way point of the 2030 Agenda for Sustainable Development, the world is far off track as shown in the figure which captures current SDG status. Without urgent course correction and acceleration, humanity will face prolonged periods of crisis and uncertainty – triggered by and reinforcing poverty, inequality, hunger, disease, conflict, and disaster. At a global level, the Leave No One Behind principle is at significant risk.

SNAPSHOT OF TRENDS IN SELECT TARGETS

GOAL	INDICATOR	DISTANCE FROM TARGET (2023)[1]	TREND OF SDG PROGRESS (2023)[1]	CHANGE IN TREND OF SDG PROGRESS BETWEEN 2020 AND 2023[2]
1	1.1.1 Eradicate extreme poverty	■ ■ ■	Limited or no progress	Backward
	1.3.1 Implement social protection systems	■ ■ ■	Fair progress but acceleration needed	N/A
2	2.1.2 Achieve food security	■ ■	Deterioration	None
	2.2.1 End malnutrition (stunting)	■ ■	Fair progress but acceleration needed	None
3	3.1.2 Increase skilled birth attendance	■ ■ ■ ■	Fair progress but acceleration needed	Backward
	3.2.1 End preventable deaths under 5	■ ■ ■	Fair progress but acceleration needed	Backward
	3.3.3 End malaria epidemic	■ ■	Limited or no progress	None
	3.b.1 Increase vaccine coverage	■ ■ ■	Deterioration	Backward
4	4.1.2 Ensure primary education completion	■ ■ ■	Limited or no progress	Backward
5	5.3.1 Eliminate child marriage	■ ■ ■	Fair progress but acceleration needed	None
	5.5.1 Increase women in political positions	■ ■ ■	Fair progress but acceleration needed	None
6	6.1.1 Universal safe drinking water	■ ■ ■	Limited or no progress	None
	6.2.1 Universal safe sanitation and hygiene	■ ■ ■	Fair progress but acceleration needed	None
7	7.1.1 Universal access to electricity	■ ■ ■	Fair progress but acceleration needed	Backward
	7.3.1 Improve energy efficiency	■ ■ ■	Fair progress but acceleration needed	None
8	8.1.1 Sustainable economic growth	■ ■ ■	Deterioration	Backward
	8.5.2 Achieve full employment	■ ■ ■ ■	Limited or no progress	None
9	9.2.1 Sustainable and inclusive industrialization	■ ■ ■ ■	Limited or no progress	None
	9.5.1 Increase research and development spending	■ ■ ■	Fair progress but acceleration needed	Forward
	9.c.1 Increase access to mobile networks	■ ■ ■ ■	Substantial progress/on track	None
10	10.4.2 Reduce inequality within countries	■ ■ ■	Fair progress but acceleration needed	N/A
11	11.1.1 Ensure safe and affordable housing	■ ■	Fair progress but acceleration needed	Forward
12	12.2.2 Reduce domestic material consumption	■ ■ ■	Limited or no progress	N/A
	12.c.1 Remove fossil fuel subsidies	■ ■ ■	Deterioration	Backward
13	13.2.2 Reduce global GHG emissions	■ ■	Deterioration	None
14	14.4.1 Ensure sustainable fish stocks	■	Deterioration	N/A
	14.5.1 Conserve marine key biodiversity areas	■ ■ ■	Limited or no progress	N/A
15	15.1.2 Conserve terrestrial key biodiversity areas	■ ■ ■	Limited or no progress	None
	15.4.1 Conserve mountain key biodiversity areas	■ ■ ■	Limited or no progress	N/A
	15.5.1 Prevent extinction of species	■ ■ ■	Deterioration	None
16	16.1.1 Reduce homicide rates	■ ■	Limited or no progress	Backward
	16.3.2 Reduce unsentenced detainees	■ ■	Deterioration	None
	16.a.1 Increase national human rights institutions	■ ■ ■	Fair progress but acceleration needed	None
17	17.2.1 Implement all development assistance commitments	■ ■	Fair progress but acceleration needed	Forward
	17.8.1 Increase internet use	■ ■ ■ ■	Substantial progress/on track	None
	17.18.3 Enhance statistical capacity	■ ■ ■	Limited or no progress	None

DISTANCE FROM TARGET (2023)[1]: ■ Very far from target; ■ Far from target; ■ Moderate distance to target; ■ Close to target; ■ Target met or almost met

[1] Distance from target (2023) and Trend of SDG progress (2023) refer to current level and trend information for the latest available data utilizing the calculation methodology from the Sustainable Development Goals 2023 Progress Chart Technical Note. Latest available data as of May 2023 from the SDG global indicator database. Please note that information for indicators 1.1.1, 10.4.2, 13.2.2, 17.2.1 and 17.18.3 are from the Sustainable Development Goals Progress Chart 2022.

[2] To capture the impacts of the COVID-19 pandemic on SDG progress, a comparison of the trend assessment from the Sustainable Development Goals Progress Chart 2020 and the Trend of SDG progress (2023) was made, with some indicators showing reversal or slowed progress.

N/A: trend comparisons unavailable due to: i) lack of trend analysis from insufficient data; ii) indicator not included in the 2020 Progress Chart; or iii) indicator has changed between progress charts.

In 2019, the previous *Global Sustainable Development Report* found that for some targets the global community was on track, but for many others the world would need to quicken the pace.

In 2023, the situation is much more worrisome due to slow implementation and a confluence of crises. For Goals where progress was too slow in 2019, countries have not accelerated enough, and for others, including food security, climate action and protecting biodiversity, the world is still moving in the wrong direction. In addition, recent crises including the ongoing COVID-19 pandemic, cost-of-living increases, armed conflict and natural disasters have wiped out years of progress on some SDGs including eradication of extreme poverty. Progress has slowed down on targets including ending preventable deaths under 5, vaccine coverage and access to energy.

These crises are not independent events: they are entwined through multiple environmental, economic, and social strands, each fuelling the other's intensities. Addressing interconnections was a starting point for elaborating the 2030 Agenda. This Report shows how these interconnections offer opportunities to act in an integrated way to release positive synergies and achieve the SDGs.

The lingering drag of the COVID-19 pandemic

The COVID-19 pandemic is still having a profound impact on progress toward the SDGs. Beyond costing more than 15 million lives globally, it has slowed, disrupted, or temporarily reversed progress across the SDGs. The pandemic resulted in losses of jobs, livelihoods, incomes, and remittances. In 2022, the total hours worked globally remained two per cent below the pre-pandemic level. The pandemic also exacerbated existing fault lines of inequality. Some schooling went online, which was useful to many children but of no help to families without broadband internet. And lockdowns did the greatest damage to small and medium enterprises and the many women and temporary workers they employed.

Recovery from the pandemic has been uneven and incomplete. Quickest to bounce back were the high-income countries which delivered more effective relief and had higher rates of vaccination. In 2021, the top 20 per cent in terms of global income distribution had recovered about half their lost income, but the bottom 40 per cent had not done so.

Conflict, war and instability

Compounding the effects of the pandemic is the highest level of state-based armed conflict since 1945. By the end of 2020, around two billion people were living in conflict-affected countries. In 2021, the number of refugees and internally displaced persons was the highest on record at 89 million, and, for the first time, global military expenditure exceeded $2 trillion.

The war in Ukraine is causing immense suffering and loss of life and triggering large movements of people – while wreaking havoc in many parts of the global economy, and driving up inflation, with huge spikes in the prices of food and energy. Besides the large number of military casualties, as of Jan 2023, there have been tens of thousands of civilian victims, 6,952 killed and 11,144 injured. There are more than 8.1 million refugees, most of them women and children as well as 5.3 million people internally displaced in Ukraine.

Conflict and unrest are barriers to SDG progress in many countries beyond the war in Ukraine, including in Afghanistan, Ethiopia, Venezuela, and the Sahel region of Africa among others. Between March and May 2022, approximately 26.5 million people in the Sahel faced a food and nutrition crisis.

Inflation and the rising cost of living

Between June and September 2022, around 89 per cent of the Least Developed Countries, 93 per cent of Landlocked Developing Countries and 94 per cent of Small Island Developing States had food inflation above 5 per cent. Worst affected were the poor who often responded by skipping meals or purchasing less nutritious food – short-term solutions that imperil family health and damage the future prospects of children. Many countries face debt levels at a 50-year high constraining options for investing in social protection that can help people cope with rising costs.

Chapter 2. Framing the future

The world is far off track on achieving the SDGs at the halfway point on the 2030 Agenda. But it is possible to actively improve future prospects for action and progress by 2030 and beyond. Leveraging scientific knowledge, strengthening governance for the SDGs and unleashing the full potential of the SDG framework for promoting sustainable development can make this happen. SDG interlinkages, and international spill-overs and dependencies must be systematically considered.

Uptake and governance using the SDGs has advanced in the last four years across sectors and levels of government, despite urgent crises, which indicates the robustness and broad acceptance of the framework. Yet, aspirations and commitments are not yet translating into institutional change, action and implementation at a scale visible in SDG progress.

While many circumstances are making it more difficult to attain the SDGs, in some respects, the prospects have improved. There is now a wealth of SDG-related knowledge and evidence. More people and organizations have learned about the Goals and are thus in a better position to put pressure on both governments and companies to operate more sustainably.

A survey of 60 countries showed that by 2021, 75 per cent of governments had developed SDG strategies and action plans. Many local governments have stepped up their efforts, by developing Voluntary Local Reviews or other SDG strategies. International organizations and institutions have widely adopted the SDGs and re-aligned their policy agendas. The private sector is more engaged, through SDG-aligned business strategies, though there is the risk of overclaiming and ‘SDG-washing’. Given the large SDG financing gaps for developing countries, innovative financing solutions have been developed, the imbalance and injustice in the international financial architecture are being called out, and there are strong calls for its reform.

The SDG framework has enabled novel and more systemic perspectives for decision-making on sustainable development, through new insights and science-based tools for considering SDG interlinkages. While some general patterns of SDG synergies and trade-offs can be observed, the scientific literature points to the context dependence of interlinkages. Local

and national actors can therefore gain a lot by using tools to identify positive and negative interlinkages in their context, and by undertaking ex ante SDG policy impact assessments.

The SDG framework allows for considering international dependencies and spill-overs between countries in their pursuit of sustainable development. Creating an educated and skilled workforce, for example, not only underpins national development in the educating country, but also, through temporary or permanent migration, spills over to the destination economies and communities – though this may be regretted by the educating country as a brain drain. An example of a generally negative spillover is carbon that is 'embedded' in the production of goods in one country that is subsequently exported to another. Better understanding and quantification of international spill-overs is urgently needed to inform and strengthen action for SDG 17.

Chapter 3: Pathways to achieve the SDGs

The Report reviews existing scenario projections for the SDG progress along various pathways. Generally, these indicate that on a business-as-usual pathway the SDGs will remain out of reach by 2030, or even 2050. Gains would be made in key areas including extreme poverty reduction and global and national income convergence. But progress would be minimal on targets relating to malnutrition and governance. At the same time the world would regress in air pollution and associated health impacts, agricultural water use, relative poverty rates, food waste, greenhouse gas emissions, and biodiversity and nitrogen use.

But business need not continue as usual. More ambitious sustainable development scenarios reveal that decisive action can deliver strong gains on the SDGs by 2030. For example, an ambitious 'SDG-push' scenario would improve social protection, strengthen governance, promote a green economy, and address digital disruption, while improving secondary education and science. By 2030, this could lift 124 million additional people out of poverty, with 113 million fewer people malnourished. It would also generate gains across other SDGs in health, nutrition and education. Nevertheless, there would still be gaps, indicating the need for truly transformative initiatives and game-changing interventions.

Entry points and levers for transformation

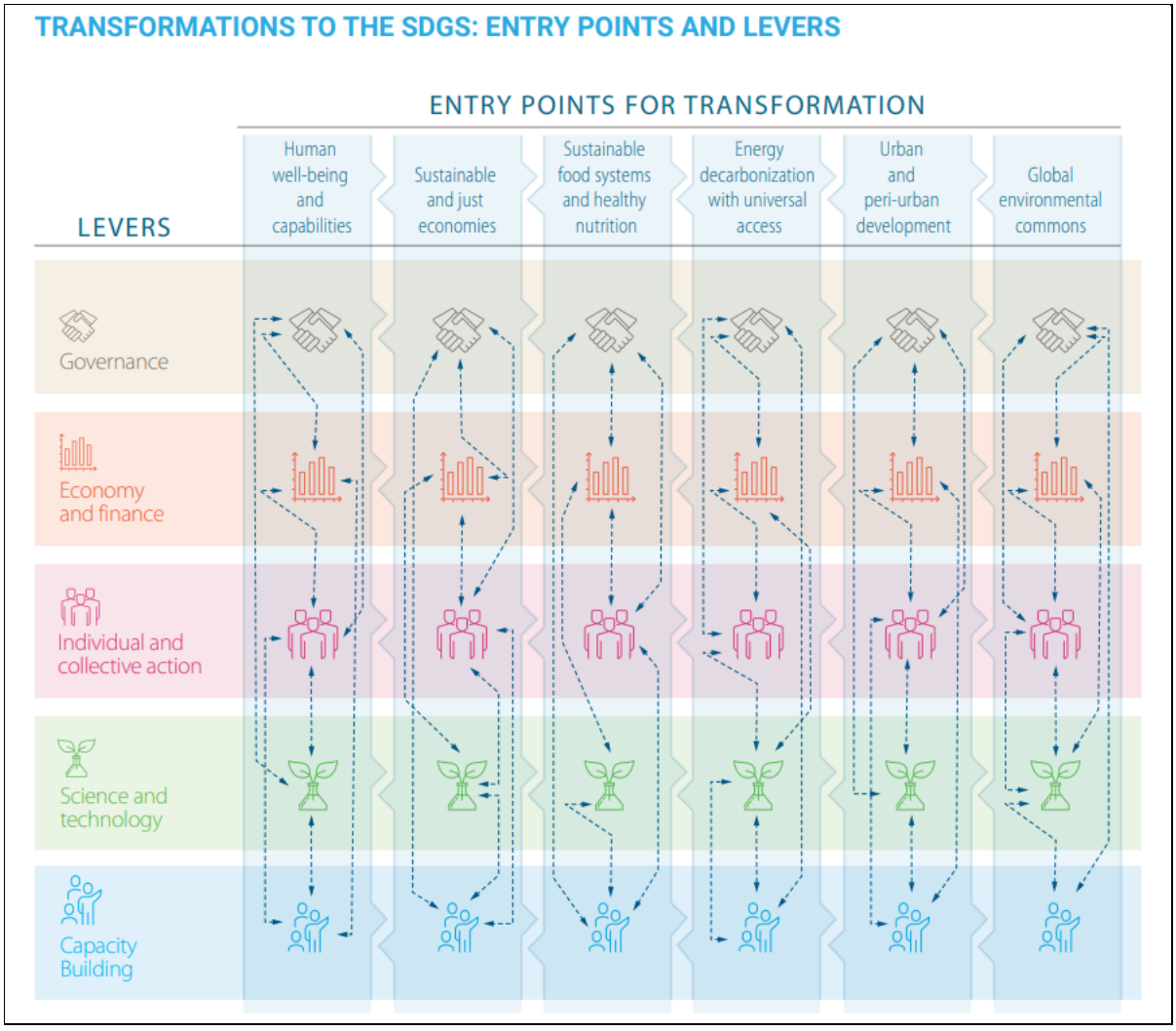
Increased ambition and transformative interventions are needed to accelerate progress towards the SDGs. Given the diversity of the Goals and targets, an integrated and coherent approach to implementation is needed.

The 2019 *Global Sustainable Development Report* put forward an organising framework of six entry points for transformation: human wellbeing and capabilities, sustainable and just economies, sustainable food systems and healthy nutrition patterns, energy decarbonization with universal access; urban and peri-urban development; and the global environmental commons. These are still crucial areas where actions can have impacts across the SDGs.

To achieve the SDGs operating through these entry points, the 2019 Report suggested deploying four 'levers' to bring about transformation in these entry points: governance, economy and finance, science and technology, and individual and collective action. This

Report adds a fifth lever, 'capacity building', as the development and or mobilisation of capacity is essential for the transformation process.

Supporting the transformation process entails enhancing capacity in all countries for strategic direction and foresight; innovation and the generation of new alternatives; orchestration, engagement and negotiation; identifying and overcoming impediments; and in learning and resilience.



Key shifts to accelerate progress

Aligning the framework of entry points and levers with evidence from ambitious global scenarios can inform integrated and transformative action.

The Report highlights important shifts needed across each entry point to accelerate progress towards the SDGs. It also provides examples of how specific policy, finance, technology, and behavioural changes could be combined to enable the necessary transformations. Capacity building to effectively deploy these levers will also be critical.

Transformative shifts for each entry point from global scenarios include:

Human wellbeing and capabilities - Scaling-up investment in primary health care and ensuring access to lifesaving interventions, accelerating secondary education enrolment and completion and ensuring all girls are enrolled, and increased investment in water and sanitation infrastructure to deliver universal piped water access and halving of untreated wastewater.

Sustainable and just economies - Encourage inclusive, pro-poor growth including progressive redistribution measures, doubling welfare transfers in low-income countries, rollout of good practice climate policies and global carbon pricing, encouraging lifestyles towards sufficiency levels, investment in green innovation, and circular and sharing economy models.

Sustainable food systems and healthy nutrition - A mix of supply side measures improving affordability, increasing yields sustainably while reducing inputs and negative impacts, and more sustainable and efficient measures in retailing, processing and distribution, as well as measures on the demand side, most importantly shifting towards healthier and more diversified diets, and reducing post-harvest losses and food waste.

Energy decarbonisation and universal access - The large-scale deployment of renewables and best available technologies, appliances and equipment, rapidly scaling up infrastructure investment and support for universal electricity access and clean cooking alternatives, phasing down of fossil fuels by 2030 in a domestically and globally just manner, major changes in global consumer behaviour to reduce energy consumption, and end-use electrification.

Urban and peri-urban development - Doubling the recycled and composted share of municipal waste by 2030 and a more circular waste cycle, more use of electrical vehicles, better public transport with cities' infrastructure oriented to people and pedestrians and not cars, and good-practice policies for transport, buildings and waste.

Global environmental commons - Expanding protected areas, abandoning intensive agricultural practices in protected areas, ambitious reforestation of all degraded forest areas, shifting societal preferences towards conservation land use, reducing water consumption and ensuring environmental flow requirements, and adopting a 1.5^{o}C land-sector roadmap combining ambitious protection, conservation, restoration and lifestyle changes.

Common impediments to transformation

Scenario projections reveal that a lot can be practically done to accelerate progress towards the SDGs through new policies, technologies, investments, and behaviours. However, a range of common impediments can derail these actions.

Deficits in governance, institutional capacities, financing and infrastructure hamper progress in many countries. Lock-ins can result from high upfront capital costs, immaturity of technologies and markets, gaps in financing, and large sunk investments that create resistance to change. Political feasibility can be undermined by influential actors and vested interests and concerns about potential trade-offs for jobs and livelihoods. Engrained practices and behaviours can be very difficult to change.

Faced with these impediments, it is critical to build understanding not only on 'what' needs to be done but also 'how' systems change can happen. Transformations typically take time to unfold and move through different phases which face different impediments changing what is needed from different actors. Each country has its own challenges, priorities, needs and capabilities. Nevertheless, many countries follow similar pathways towards the SDGs and face common barriers and impediments.

Chapter 4. Accelerating transformations to the SDGs

Transformation is inevitable but its course, directions and speed are not. Change can and must be steered in positive directions by human determination. Goals matter in this regard. Over the last 200 years, human societies have produced many rapid and profound transformations – in human rights, for example, economic activity, health, technology and living standards.

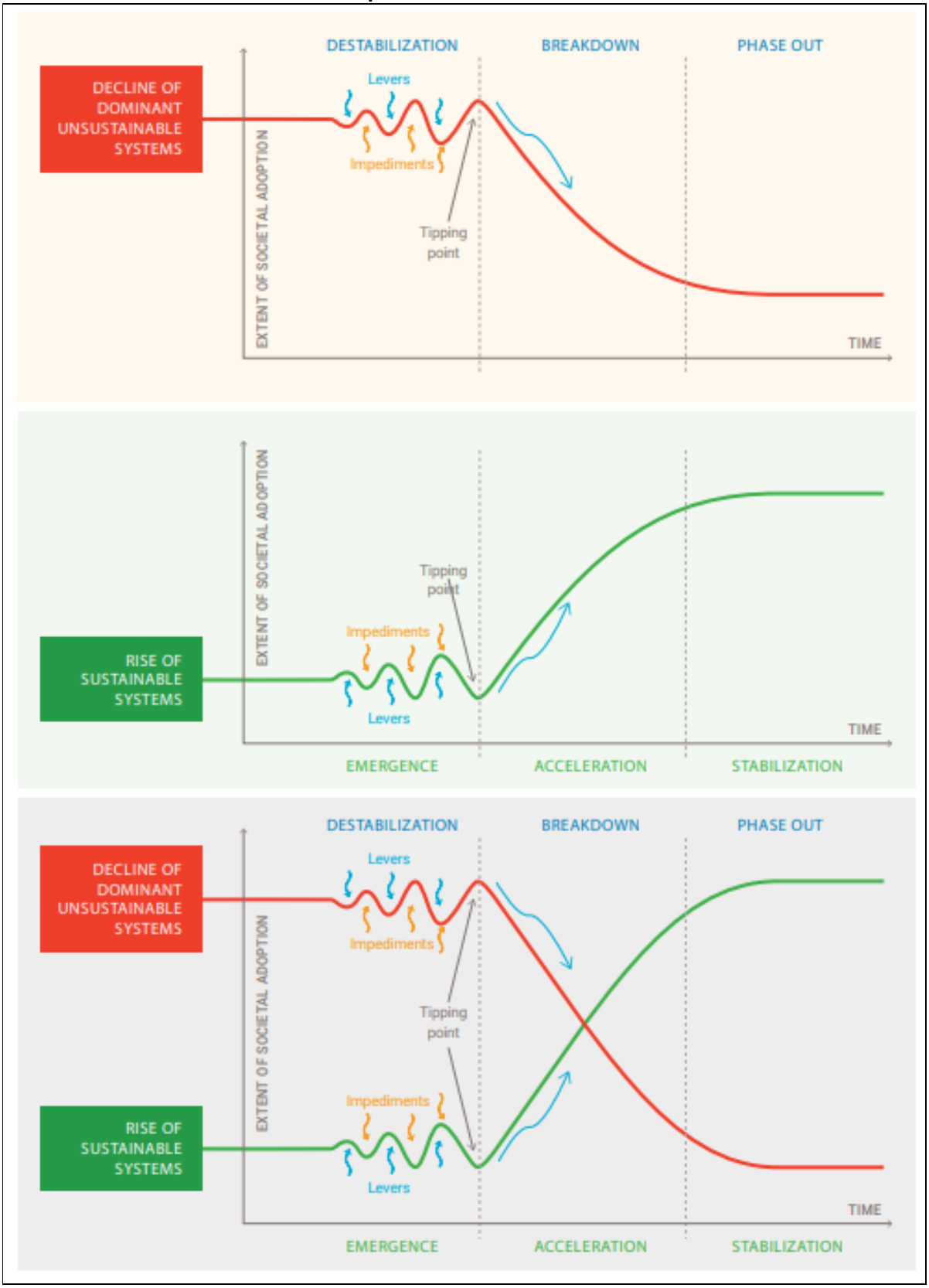
One major intervention was the Green Revolution which used high-yielding crops along with fertilizers and irrigation to transform agricultural systems. However, the Green Revolution also offers a cautionary tale. Crop yields rose rapidly, food consumption increased, and undernutrition plummeted. But the Green Revolution was often divisive, leaving many smallholders behind, excluded by inequitable land distribution, poor tenancy rights, and lack of access to credit. Women farmers were especially disadvantaged. Intensive, chemical-heavy farming also affected soils, water, biodiversity, and nutrition. The Green Revolution illustrates the importance of a whole-of society approach, weighing up positives and negatives to optimize human wellbeing while safeguarding the planet.

S-curve nature of transformations

This Report provides a stylized model to help unpack and understand the transformation process through a systematic and structured approach, suggesting that a successful transformation can be considered in three phases – emergence, acceleration and stabilization – tracing an S-curve. During the first, emergence phase, innovative ideas give rise to new technologies and practices – often operated in niches through experimentation and learning. The concept of innovation in this report includes technological, organisational, institutional, behavioural and social innovations. If successful, during the second, acceleration phase innovations expand and reach tipping points beyond which they are widely shared and adopted, leading to rapid, non-linear growth. Finally, in the third, stabilization phase these technologies and practices become pervasive in daily life as the new normal.

S-curves work in both directions. Progress in one area is typically mirrored by a decline in others, with three corresponding phases: destabilization, breakdown and phase-out. For example, the rise of renewable energy systems or electrified transport is being matched by the decline of fossil-fuel energy and internal combustion vehicles. Ambitious public policies are crucial for pushing innovation and change and for ensuring that old and new structures do not co-exist too long, in order to harvest the benefits of transformation towards sustainability as quickly as possible.

Three phases of transformation



Along this trajectory, innovations evolve – typically becoming cheaper and more effective as they are embedded with other complementary institutions, norms, technologies and infrastructure. Governments can also accelerate progress through targeted investments,

policies and incentives that promote innovation and adoption. These can effectively push innovations across tipping points beyond which they are rapidly adopted.

However, sustainable transitions can also fail or veer off along undesirable pathways. This might, for example, be the result of lock-ins to old technologies and practices, political opposition or backlash from vested interests or affected communities, stubborn social norms and behaviours that are difficult to change, or gaps in human, financial and institutional capacities or supporting infrastructure.

Enabling transformations through emergence, acceleration and stabilization

As transformations evolve across the S-curves, countries can minimise impediments by creating supportive technological, social and political conditions aligned to the different phases. They can also work to build trust and consensus, provide finance, and safeguard against undesirable consequences. This will require bold leadership, a shared vision and direction, collective effort using the levers in a coordinated way, and mutual accountability.

Emergence (destabilisation) phase - In the emergence (or destabilisation) phase, deliberative processes to collectively build common narratives, visions and missions will be important. Governments, multilateral development banks, private finance, philanthropists and others will need to support innovation and the piloting, prototyping and implementation of new knowledge. Governments can also send clear market signals for investment and adoption through credible long-term policies and targets. Capacities are needed to innovate and generate sustainable alternatives and provide informal and protected spaces for innovation and dialogue.

Acceleration (break down) phase - Decisive action by governments is often needed for transitions to cross tipping points to the acceleration (or break down) phase. Building on efforts in the emergence phase, proactive and decisive governments can shape markets by stimulating research and innovation, investing in public infrastructure, setting targets, standardisation, and regulating businesses. This can reorient economic activities towards the SDGs.

Conflicts, tensions and political struggles are common during acceleration, as different actors, interests and coalitions seek to promote or delay the transition for various reasons. These reasons may include perceived trade-offs between competing SDGs or negative outcomes for local jobs and livelihoods. A coherent mix of policies will be needed to ensure just transitions where no one is left behind.

Individual and collective action through social movements and coalitions, changing narratives and norms, maturing technologies, and crisis events can provide the critical impetus needed for governments to take decisive action to accelerate transitions. For governments facing strong opposition, early interventions or ‘small wins’ can build political momentum for later more difficult and transformative measures.

Stabilisation (phase out) phase - During the stabilisation (or phase out) phase, innovations can saturate markets and achieve widespread dissemination and use, becoming anchored in infrastructure, regulations, user habits and standards. However, for stabilisation to take root, new institutions and infrastructure must be resilient. Unless reforms are

institutionalised, the whole process may break down if leaders are unable to sustain momentum or leave office. Sustaining momentum requires a strong tax and revenue base, commitment of ongoing human and financial resources, maintaining political support, and building institutional capacities for implementation.

Governments and the private sector can support a managed decline and phase-out of unsustainable technologies and practices. Unintended consequences such as job losses or the decline in regional industries and economies can be mitigated through government support for affected workers such as compensation, social safety nets, reskilling and training, and alternative employment opportunities. These measures will help to reduce resistance, increase public acceptance and ensure a just transition with fair outcomes for all.

Chapter 5. Transformations through science—and in science

Transformations to sustainable pathways should be rooted in science. The scientific method, based on observation and testing hypotheses, reduces uncertainty, identifies tipping points, accelerates the uptake of innovations and lays the foundations for the next frontier of ideas. This Report argues for science that is multidisciplinary, equitably and inclusively produced, openly shared, widely trusted and embraced, and 'socially robust' — relevant to society.

A few decades ago, the "science-policy interface" primarily involved experts in individual scientific disciplines – usually in the Global North, and predominantly white male. For sustainable development in the 21st Century, science-policy interactions will need to be far more multi-directional and multi-disciplinary – and expanded to a 'science-policy-society' interface.

It is clear, though, that the current platforms and intermediaries are not sufficient. Civil society organizations (CSOs), Non-governmental organizations (NGOs), think tanks and other institutions can be powerful advocates for change, and can promote accountability. While young people and CSOs are starting to be included in the global processes and platforms, they are still often excluded from the actual decision making. Young people, those who have the biggest stake in the future, are particularly compelling messengers and leaders, and should be further empowered.

Global imbalance in research and development

To be relevant to the SDGs, more scientific activity should be conceived and produced outside of high-income countries. Current imbalances severely curtail the capacity of many low- and middle-income countries to attain the SDGs by generating context-specific solutions in their region.

As well as making the production of science more inclusive and geographically diverse, it is also crucial to ensure that once science is produced, the resulting knowledge is widely accessible. Public interest groups, policymakers, industry and teachers should have free access to the relevant publications, data and software. This is especially important for SDG issues, and for research that has been publicly funded. In the humanities, for example, the digitization of historical documents across continents has allowed students and citizens to

gain first-hand understanding of key moments in history—struggles for independence, human rights movements, and social progress that can be instructive for current challenges.

Trust and Integrity

A major hurdle for science is the speed of publication. Producing unbiased, peer-reviewed information absorbs time and money, giving some platforms, particularly social media, a head start for promulgating false information. Influencers and propagandists, with little or no expertise, can nevertheless create compelling stories and catchy headlines that appear factual and elicit strong emotional responses. And, because of social media algorithms, people rarely see posts that contradict their own biases and preferences. This echo chamber effect is having a profound impact on the political landscape, with increased polarization and partisanship and lower levels of trust in governments and science.

The world has responded to the proliferation of fake news with comprehensive countermeasures. In 2022 around 400 teams of journalists and researchers in 105 countries were working on tackling political lies, hoaxes and other forms of misinformation. To help scientific health evidence keep pace with fake news for COVID-19, WHO gathers real time information on how people are talking online about the pandemic and had released tips to identify mis- and dis-information and is aiming to ensure the top results on the pandemic are official science-based sources.

Socially robust science

There is inevitably a time lag between the publication of scientific evidence, public policy decisions, and full implementation of science-based recommendations. Sometimes, the gap is created by a lack of political will or lobbying and disinformation by vested interest groups. Sometimes, action is simply impossible because of political unrest and conflict, or the lack of financial resources. Consider climate change, the IPCC has reached clear conclusions, but the world is still failing to reduce the global carbon footprint.

Achieving the SDGs requires broader societal engagement with all aspects of science and a greater democratization of knowledge – so that people will be ready and willing to commit to the transformations needed.

Chapter 6. Calls to action

Implementation of the Agenda 2030 requires the active mobilisation of political leadership and ambition, and building societal support for policy shifts embracing transformations through meaningful consultation with stakeholders and effective participation.

Transformation is possible, and inevitable. To guide policymakers in this process, the Report presents a series of calls to action. First, it proposes that, at the midpoint to the 2030 Agenda, the United Nations Member States elaborate a shared SDG Transformation Framework that consists of six elements: (i) national plans of action to counter negative trends or stagnation in SDG implementation; (ii) local and industry specific planning to feed into national plans; (iii) initiatives through the Addis Ababa Action Agenda or otherwise to increase fiscal space, including tax reforms, debt restructuring and relief, and increased engagement by international finance institutions for SDG implementation; (iv) investment in

SDG related data, science-based tools and policy learning; (v) partnerships to strengthen the science-policy-society interface; and, (vi) measures to improve accountability of governments and other stakeholders.

Second, it recommends building capacity for transformation at individual, institutional and network levels, to strategize, innovate, manage conflicts, identify and overcome impediments and cope with crises and risks. Third, it puts forward key synergetic interventions in each of the six entry-points for sustainability transformation, to achieve coherence and equity, and ensure that advances in human wellbeing are not made at the expense of climate, biodiversity and ecosystems. Fourth, it proposes five measures for improving the fundamental conditions for implementation, namely by investing in conflict prevention and resolution, enhancing fiscal space, supporting marginalised groups, taking advantage of the digital transformation and by investing in gender equality. Finally, it recommends tools for transforming science and approaches to ensure that science, policy and society work together for a future where people and nature can thrive as one.

This report bridges science and practice to provide actionable knowledge, practical tools, and examples for a variety of actors, from policymakers in United Nations Member States to youth and community groups, from financiers to other industry partners, from donor agencies to philanthropies, and from academics to civil society groups. The 2023 Global Sustainable Development Report benefited from inputs received from experts from a wide range of disciplines - natural scientists, social scientists, policy makers, and practitioners - in response to an open call for inputs, a scientific peer review led by the International Science Council, as well as region-specific inputs gathered through a series of regional consultations held in Australia, China, Japan, Malawi, Peru, Philippines, Qatar, and Senegal. Achieving the SDGs is not only the work of governments, and the contributions from multiple actors are essential indeed. This report is for all stakeholders, with the recognition that everyone will engage with these transformations in some way, and for doing so effectively, everyone will need strategies and tools.

Chapter 1: Half-way to 2030 – progress towards the SDGs

In 2015, United Nations Member States agreed on the 2030 Agenda for Sustainable Development and the 17 associated Sustainable Development Goals (SDGs) – as a universal call for action to end poverty and protect the planet. But today at the half-way point, the world is not on track to achieve the SDGs by 2030, and we are more off track than four years ago. This is a warning signal that unless the world makes an urgent course correction and initiates transformative change, we risk undermining advances made, increasing vulnerability to future crises and cementing unsustainable development pathways.

In 2015, the global community adopted a shared blueprint for people, planet, peace, prosperity and partnership, the 2030 Agenda for Sustainable Development, and established an ambitious set of interlinked Sustainable Development Goals (SDGs). The SDGs cover all regions of the world in all aspects of life and development – in health, education, and the environment, peace, justice, security, and equality. They aim to eliminate poverty and hunger, tackle diseases to ensure healthier societies and wellbeing, empower women and girls and tackle the triple planetary crisis of climate change, biodiversity loss and pollution. [1] [2] Achieving the SDGs would be a monumental step forward but will demand determination and effort from citizens in every country, shared responsibility of governments and global solidarity.

The big picture: stagnation in the face of multiple crises

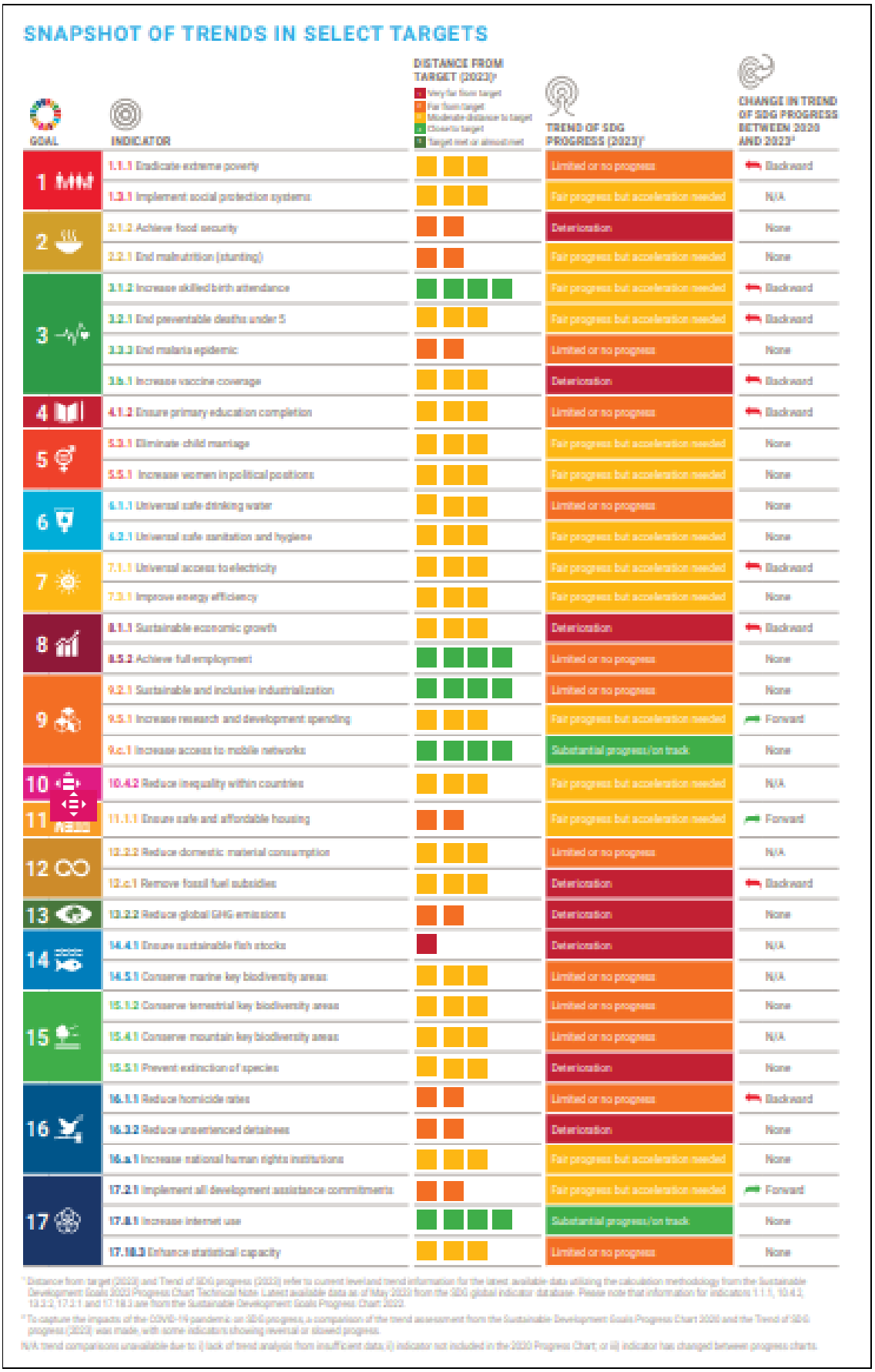
The *2019 Global Sustainable Development Report* (GSDR) assessed progress on the SDGs. The indications were not encouraging. That Report concluded that on the current trajectory the world was unlikely to achieve the SDGs by 2030. It found that for some targets the global community was on track, such as those for child mortality and for primary school enrolment. And to meet many other targets, the world would need to quicken the pace – particularly for eradicating poverty and hunger, reducing maternal mortality, increasing access to drinking water and sanitation, and achieving gender equality. More worrying still, in some respects the world was slipping backwards – regressing on climate action and biodiversity, for example, and on reducing inequality.

In 2023, halfway to 2030, the situation is much more dire.

Figure 1-1, with an assessment of select targets with sufficient data, shows that SDG targets close to being achieved are the exception rather than the rule[3]. As shown in the column *Distance from Target*, the SDG targets close to being achieved include increasing skilled birth attendance (3.1.2), full employment (8.5.2), raising industry's value to GDP (9.2.1), access to mobile networks (9.c.1) and access to internet (17.8.1). However, in many of these, progress is not fast enough, as shown in the column *Trend of SDG Progress*.

Most other targets are either at a moderate distance to the goalpost or far from it as shown in the column *Distance from Target*. Based on the targets for which we have data available, particularly far from the reaching the 2030 ambitions are goal 2, goal 11, goal 13, goal 16 and goal 17.

677 **Figure 1-1: Current state of progress toward the SDGs based on select targets**



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Source: Calculations based on Sustainable Development Goals Database https://unstats.un.org/sdgs/dataportal

To capture impacts of recent crises on SDG progress, Figure 1-1 also shows a comparison of trends for each target, as assessed in 2020, with trends in 2023 (see column *Change in Trend of SDG Progress between 2020 and 2023*). SDG targets that were on track and remain on track are access to mobile networks (9.c.1) and internet access among individuals (17.8.1) (indicated by None).

The analysis shows a worsening trend across many of the SDGs between 2020 and 2023 (indicated by Backward). The target on ending extreme poverty (indicator 1.1.1), which saw steady progress through 2018/2019, has been disrupted by a multitude of recent crises. COVID-19 pushed tens of millions into poverty. While poverty is again on the decline, the recent spate of cost-of-living and climate crises, among others, mean that poverty reduction is now on a much slower path. On several other targets where there was good progress in 2018/2019, the progress has now slowed down. These include skilled birth attendance (3.1.2), under five mortality rate (3.2.1), vaccine coverage (3.b.1), primary education completion (4.1.2), access to electricity (7.1.1), GDP growth (8.1.1), addressing fossil fuel subsidies (12.c.1), and reducing homicide rates (16.1.1).

For Goals where progress was too slow in 2019, in most cases, countries have not accelerated enough. On some SDG targets, however, progress is now faster than it was in 2018/19 (indicated by Forward). These include increasing research and development spending (9.5.1), safe and affordable housing (11.1.1), and implementation of ODA commitments (17.2.1).

Other targets were moving backward and continue to regress, including achieving food security (2.1.1), reducing global GHG emissions (13.2.2) and preventing the extinction of species (15.5.1). Since 2015, the number of people living in hunger and food insecurity is on the rise. The situation is getting worse. On Stunting, progress had been made since 2015 though full impacts of the pandemic on child nutrition may take years to manifest[4].

Where progress has been halted or slowed down, it is partly a consequence of a confluence of crises – the ongoing pandemic, rising inflation and the cost-of-living crisis, and planetary environmental and economic distress, along with regional and national unrest, conflicts, and natural disasters. To have these crises overlap so relentlessly might seem bad luck, but they are not independent events: they are entwined through various physical, economic, and social strands, each fuelling other's intensities.[5] For example, climate change fuelled fluctuations in transboundary fish stocks is causing international and regional tensions (Box 1-1). Climate change is causing water stress and food insecurity, altering marine, terrestrial and freshwater ecosystems, harming biodiversity, destroying livelihoods, and widening inequalities. These worsening prospects in turn intensify ideological extremism, fuelling tensions and conflict.

Box 1-1: Challenges of managing transboundary ocean resources in an era of Climate change[6]

Indirect effects of climate shifts can be felt across borders through disruptions in supply chains, markets and the movement of natural resources. Transboundary risks to the water, energy and food sectors have been projected as a result of extreme weather and climate events[7]. Globally, 633 (68 per cent) of assessed commercial marine stocks are estimated to be transboundary resources[8]. By 2030, it is predicted that about 23 per cent of transboundary stocks of marine fish and invertebrates will shift due to climate change.[9] Changes in

species distribution across borders introduces challenges for biodiversity governance[10], with implications for security and stability.[11] Further complications are introduced by a lack of sufficient data and institutional mechanisms to accurately track these shifts.[12] For example, in Southeast Asia, there are transboundary concerns about fisheries and marine area management. Prior to the establishment of exclusive economic zones (EEZs), the shallower areas within archipelagic waters of what is now known as the Coral Triangle were accessible to all Southeast Asian fishers. Each country had traditional fishing grounds, shaped by local and indigenous knowledge, some of which extended outside EEZ boundaries. The establishment of EEZs resulted in overlapping claims and tensions among fishing communities in Southeast Asian nations. There has also been a high frequency of illegal, unreported and unregulated (IUU) fisheries. IUU fisheries contribute to the loss of biodiversity, mismanagement and in some cases the deployment of military units to secure contested territorial claims. Climate change can be expected to exacerbate existing tensions. Regional mechanisms for fisheries management could help alleviate these challenges; for instance, the establishment of an Association of Southeast Asian Nations (ASEAN) nations regional fisheries management organization, focusing on shallow waters that host commercially important and exploited demersal species.

On the other hand, the inter-connections between economies and people, including those across national borders could be exploited to release positive synergies (Box 1-2). Accelerating progress on the SDGs in a holistic and integrated way could help recover from these crises and reduce future systemic risks.

Box 1-2: Harnessing migration for the SDGs

When well-governed, migration can contribute to alleviating poverty and inequality and advancing sustainable development. With over 281 million estimated to be international migrants in mid-year 2020[13], and 38 million newly internally displaced in 2021[14], ensuring safe, orderly and regular migration can contribute to positive development outcomes at all levels.

For example, remittances are a critical source of financial support for families and communities. Remittances proved resilient despite COVID-19, reaching USD 605 billion in 2021 and overtaking FDI and ODA to low- and middle-income countries excluding China[15] –providing people with paths to improved livelihoods. Migrant workers in essential sectors kept many economies afloat during the COVID-19 pandemic, including migrant workers in healthcare sectors who provided support at the frontline of the pandemic response in many countries.

There are examples across regions of initiatives to make migration work for sustainable development. In Serbia, Municipal Youth Offices in three rural towns facilitate technical trainings for young people to learn skills that local businesses need, and to directly connect the young people with education-to-employment pathways in local companies.[16] In Morocco, a CSO orients vulnerable women and children, including irregular migrants, to psycho-social support and local healthcare services.[17] In Ecuador, municipal authorities have implemented an online marketplace, job banks and physical co-working spaces and provide trainings for local companies on inclusive hiring practices.[18]

With the right enabling tools, migration can help fulfil the aspirations of those on the move and the societies they join, as well as those who stay behind. To reduce inequalities in terms to access to travel and immigration processes, regular pathways for migrants need to be reinforced and made safe, and accessible immigration channels need to be ensured.[19] Strengthened data and capacities to measure the implementation of migration aspects in the SDGs are also needed to better understand mobile populations, whose data are often not included in official statistics.

At the same time, forced displacement is a human crisis that should be prevented from happening. States must take measures to protect and assist their citizens who are displaced within their own countries as internally displace persons (IDPs) and to provide asylum and protection to refugees when people are forced to cross borders.

This chapter examines the state of the SDGs today, while Chapter 2 assesses future prospects for achieving the SDGs.

The lingering drag of COVID-19

Around the globe*, t*he COVID-19 pandemic is still having a profound impact on the mental and physical health and wellbeing of individuals, households and communities worldwide. Beyond costing more than 15 million lives globally, it has slowed, disrupted, or temporarily reversed progress across the SDGs.[20] The pandemic has at times shut down entire industries, from travel and tourism to entertainment and retail, with a loss of jobs, livelihoods, incomes, and remittances. In 2022, because of the loss of jobs and many people leaving the labour force, the total hours worked globally remained two per cent below the pre-pandemic level.[21] The pandemic also cast a large shadow over the lives and future prospects of children, particularly through the closure of schools, and added to women's burden of care work[22].

The pandemic exacerbated existing fault lines of inequality. Much of schooling went online, which was useful, but inferior to classroom interactions and socialization while being of no use at all to families without access to devices or broadband internet – widening the gaps between richer and poorer students.[23] There was also an increase in economic disparities. As economies shrank and many services and goods dried up, the impacts were greatest on small and medium enterprises (SMEs) and on the many women and temporary workers they employ.[24] During the lockdowns, migrants who faced more restrictions and had less access to relief measures were some of the most affected workers.[25]

Recovery from COVID-19 has been very uneven and incomplete. Quickest to recover were the high-income countries who generally achieved higher rates of vaccination and could find more effective relief measures.[26] In 2021, the top 20 per cent in terms of global income distribution had recovered about half their lost income, but the bottom 40 per cent had not recovered.[27] The high-income countries also resumed education more rapidly, bringing students back into classrooms and enabling parents to get to work. By end of Feb 2022, 42 countries had opened schools only partially and six countries still had schools fully closed[28]. This uneven recovery does not just affect those countries that are slowest to recover. National economies are now so interconnected through trade and migration that delayed recoveries in any country reduces the prospects for all.[29]

Informality and working poverty rose because of the pandemic. The incomplete recovery implies an ongoing shortage of better job opportunities, pushing workers into jobs of worse quality[30].

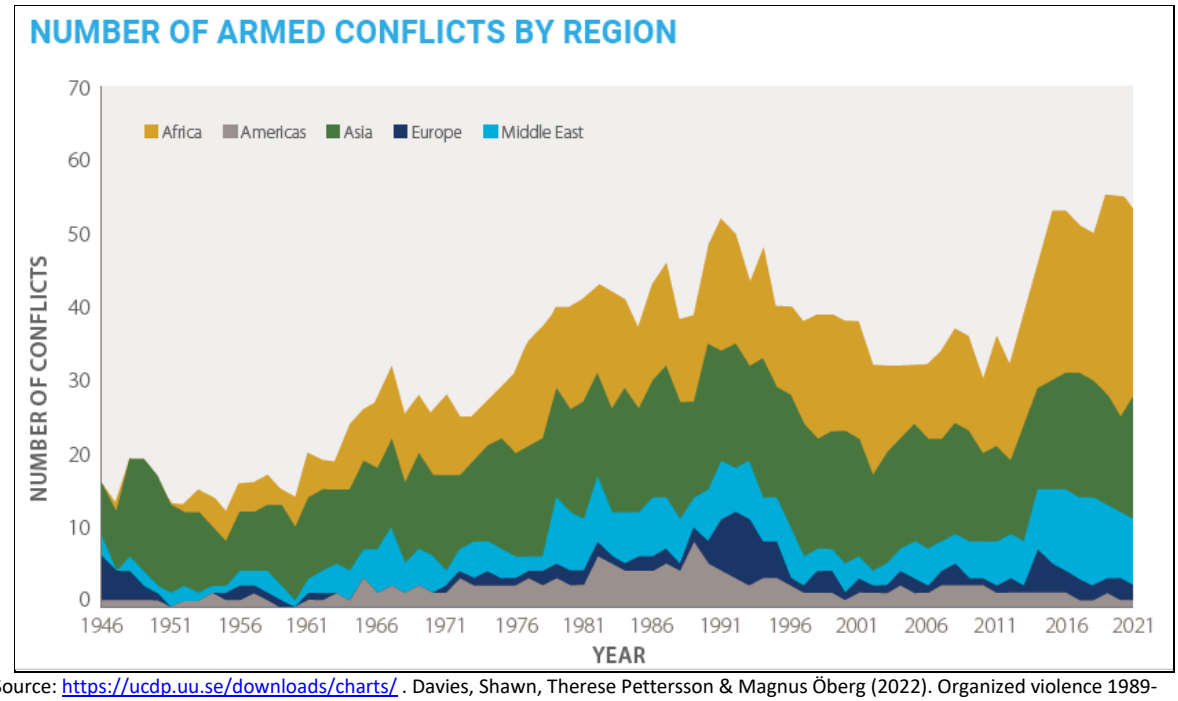
The pandemic also had detrimental environmental impacts including through the heightened use of plastic in medical use such as personal protective gear, and through the postponement of vital global environmental governance negotiations scheduled for 2020[31].

Rising levels of conflict war and instability

The world is currently witnessing the highest level of state-based armed conflicts seen since 1945. By the end of 2020, around two billion people were living in conflict-affected countries[32]. In 2021, the number of people who were forcibly displaced was the highest on

record, at 89.3 million with 27.1 million refugees and 53.2 million internally displaced people.[33] There is also a deeply concerning long-term trend of an increasing number of armed state-based conflicts as well as non-state conflicts[34] (see figure 1-2).

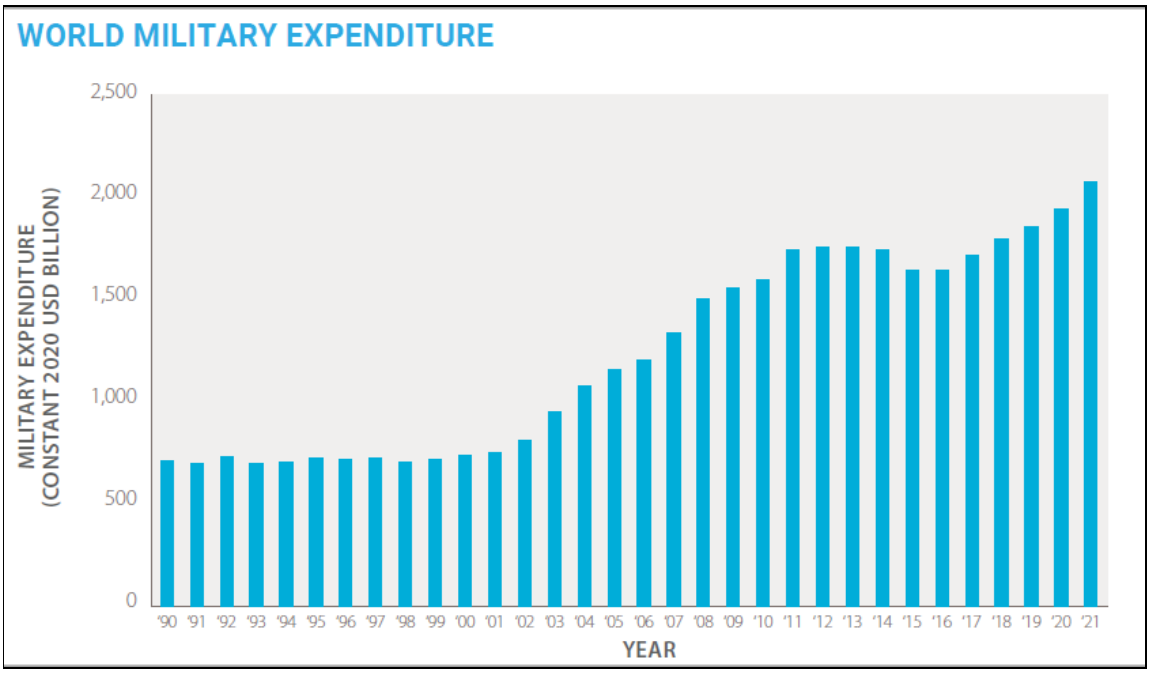
Figure 1-2: Number of armed conflicts by region



Source: https://ucdp.uu.se/downloads/charts/ . Davies, Shawn, Therese Pettersson & Magnus Öberg (2022). Organized violence 1989-2021 and drone warfare. Journal of Peace Research 59(4).

By 2030, up to two-thirds of the world's extreme poor could live in settings characterized by fragility, conflict and violence threatening efforts to end extreme poverty. Conflicts also drive 80 per cent of all humanitarian needs[35]. Violent conflict not only disrupts human development and causes insecurity, it also destroys man-made and natural capital and diverts private and public resources to spending on defence and reconstruction. In 2021, for the first time, global military expenditure exceeded $2 trillion[36] (figure 1-3).

Figure 1-3: World military expenditure



Source: SIPRI Yearbook

Conflict forces people to flee their homes. And 2021 was the deadliest year on record for migrants since 2017, with nearly 6,000 people dying as they fled their countries through often dangerous routes.[37] The economic, health and social impacts of conflict and forced migration are highly gendered, meaning that women, men, and sexual minorities face different risks and experiences before, during, and after migration[38]. Sexual violence and exploitation and the risk of being trafficked are all too common among women and children fleeing war or persecution. Many humanitarian aid workers and health professionals are not adequately trained to identify these risks and provide services and support[39].

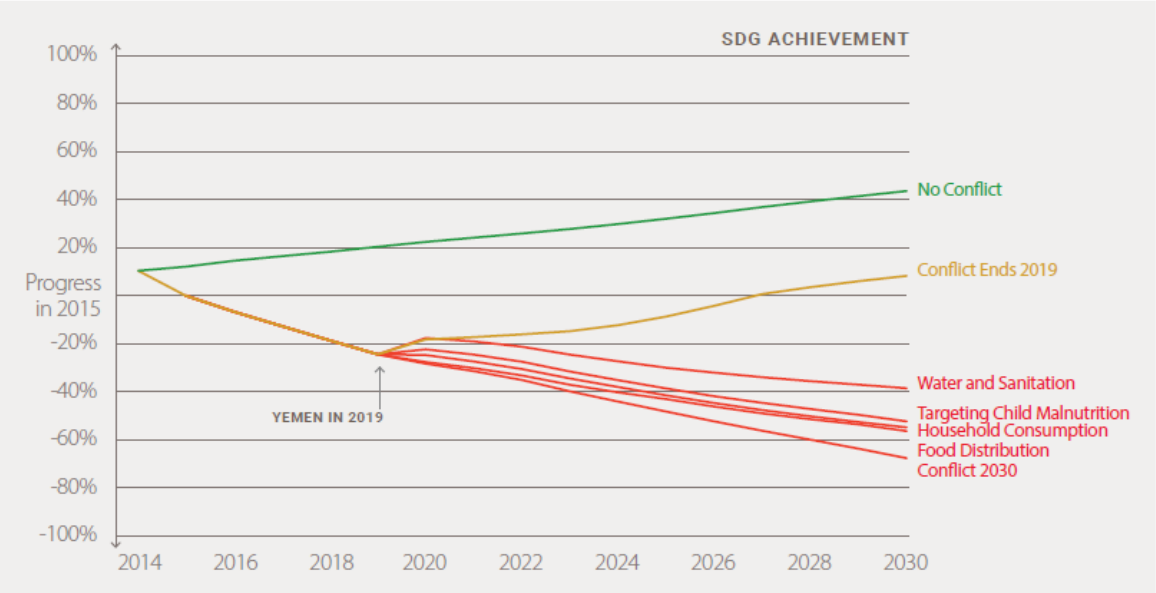
The war in Ukraine is causing immense suffering and loss of life, as well as destruction to property, while also giving rise to huge movements of people. Besides the large number of military casualties, as of Jan 2023, there have been tens of thousands of civilian casualties, 6,952 killed and 11,144 injured[40]. There are more than 8.1 million refugees, most of them women and children, as well as 5.3 million internally displaced persons (IDPs) creating one of the largest refugee and internal displacement crises of modern times[41]. The Ukraine war is wreaking havoc on the global economy, leading to food and energy price hikes, and a potent cost of living crisis[42].

Conflict and unrest have surged in many countries creating tangible barriers to SDG progress (Box 1-3). In Ethiopia, for example, in 2021, some 2.5 million people were displaced due to conflict. In Afghanistan, the number of displaced people increased for the 15th straight year. In Venezuela, the number of refugees is on the rise. A number of other countries saw increases of between 100,000 and 500,000 internally displaced people in 2021, including the Democratic Republic of the Congo, Nigeria, South Sudan, Sudan, the Syrian Arab Republic and Yemen.[43]

Box 1-3: SDG attainment amidst conflict, the case of Yemen

In Yemen, since 2014 conflict has impacted food security, social and health services—reversing decades of development.[44] Projections of SDG attainment in Yemen have shown how conflict has impacted progress toward SDG 1: No Poverty; SDG2: Zero Hunger; SDG 6: Clean Water and Sanitation; SDG 8: Decent Work and Economic Growth; SDG 10: Reduced Inequalities. Scenarios indicate that if the conflict had ended in 2019, Yemen would have been eight percent closer to achieving some SDGs (compared to 2015) due to reduced poverty and malnutrition, along with greater economic growth; however, if conflict continues throughout 2030, Yemen will face generational impacts of poverty, malnourishment, and socio-economic setbacks.[45]

SCENARIOS OF IMPACTS OF CONFLICT ON SDGS IN YEMEN



Layered on top of SDG challenges from conflict, Yemen faced further setbacks due to the COVID-19 pandemic. With a healthcare system weakened from conflict, Yemen had three doctors and seven beds per 10,000 people when the pandemic hit. Only half of those healthcare facilities were operational, two-thirds of Yemenis lacked access to healthcare, and drinking-water, sanitation and hygiene (WASH) were inadequate - all barriers for Yemenis to stay safe during the pandemic.[46]

Afghanistan is facing severe food insecurity throughout the country and is home to millions of internally displaced Afghans and those seeking refuge[47]. Beyond increased instability, gender equality in Afghanistan has also been jeopardized with women facing exclusion from public and political life, and restricted access to education, humanitarian assistance, employment, justice and health services.[48]

In the Sahel region of Africa progress across the SDGs is being blocked by the proliferation of armed groups in the region and the collapse of the Libyan state. [49] [50] As of March 2023, some 3.1 million Sahelians were internally displaced by conflict.[51] Similarly, between March and May 2022, approximately 26.5 million people in the Sahel were in crisis or worse with respect to food and nutrition.[52]

Inflation and the cost-of-living

Around the globe, people face a severe cost-of-living crisis[53]. The pandemic and subsequent recovery pushed up prices for food and energy, which rose further as a result of the war in

Ukraine. As the war broke out, food prices peaked in March 2022. Since then, they have fallen somewhat but remain at historic highs[54]. Many countries are seeing domestic food inflation. Between June and September of 2022, around 89 per cent of Least Developed Countries (LDCs), 93 per cent of Landlocked Developing Countries (LLDCs) and 94 per cent of Small Island Development States (SIDS) had food inflation above 5 per cent, with many experiencing inflation in double digits.[55]

Worst affected by inflation are the poor who spend a significant amount of their budget on food and fuel. Often, they respond by skipping meals or purchasing cheaper and less nutritious food – short-term solutions that can have long-term consequences for health and future prospects particularly of children.[56] The cost-of-living crisis is pushing an additional 78 million – 141 million into poverty[57]. Women and the urban poor are at greatest risk of facing hunger and deprivation and need urgent support[58].

In response to high inflation, countries have put in place measures including fuel and energy subsidies (about a quarter of total measures), food and fertilizer subsidies, cash transfers, labour market programs and other measures, with the capacity of countries to implement such programmes varying significantly across the world[59]. Increased spending on fuel subsidies can alleviate household expenditure challenges, but with implications for addressing the climate and biodiversity crises.

Central banks face the classic trade-off between controlling prices and supporting growth. A number of countries have responded to inflationary pressures by tightening monetary policy. The United States Federal Reserve has increased interest rates which drove up the exchange rate of the dollar with knock-on effects for other countries that have to pay in dollars for fuel and other commodities. Around the world other central banks are defending their currencies from the rising dollar by also increasing their own interest rates[60]. All of which raises the spectre of an impending global economic slowdown, with ominous implications for the SDGs. Forecasts for global growth in 2023 have been lowered to 1.7 percent, the third weakest growth in nearly three decades[61].

Policy makers keen to help the most vulnerable in their countries are faced with tough choices as they operate with limited fiscal space. The pandemic, and high inflation may have pushed debt in developing countries to an estimated 50-year high[62]; and now the fiscal positions of many countries are being further weakened by rising interest rates and ballooning debt servicing costs. Almost half of the LDCs and more than one in every three SIDS and LLDCs are in debt distress or at high risk[63]. Others lack the resources to expand social spending, such as through cash transfers, tax cuts or other relief, which could help offset the impacts of rising prices on businesses and households.

Insufficient progress on the SDGs

Slow progress towards the SDGs has made many countries far more vulnerable during the recent spate of crises. For example, high inequality, lack of universal healthcare and inadequate social safety nets left vulnerable groups even more exposed to the myriad health, social and economic impacts of COVID-19, while unequal gender roles placed an enormous burden on women. Similarly, many countries that had made insufficient investments in agriculture, or efforts to diversify their sources of energy, were highly dependent on food and fuel imports from a handful of countries, including Russia and

Ukraine. Inadequate protection of forests and trafficking of wildlife also increased the risk of zoonotic diseases.

Some of the shocks are temporary. For example, economic growth bounced back in 2021 and extreme poverty is now falling again. However, even temporary reversals at the national level can have lifelong impacts on individual families, and particularly on children who have lost a breadwinner, or a family member, or who never return to school[64]. Years of malnutrition or lost education create setbacks that can last a lifetime.

The Secretary-General's Annual SDG Progress Report analyses the most recent data[65]. The following sections complement this assessment by considering the impacts of crises on the SDGs and set the stage for subsequent chapters, which consider how the SDGs can and must be achieved. In the current context of multiple and overlapping crises, scaling up and accelerating the necessary actions has never been more urgent.

SDG 1 – No poverty

Any predictions that SDG 1 would be achieved by 2030 have been upended. When the pandemic struck, there had been steady progress on reducing global poverty even though the no poverty target was not on track to be achieved[66]. The combined crises have pushed an additional 75 million to 95 million into extreme poverty[67]. Roughly 575 million people will still be in extreme poverty in 2030[68] with poverty particularly entrenched in sub-Saharan Africa (Box 1-4).

Box 1-4: Poverty remains prevalent in Africa despite the forecast decline

The COVID-19 pandemic marks a turning point in the trajectory of global poverty reduction, halting three decades of successful reduction of global poverty and inequality. The war in Ukraine, multiple regional conflicts, and climate shocks are compounding the situation[69].

In this context, Africa is strongly affected. In 2022, around 460 million people on the continent were living below the extreme poverty line of 1.90 U.S. dollars a day. Nigeria and the Democratic Republic of the Congo accounted respectively for around 12 and 11 per cent of the global population in extreme poverty. Other African countries with a large poor population included Tanzania (4.3 per cent), Mozambique (3.5 per cent) and Madagascar (2.8 per cent). Throughout Africa, rural households face higher poverty levels. In 2022, for instance, the extreme poverty rate reached about 50 per cent among the African rural population, compared to 10 percent in urban areas. The current levels of poverty on the continent are forecast to decrease in the coming years, with the number of inhabitants living below the extreme poverty line falling to 411 million by 2027. However, Africa would remain the poorest region compared to the rest of the world[70].

Informal economies, weak social protection systems and less developed financial systems are aggravating attributes in dealing with poverty and inequality. Africa's natural and human endowments present opportunities to address the challenges it is facing. Addressing underlying structural barriers to reducing poverty, including unequal international financial structures, in the coming years is vital.

People suffer from poverty not just in terms of low income but in many other aspects of daily life. The multidimensional poverty index (MPI) accounts for deprivations faced by households in health, education and standard of living. Under these three broad dimensions, MPI tracks deprivations in ten indicators of human well-being. In 2022, 1.2 billion people live in multidimensional poverty. The health dimension accounts for 24.9 per cent of the deprivations, the education dimension for 31.3 percent and the standard of living dimension for 43.8 per cent. Most poor households are deprived in access to modern

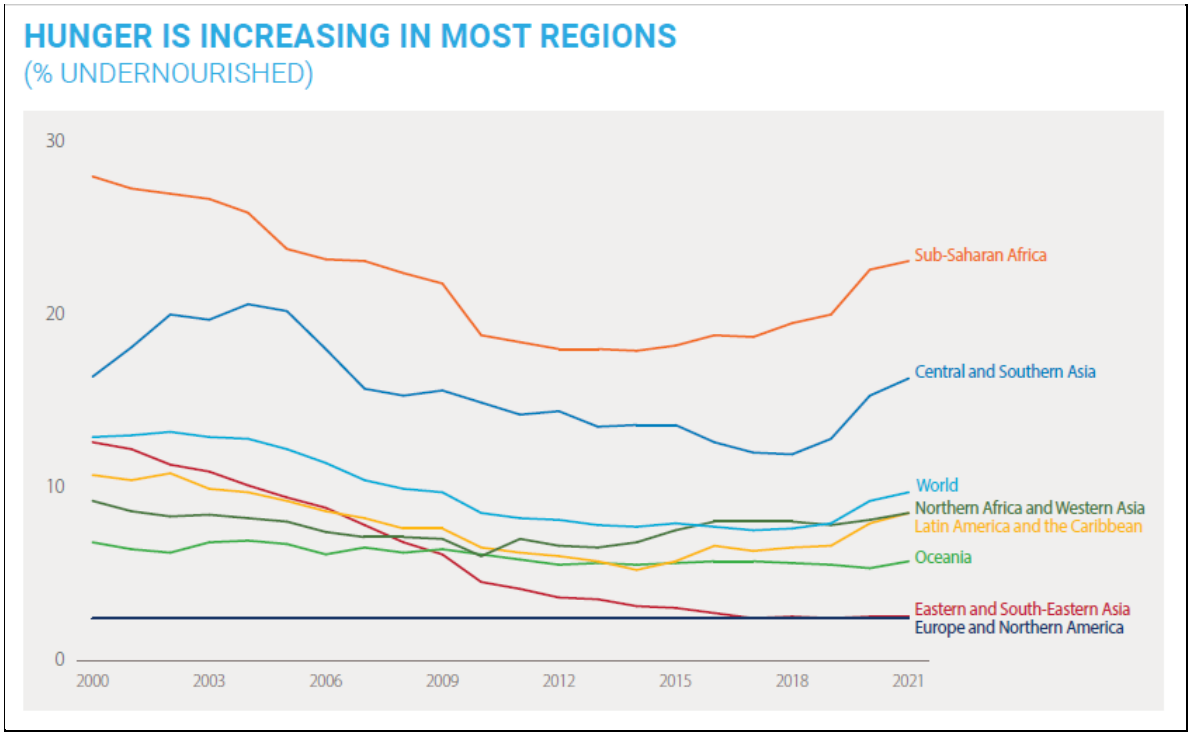
fuels, while many deprivations link to housing, sanitation, drinking water, school attendance and child mortality. Early indications on the impacts of the pandemic globally are striking, showing a significant worsening in all 10 MPI deprivations among the poor[71].

In response to COVID-19 and its impacts on poverty, governments across the world quickly ramped up social protection, often through digital means. For example, in Togo, the Government made quick and efficient digital payments to 600,000 urban residents.[72] However the pandemic also exposed vast shortfalls in digital and non-digital coverage with particular difficulties in reaching informal workers, women and youth. In response to the pandemic, around the world, cash transfers covered on average just 46 per cent of recipients' pre-pandemic incomes.[73]

SDG 2 – Zero hunger

Between 2019 and 2020, globally, the proportion of people living with hunger increased from 8.0 to 9.3 per cent, and in 2021 to 9.8 per cent (figure 1-4). [74] Hopes that food security would quickly recover from the pandemic were dashed. The hardest hit region was Africa, with hunger at around 20 per cent in 2021. Since 2015, the prevalence of hunger in Africa has increased by 4.4 percentage points.[75]

Figure 1-4: Prevalence of undernourishment



Source: UN 2023

COVID-19 and the measures to contain it had a disproportionate impact on women, especially rural women, through reduced food production and distribution capacities, decreased purchasing power and reduced access to nutritious food[76]. Women already face greater constraints in accessing productive resources, technologies, markets, and social protection. The pandemic also increased their workload and levels of gender-based violence[77].

Food supplies have been cut by the war in Ukraine. Russia and Ukraine supply 12 per cent of the world's traded calories and are among the top five global exporters for cereals and oilseeds, including wheat, barley, sunflowers, and maize[78]. These two countries produce 73 per cent of the world's sunflower oil and 30 per cent of its wheat[79]. In 2022, the Global Report on Food Crises found that 53 countries were dependent on imports, and 36 depended on imports from Ukraine or Russian exports for more than 10 per cent of their total wheat imports. For Somalia, the proportion was over 90 per cent, for the Democratic Republic of the Congo 60 per cent, and from Madagascar over 70 per cent.[80] Food supplies have been further affected by climate change through droughts and low rainfall and by conflict.

Up to 205 million people were expected to face acute food insecurity and be in need of urgent assistance, over the period October 2022 to January 2023, including in Afghanistan, Ethiopia, Nigeria, South Sudan, Somalia and Yemen[81]. Rising prices and difficult access to grains have severely affected humanitarian aid to support refugees and countries in conflict. The World Food Program used to buy 50 per cent of its wheat in Ukraine.

Globally, between 2000 and 2022 the prevalence of stunting among children under five declined steadily from 33 to 22 per cent, though this could have slowed down because of the pandemic[82]. In 2022, 45 million children (6.8 per cent) suffered from wasting. The prevalence of anaemia in women of reproductive age continues to be alarming, stagnant at around 30 per cent since 2000 and low and lower-middle income economies bear the greatest burden of stunting, wasting, low birth weight and anaemia.[83]

SDG 3 – Good health and wellbeing

The number of excess deaths attributable to the pandemic, directly or indirectly, is around 15 million.[84] Between, 2019 and 2021, global life expectancy, which had been increasing, fell from 72.8 to 71.0 years.[85] The pandemic put health services under severe financial and organizational strain and diverted resources from other medical needs. In addition, during lockdowns patients lost access to medical facilities, delaying treatment for chronic conditions including HIV, non-communicable diseases (NCDs), and cancers.[86, 87, 88 89] Deaths from tuberculosis (TB) and malaria increased[90]. Ongoing suffering has also heavily impacted mental health in multiple ways[91].

Prior to the COVID-19 pandemic, global health trends were encouraging – with progress on reproductive, maternal and child health, immunization coverage, and treatment of communicable diseases. But subsequently at least 50 per cent of countries reported disruption to services for NCDs and over one-third reported disruptions across mental, neurological, and substance-use services[92]. At the current pace, many indicators, including premature mortality due to NCDs, the incidence of TB, malaria, and new HIV infections, will not meet their SDG targets by 2030.[93]

The pandemic has also disrupted regular vaccination schedules. Between 2019 and 2021, global infant vaccine coverage for diphtheria-tetanus-pertussis (DPT3) dropped from 86 to 81 per cent, with 25 million children under one year old not receiving basic vaccines – the highest number since 2009.[94] As of 2022, 68 million children are known to be un- or under-vaccinated[95].

There are also significant health hazards from environmental factors including pollution. Globally, there are 6.7 million deaths each year from exposure to ambient and household air pollution and 99 percent of the world's population lives in places where air pollution exceeds WHO guideline limits[96]. Global public health continues to be threatened by these health hazards.

SDG 4 – Quality education

The pandemic has been the largest disruptor of education systems in history. Globally, at the peak of the crisis, school closures affected over 90 per cent of students[97]. By October 2021, schools had been at least partially closed for 55 per cent of total days[98]. As a result, more than one billion children are at risk of falling behind in their studies, while over 100 million additional children will fall below the minimum proficiency level for reading. [99]

The longer children are out of school, the less likely they are to return; the same risk applies to students who had no access to remote learning during lockdowns. UNESCO estimates that half of all global learners do not have a household computer and 43 per cent have no household internet access – with the widest gaps in low-income countries.[100] Lost learning due to COVID-19 may affect a generation of students: the World Bank estimates that, over their working life, students currently in school stand to lose a cumulative $17 trillion.[101]

The impacts have been greatest in low-income countries, and for low-income households, as well as for women and girls, persons with disabilities, migrants, and refugees. Even before the COVID-19 pandemic, the world was off-track for achieving quality education at all levels by 2030. Some 64 million children of primary school age were out of school, as were 63 million adolescents of lower-secondary age, and 132 million youth of upper-secondary age[102].

One success for girls' education is that the world is closer to gender parity. At all three levels of education the gender gap is less than one percentage point. The region furthest from parity is Sub-Saharan Africa. Overall, however the largest gaps in access to education are not by sex but by income and location[103].

SDG 5 – Gender equality

COVID-19 generated new pressures on women and girls. In 2020, women with children at home on average spent 31 hours per week on childcare – five hours more than before the pandemic.[104] When schools and preschools closed during COVID-19, women shouldered most of the childcare – and nearly 60 per cent of countries took no steps to offset this increase in unpaid work[105]. Due to the increasing pressures of unpaid care, more than two million women left the workforce.[106] Globally, employment for women fell by 4.2 per cent compared with 3 per cent for men.[107] Approximately 12 million women experienced disruptions in birth control, resulting in 1.4 million unwanted pregnancies.[108]

In 2020, in many countries there were much higher call volumes on emergency hotlines for violence against women.[109] One in four women reported increased household conflict and intimate partner violence[110]. UNICEF estimates that by 2030 due to COVID-19 around 10 million more girls will be at risk of child marriage.[111] Similarly, other harmful practices such as female genital mutilation (FGM) increased during the pandemic as girls were kept home,

away from the protective environment of schools[112]. Disruption to services may lead to 2 million more FGM cases over the next decade[113].

Globally, most frontline workers are women, who make up about 70 per cent of health workers and first responders, which puts them at continuous high risk of infection. But they are less likely to be in charge: notably, in 2020 women held only 24 per cent of seats on COVID-19 taskforces.[114] And while the proportion of seats held by women in national parliaments and local governments has steadily increased in recent years, in 2023, women held only 26.5 per cent of seats in lower and single chambers of parliaments and 35.4 per cent in local government.[115]

In addition to impacts from the pandemic, women's sexual and reproductive health have been affected by in legal restrictions, recent social backlashes, and vulnerabilities experienced through violent conflict and climate change.[116] Progress on the 2030 Agenda cannot be achieved if half the human race is left behind. Advancing on SDG 5 can untap huge potential and have multiplier effects across the SDGs.

SDG 6 – Clean water and sanitation

Between 2000 and 2020, the proportion of the world's population that used safely managed drinking water increased from 62 to 74 per cent – representing safer water for two billion more people. Nevertheless, there are vast inequalities between and within countries, and 2.2 billion people still do not use safely managed drinking water[117]. Progress is also threatened by climate change, and by competing agricultural, ecological and financial priorities, along with multiple threats to water quality.[118]

More people also have access to adequate and equitable sanitation and hygiene, with a reduction in open defecation yet 3.4 billion people still lack safely managed sanitation services and 1.9 billion lack basic hygiene services[119]. It is currently estimated that 2.3 billion people live in water stressed countries, of which 733 million live in high and critically high water stressed countries[120]. Those most at risk are those living in fragile contexts who are less likely than other people to have safely managed drinking water or sanitation services[121]. Especially vulnerable are people living in refugee camps: in many countries, camps are unable to meet the target of 85 per cent of households having a toilet and 95 per cent having access to soap.[122]

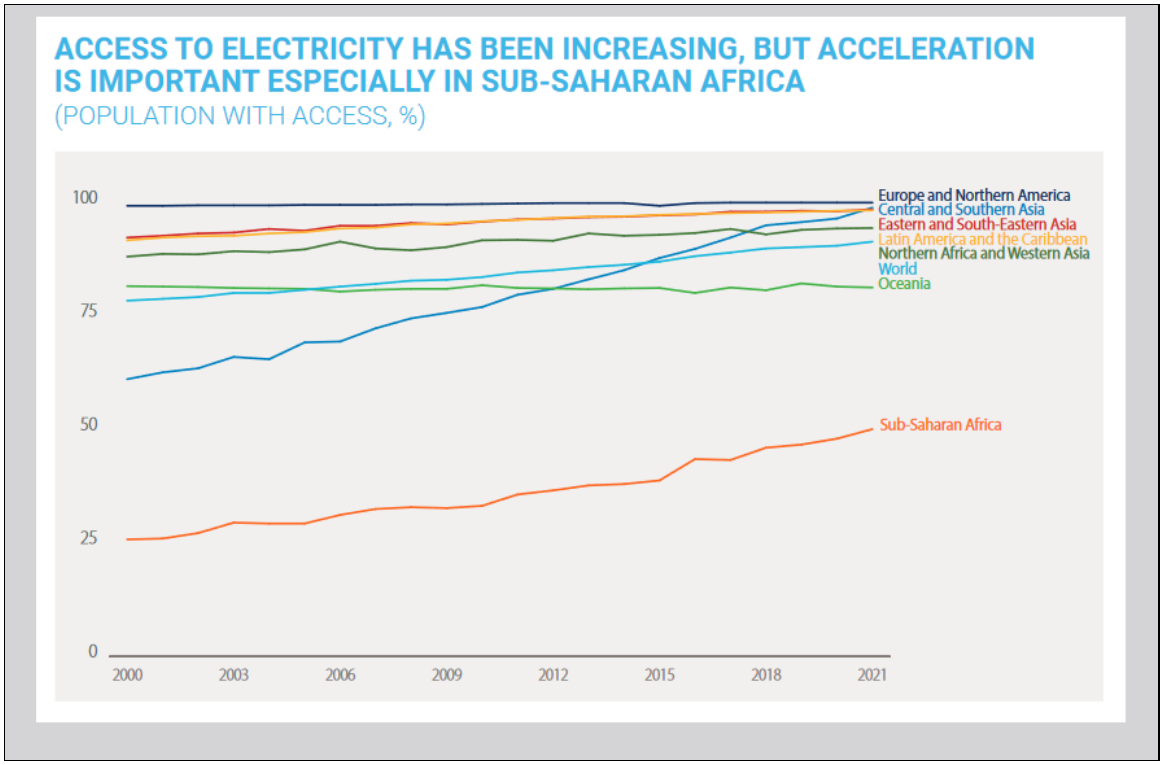
Over half (107) countries are not on-track to have sustainably managed water resources by 2030 which is vital for balancing competing water demands from across society and the economy. Out of 153 countries that share transboundary waters, only 24 countries reported that all the rivers, lakes and aquifers that they share with their neighbors are covered by operational arrangements for cooperation, which are important instruments to prevent or manage conflicts and promote regional sustainable development[123].

SDG 7 – Affordable and clean energy

The war in Ukraine prompted a global energy crisis. Some 75 million people have lost the ability to afford extended electricity services, and 100 million people, faced with surging prices for liquified petroleum gas may revert to traditional fuels like coal and solid cooking fuels.[124] The global population with access to electricity has increased to 91 per cent in 2021

but the pace of growth has slowed in recent years and some 675 million people, mainly located in LDCs and sub-Saharan Africa, still lack access (figure 1-5).

Figure 1-5: Proportion of population with access to electricity



Source: UN 2023

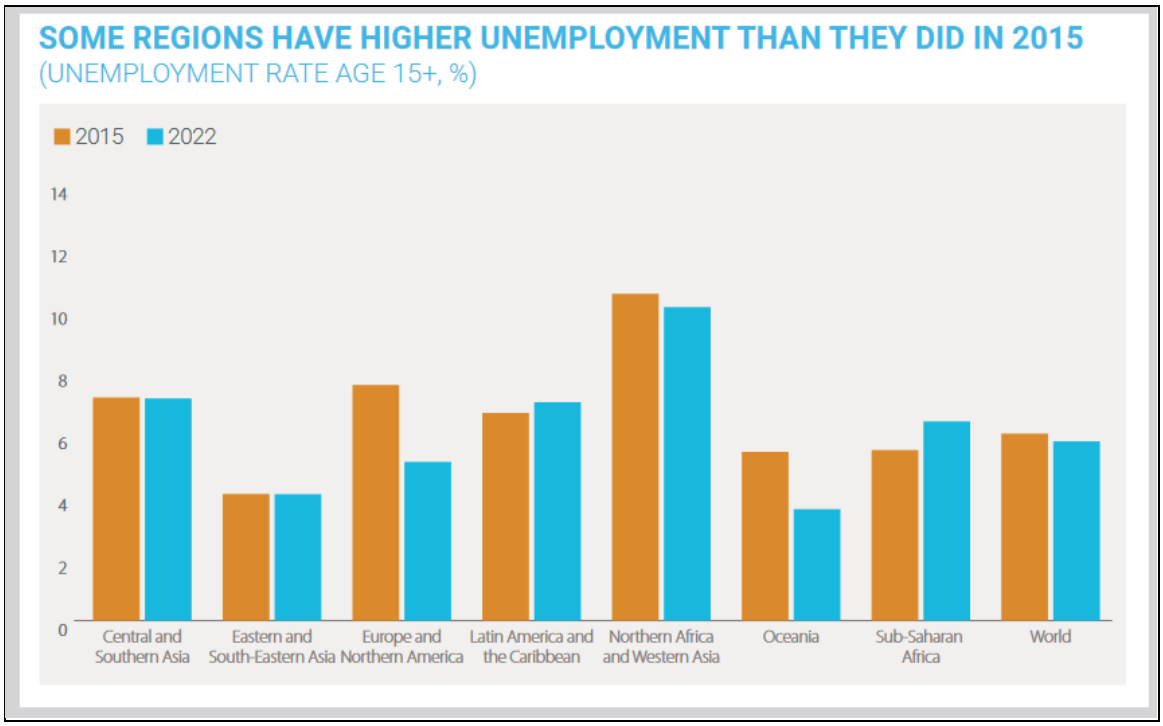
On a more optimistic note, the world could be transitioning faster towards green energy Since 2010, the cost of solar power and lithium-battery technology has fallen by more than 85 per cent, and the cost of wind power by about 50 per cent[125]. Green energy is now seen as a growth sector that can create jobs and boost economic growth, while also bringing resilience and long-term benefits.[126] In 2022, for the first time, investment in green energy exceeded that in fossil fuels and in the next few years global coal use is expected to start declining. The war in Ukraine led to a spike in the use of fossil fuels, including coal, but this is expected to be short-lived, with the demand for fossil fuels expected to peak in the near future.[127]

SDG 8 – Decent work and economic growth

Economic activity and international trade were severely disrupted by the war in Ukraine so that global growth is expected to slow from 5 per cent in 2021 to 1 per cent in 2023[128]. With shrinking fiscal space and the need to curb inflation, governments cannot sustain the types of monetary support, including low interest rates, offered during the pandemic.[129]

In the past, economic growth has typically been accompanied by increases in greenhouse gas emissions – with corresponding increases in global heating, and damage to biodiversity. In 2020 COVID-19 lockdowns and disruptions in supply chains resulted in a six per cent decline in global emissions[130]. In 2021, however, as economic activity revived, the drop in emissions was reversed and emissions continued to grow in 2022[131].

Figure 1-6: Unemployment rate (%), for persons 15 years and older



Source: UN 2023

Global unemployment peaked in 2020 at 6.9 per cent but is lower at 5.8 per cent in 2022. However, some regions have higher unemployment that they did in 2015 (figure 1-6). In 2022, informal wage employment still trailed its pre-crisis level by 8 per cent, leaving many families in a precarious position, with rising poverty and inequality[132] Most countries have not yet returned to the levels of employment and hours worked seen before the outbreak of the pandemic. Global employment is projected to increase by 1 percent in 2023, a significant deceleration from the 2.3 percent growth in 2022[133].

In the years ahead, achieving the 2030 agenda will mean decoupling economic growth from environmental damage and ensuring that growth is also more inclusive. A green transition can also be an opportunity for employment and job creation in green sectors. Such a transition could create a net 18 million jobs worldwide[134].

SDG 9 – Industry, innovation and infrastructure

The pandemic affected almost one-in-three jobs in the manufacturing industry. But impacts varied between enterprise and industries. Production of essential goods including food, chemicals and paper remained robust and there was higher demand for producers of pharmaceuticals, medical equipment and computers. Also, high-tech industries, including machinery and electrical equipment bounced back rapidly after lockdown restrictions were eased. On the other hand, manufacturing small and medium enterprises (SMEs) did not fare so well, with labour-intensive industries such as apparel, furniture, leather and others, reporting drops in sales. [135] Generally, countries with larger and stronger manufacturing systems weathered the crises better. [136]

Innovation investments were resilient in the face of the pandemic. Investment in global research and development (R&D) grew at 3.3. percent, not falling, but slowing from the 2019 record high rate of 6.1 percent. Government R&D budgets grew. Corporate R&D spending also grew substantially, driven by ICT sectors and also biotechnologies, nanotechnology, new materials and other areas that are transforming health, food, environment and mobility. The biggest boom was in venture capital which has also been very active in Latin America and the Caribbean and in Africa[137].

The pandemic moved many activities of daily life including work, school, retail, banking, and health, online and caused an unprecedented acceleration in digitalization of services. Sixty-six per cent of the global population or 5.3 billion people used the internet in 2022, up from 54 percent in 2019. However, 2.7 billion people globally have yet to access the internet. They are missing out on vital services provided digitally. Some groups, such as older persons and persons with disabilities, are being left behind[138].

Adequate and resilient infrastructure is a prerequisite for all the SDGs and even before the pandemic, infrastructure was far from adequate. Some one billion people live more than a mile from a road and 450 million live beyond range of a broadband signal. With fiscal tightening and the end of low borrowing costs, infrastructure updates and investments are likely to be below what is needed[139]. The war in Ukraine is expected to continue to dampen the slow investment recovery following the pandemic[140].

SDG 10 – Reduced inequalities

COVID-19 magnified pre-existing inequalities including health inequalities and inequalities in the capacity to cope. In terms of income inequality, the global Gini coefficient increased by about 0.5 points, from 62 points in 2019 to about 62.6 points in 2020[141].

COVID-19 widened the gaps between low- and high-paid workers. Lower-paid workers are less likely to have jobs that can be done from home, and they and essential workers tend to interact more with people – exposing them to infection. Many service industries such as tourism and restaurants which have a high proportion of low-paid workers, had to be suspended. These workers and many others in the informal sector have little cover from social protection.[142]

During the pandemic, wealthy individuals increased their assets while the poor became poorer.[143] The world's 10 richest people doubled their incomes, while 99 per cent of humanity became worse off.[144] Between 2020 and 2021, the productivity gap between advanced and developing countries widened further in real terms, from 17.5:1 to 18:1, the highest gap since 2005. [145]Inequality between countries is expected to rise as a result of weak recoveries in emerging markets and developing economies, further exacerbated by inflation.

SDG 11 – Sustainable cities and communities

More than half of the world's population lives in cities and by 2050 that proportion is expected to rise to two-thirds. [146] Between 2020 and 2021, 2.9 million people in slums and informal settlements gained access to basic services. However, many challenges remain for

urban areas[147]. Poverty rates are falling slower than in rural areas.[148] Cities account over 80 per cent of global GDP, and more than 70 per cent of global greenhouse gas emissions[149].

During the COVID-19 pandemic, cities bore the brunt of the impact, with economic downturns due to lockdowns, while many people lacked safe water and sanitation or green public spaces for exercising in – particularly those in informal settlements and urban slums which faced overcrowding and had limited socio-economic support.[150]

Well planned, compact cities can improve the environment and people's health and well-being. But rapid and poorly planned urbanization can lead to deep inequalities, in housing, public transportation, and access to basic services. "Leaving no one behind" will require an intensified focus on 1 billion slum dwellers[151].

SDG 12 – Responsible consumption and production

Overconsumption—using too many natural resources too quickly and inefficiently—has created a triple planetary crisis – of climate change, biodiversity loss, and pollution. Between 2000 and 2019, material footprint consumption per capita rose steadily and reached 95.1 billion metric tons[152] While at the global level, production and consumption will necessarily match, the data diverge at the regional and national levels, with larger consumption footprints in the Global North.

At the same time the world generates very high levels of waste. Globally, around 14 per cent of food is lost in production processes and 17 per cent is lost in retail and households.[153] Other forms include improperly managed electronic and chemical waste. On current trends, the world will generate 3.40 billion tonnes of solid waste annually by 2050.[154] Unsustainable resource use has also been bolstered by continuing fossil fuel subsidies.

Plastic pollution has risen exponentially in the last few decades, to some 400 million tons per year, and is set to double by 2040[155]. The COVID-19 pandemic resulted in a documented increase in demand for single-use plastics, worsening the severe impacts on natural ecosystems and human health[156]. The 5th United Nations Environment Assembly Session (UNEA-5.2) adopted a historical resolution to end plastic pollution and forge an international legally binding agreement by 2024[157].

Learning to live in balance with planet earth is at the core of the 2030 Agenda. Without sustainable use of resources, it will not be possible to limit damage to the climate, and land and sea ecosystems. Research shows that up to 2015, countries tended to transgress biophysical boundaries at a faster rate than social thresholds were achieved, suggesting a recurring pattern of environmentally unsustainable social development gains[158].

SDG 13 – Climate action

The world is already 1.1°C hotter than in preindustrial times[159]. The latest data from the IPCC shows that global average temperatures are estimated to breach 1.5°C by the early 2030s[160]. Given current pledges in Nationally Determined Contributions (NDCs), warming is likely to be between two and three degrees over preindustrial times by the end of the century.[161]

Failure to achieve SDG 13 and ensure deep, rapid and sustained reductions in GHG emissions leads to dangerous climate change, for humans and all living beings. The world is already seeing unprecedented sequences of hurricanes, wildfires, floods, and heat stress damaging agricultural production, fisheries, forests and ecosystems that people the world over rely on. Global warming beyond the 1.5 degrees target risks triggering multiple tipping points in the climate system and causing planetary instability[162]. Climate change could force as many as 216 million people to move within their countries by 2050.[163] The IPCC projects a 200 per cent increase in human displacement across Africa for 1.6°C of global warming and an increase of 600 per cent for 2.6°C of global warming.[164]

In many countries, the COVID-19 economic stimulus packages created opportunities to invest in more sustainable and climate-resilient systems. Some countries did apply part of their stimulus funds this way, but overall, the results were more grey than green.[165] Based on OECD data, government support that could damage the environment amounts to more than $680 billion annually around the world, including subsidies for fossil fuel production and for consumption, and environmentally harmful agricultural support. After only two years, these subsidies have already cancelled out the $1,090 billion of green spending to be spent over multiple years.[166]

Combined with innovations in clean energy, sufficient funding for scale up, and other efforts to decarbonize the world's economies, natural climate solutions offer some of the best options in the response to climate change[167]. Nature based solutions often rely on the participation and inclusion of local communities and indigenous people and can enhance their agency. Examples include investing in green areas to reduce temperatures, improving water quality, and improving agricultural practices to ensure food security[168].

At the COP 27 climate talks in Egypt, the commitment to the Paris goals was reaffirmed and it was recognized that limiting global warming to 1.5 degrees Celsius requires rapid, deep and sustained reductions in global greenhouse gas emissions of 43 per cent by 2030 relative to 2019 levels. COP 27 resulted in the establishment of a Loss and Damage Fund to be financed by wealthy nations to help vulnerable countries cope with climate change-induced disasters.

Without achieving SDG 13, it will be close to impossible to achieve Agenda 2030. Limiting the human suffering from a warming planet will require transformational change in energy and economies.

SDG 14 – Life below water

Climate change, pollution, habitat destruction, public sector subsidies for harmful ocean economic activity [169] and overfishing still pose a threat to the ocean and are increasingly degrading the ocean's ability to regulate the climate and sustain livelihoods. Since 1970, there has been a global-scale decline in 14 out of 18 categories that measure the capacity of nature to "sustain contributions to good quality of life"[170]. In 1974, 10 percent of stocks were fished at "biologically unsustainable" levels; in 2019, that proportion had increased to 35.4 percent[171]. Notably, that rate of degradation has slowed over the last decade due to diverse efforts. The majority of landings (82.5%) come from biologically sustainable assessed stocks[172]. Global catches were reconstructed to include estimates of illegal, unreported and

unregulated (IUU) catches from 1950-2010. Over that time period, the reconstructed estimates were 53 per cent higher than recorded catches but importantly the proportion of IUU catches peaked in the 1990's and have fallen[173]. Discards have also declined from the 1990s are currently estimated at 10-12 per cent of unreported[174].

Despite improvements, there are still tremendous challenges. Nations with low levels of wealth and nutritional status that also depend on fisheries are affected more by climate-change impacts on fished species than by their own fishing practices, even as they contribute least to climate change. Those nations are in areas where there is a higher proportion of fished species at risk to climate change.[175] Several areas are also hotspots for marine heatwaves[176] which may further imperil their long-term food security. Small island developing states are highly vulnerable and would benefit greatly from a blue economy.

Funding allocations to SDG 14 globally remains lower than for any other SDG.[177] Indeed, four targets of SDG 14, related to marine protection and management, expired in 2020; the corresponding indicators show that most nations have made very little progress, which can be related to a lack of capacity, funding, and commitment[178]. Recently, written commitments to ocean sustainability provide a reason for hope, including a recent WTO agreement to reduce harmful fisheries subsidies, the new Global Biodiversity Framework (GBF), the 30x30 pledge by member nations to protect 30% of land and sea by 2030, and finally the UN High seas treaty to extend the 30X30 pledge to the High Seas, which are areas beyond national jurisdiction. These global level commitments to SDG aligned goals require the corresponding capacity and funding for full monitoring and implementation.[179].

SDG 15 – Life on land

Species are becoming extinct at unprecedented rates. Overharvesting of species, agricultural activities, logging and deforestation for agriculture are causing irreversible damage to the world's biodiversity. On current trends, between 1990 and 2030 the Red List Index of species survival will drop from 0.82 to 0.70 or lower. Only 32 per cent of countries are on track to achieve their national biodiversity targets. [180]

The poorest and the most vulnerable have traditionally relied on forests and small-scale fishing to supplement other lines of income, especially when facing loss of jobs and income related to the pandemic. Also land use change and degradation and resource-intensive consumption and production open up new pathways for infectious diseases. The pandemic recovery period and the COVID-19 recovery plans and stimulus packages offered an opportunity to change direction, but this has largely been missed. Five SDG 15 targets were to be met by 2020 but have come and gone with insufficient progress.

In a promising development though, the recent Convention on Biodiversity Conference of Parties (COP) 15 resulted in a landmark Biodiversity agreement that aims to avert planetary disaster. The Kunming-Montreal Global Biodiversity Framework includes 23 targets aimed at reversing biodiversity loss by 2030, including a target to protect 30 per cent of land and oceans by 2030 (30X30). Other targets include cutting global food waste by half and progressive phasing out or reforming by 2030 subsidies that harm biodiversity by at least $500 billion per year, while scaling up positive incentives for biodiversity conservation and sustainable use[181]. The Accelerator Partnership was also launched at COP 15 to help

countries fast track and upscale the implementation of their National Biodiversity Strategies and Action Plans[182].

The Convention on International Trade in Endangered Species of Wild Fauna and Flora COP 19 brought a record number of species to be regulated by it, to ensure that international trade in wildlife is sustainable, legal and traceable and does not aggravate biodiversity loss[183].

SDG 16 – Peace, justice and strong institutions

Progress on SDG 16 is threatened by rising levels of conflict, war and instability. Progress across the SDGs relies on peaceful and inclusive societies with access to justice for all and effective, accountable and inclusive institutions. These are especially important during times of uncertainty and crisis. Instead, when under strain they often deteriorate: the COVID-19 pandemic, for example, exacerbated existing socio-economic insecurity and inequalities that worsened violence and illicit activities – weakening rights and protection systems with severe repercussions for marginalized people. The recovery from COVID-19 has also been undermined in some cases by corruption in the allocation of resources for emergency equipment and health services.

During lockdowns there is less chance of detecting violence and abuse including against youth, older persons, women and the poor or of delivering assistance. Increases in unemployment rates also increased trafficking in persons, half of whom were trafficked for sexual exploitation or forced labour.

SDG 16 should be seen as an enabler for other SDGs – it is an important condition for successful pathways to sustainability.[184] On the other hand the absence of institutional capacity and continuing violent conflicts in many parts of the world severely constrain the achievement of the SDGs.[185]

SDG 17 – Partnerships for the Goals

SDG 17 is about strengthening the means of implementation to achieve all of the Goals and Targets including with sufficient access to science and technology, financial resources, fair and equitable trade and capacity for bringing about change. In the context of multiple crises, partnerships are strained as resources are redirected to crisis management and recovery efforts and protectionist policies may be appealing at home. For example, since the pandemic, much foreign aid has been directed towards immediate public health concerns. Total official development assistance (ODA) as a percentage of GNI reached 0.36 per cent in 2022 compared to 0.31 percent in 2021, reflecting aid for Ukraine and increased spending on refugees. But it still fell far short of the 0.7 per cent target needed to support investments in longer-term sustainable development.[186]

Foreign direct investment (FDI) dropped to a point lower than during the 2008 financial crisis in 2020 during the pandemic, but has since recovered to pre-pandemic levels with a large part of the recovery growth in renewable energy and energy efficiency investments.[187] Remittance flows registered a smaller decline due to COVID-19 than expected and recovered by 2021.[188] Despite these increases though, the scale of challenges to be addressed are leaving many lower-income countries fiscally strained.

Equally as important to financial resources are partnerships to build capacity and enable access to science and technology innovations that can be applied to accelerate SDG progress. The importance of knowledge and science partnerships was on full display during the pandemic with open sharing of genome sequencing data, open-source designs for personal protective equipment (PPE), preprint publishing of research articles and data sharing platforms. Knowledge sharing enabled the development of COVID-19 vaccines in record time. But then mechanisms for sharing broke-down - as of April 2023, 3 out of 4 people in high-income countries had received at least one dose of a COVID-19 vaccine while only 1 in 3 people in low-income countries had received at least one shot.[189]

SDG 17 calls for cooperation on and access to science, technology and innovation including through a global technology facilitation mechanism. In the context of multiple crises with impacts felt across the globe, strong mechanisms for cooperation and knowledge partnerships are all the more crucial. Creating synergies among the expertise and resources in different regions and institutions would allow for more efficient and equitable SDG attainment than working in silos.[190]

Regional trends in SDG implementation and progress

Globally, there has been slow progress towards the SDGs but there have been variations between global regions.

Europe – Europe is further away from attaining the 2030 Agenda today than it was a year ago, with a lower number of SDG targets that are on track to be achieved, though the data do not reflect the impact of the Ukraine war[191]. Even before the war in Ukraine and the COVID-19 pandemic, Europe was facing a number of challenges to sustainable development. Many countries had seen rises in income inequality and were not making sufficient progress on nutrition or sustainable food supplies. There had been improvements in access to services, such as drinking water and energy, but access to sanitation was lagging, and water quality and water-use efficiency require greater attention. On a positive note, Europe's green transition is well under way, with more renewable energy and increases in energy efficiency. But to achieve the SDGs by 2030, the pace of the transition must quicken, with a drastic cut in fossil fuel consumption. Infrastructure development for the green transition should continue, with additional investments and increased collaboration. The region also needs to increase gender equality, for example in reducing gender pay gaps, increasing the share of women in management positions, and reducing domestic violence.[192]

Asia and the Pacific – The region has progressed in some areas including access to energy, but has regressed in others, notably climate action and responsible consumption and production. With rapidly rising energy demands, the region has struggled to accelerate the transition to clean energy, and during 2020 and 2021 there was increasing investment in coal production.[193] COVID-19 caused major setbacks on poverty eradication particularly in South Asia. Additionally, 9.1 per cent of Asia's population faces hunger. [194] With global climate change exacerbated, the recent food and energy crises intensified inflation, adversely affecting vulnerable groups and resulting in severe socioeconomic consequences. The need to transform the energy and food systems in favour of a more inclusive, sustainable and resilient recovery is therefore crucial in the region[195]. Meanwhile, conflicts are increasing energy costs, disrupting trade and supply chains, and causing serious damage

to tourism. Moving forward will require greater investment in sustainable and greener pathways to social and economic development.

Africa – Prior to the pandemic, there had been some progress in poverty reduction, maternal and child health, access to electricity, and gender equality. Overall, however, SDG achievements were too slow. [196] In Sub-Saharan Africa the rate of extreme poverty is projected to continue rising through to 2030. Many countries in the region are now deeper in debt, further increasing economic vulnerability.[197] Around 20 per cent of the region's population faces hunger, 22 per cent lack a basic drinking water service and 54 per cent lack basic sanitation services, exacerbating inequalities between urban and rural areas, wealth quintiles, and gender [198]. Addressing this problem will require targeted efforts and greater contributions of ODA. The effective management of debt, as well as the reinforcement of strong domestic institutions and the localisation of sustainable development, will be key to achieve Agenda 2030 in Africa[199]. At the same time, Africa could use COVID-19 recovery as a springboard to invest in human capital and unlock the potential capacity of its young population and build toward greener and more resilient infrastructure and industry. [200]

Latin America and the Caribbean – This is the region most heavily affected by the COVID-19 pandemic – a consequence of its large informal sector and unequal access to vaccines. The pandemic slowed economic activity, especially tourism, and reduced inflows of foreign direct investment. Particularly exposed were workers in the informal sector who cannot rely on social safety nets.[201] Most students have lost more than a year of classroom schooling. Women have suffered from increases in gender-based violence and from the unequal distribution of care work. The natural environment has also suffered from illegal destruction of marine and terrestrial biodiversity.[202] Slow growth in the ten years from 2014 to 2023 already contributed to the undermining of many of the Sustainable Development Goals, putting many of these targets off-track and in danger of not being met. Both the economic slowdown and recent shocks are exacerbating this issue[203]. Economic progress continues to be hindered by structural problems including inequality, poverty and low investment and productivity.[204]

Western Asia – In the Arab region, the COVID-19 pandemic and weak access to vaccines exacerbated existing structural barriers to achieving the SDGs. Vulnerabilities were further heightened by the war in Ukraine and associated food and energy crises, high fuel prices and tighter restrictions on access to finance.[205] During the pandemic, the Arab region was particularly affected by falling oil prices: in early 2020, the region lost nearly $11 billion in net oil revenues and declining oil exports.[206] With high dependence on imports, there are concerns about food insecurity. Water stress is a growing concern in the region, as many countries are withdrawing all their renewable water resources (100 per cent) or even rely on nonrenewable resources (up to 1000 per cent) to meet their water needs, that will eventually run dry[207]. Countries in conflict have seen disruptions in humanitarian aid – a major concern for millions of refugees and internally displaced persons.[208] This has led to increases in hunger, unemployment and poverty. At the same time, these crises could motivate governments to expand social protection, strengthen cohesion and coordination among different parts of government, and support green transformations of industry and infrastructure. The private sector, together with government, donors, and other partners, can play a key role in achieving the SDGs by 2030[209].

Countries in special situations – The countries most vulnerable to the persistent and acute crises shaping SDG outcomes are the least developed countries (LDCs), landlocked developing countries (LLDCs), and small island developing states (SIDS). COVID-19 had deep impacts in LDCs due to weak health systems, gaps in social safety nets, and insufficient resources [210] Despite efforts of COVAX to ensure global access, recovery has been slowed by lack of access to vaccines and vaccine hesitancy. With the current food, energy and the cost-of-living crisis, the risks of poverty and hunger in LDCs are intensifying. In LLDCs, SDG progress has been hampered by broken supply chains and less access to international markets. These countries are also very exposed to climate change effects – to drought, desertification, land degradation or the melting of glaciers. During the pandemic, SIDS struggled with the sudden disappearance of tourism which caused serious drops in economic growth. In 2020, the SIDS GDP dropped by 6.9 per cent compared with 4.8 per cent in other developing countries.[211] Countries struggle to address long-term concerns over rising debt and vulnerabilities to climate change, while also addressing immediate needs.

All these challenges are compounded by conflict. Countries in special situations are more likely to be net importers of energy and food supplies, increasing their vulnerabilities to global price shocks.[212] The cost of food imports in LDCs grew by 27 per cent in 2020 and 2021.[213] Due to the pandemic, global trade fell by 9.6 per cent while in LDCs the loss was 12 per cent, resulting in further breaks in supply chains. These issues are likely to be exacerbated by transport and trade cost increases due to the conflict in Ukraine.[214]

Fixed Goals for a world in flux

Multiple crises in recent years have meant that we are far off track on meeting the SDGs by 2030. Importantly, however, societies were on unsustainable development trajectories before these crises, indicating the need for transformative change. Without renewed efforts and ambitious action, the situation is dire. Particularly at risk are the Goals that have consistently been moving in the wrong direction like reducing hunger, curtailing global GHG emissions, ending the deterioration of coastal, inland and ground waters, and reversing the loss of biodiversity. Countries will also need to pay special attention to increasing poverty and hunger as well as gender inequality. For the second half of Agenda 2030 and in light of the war in Ukraine it is clear that progress, once attained, is not guaranteed. Goals remain vulnerable to further shocks, political or economic, or natural disasters including pandemics. Thus, progress towards the SDGs has to focus on both resilience and acceleration.

Chapter 2: Framing the future

Progress to date, at the halfway point of the 2030 Agenda, is far off track and projections show that the world will not achieve the SDGs by 2030. However, the future is not given and there is ample room for Member States of the United Nations, local government, business and other actors to take action to prepare for and shape the future – up to 2030 and beyond. This chapter looks forward at the changing context for sustainable development at the halfway point of the 2030 Agenda. It highlights important trends and conditions that will deeply affect prospects for meeting the SDGs. It reviews how SDG action and governance, while so far not showing visible results on Goal achievement, is taking root and how the SDGs offer a robust and broadly supported framework for sustainable development. Finally, it reviews new knowledge about sustainable pathways that the SDG framework has unlocked: understanding interlinkages between goals, and international spillover effects.

In the Anthropocene age humans have, for better or for worse, become the dominant geological force on the planet. Human ingenuity, resolve and commitment have enabled millions more people to live longer, healthier, and fulfilling lives. But since the industrial revolution, economic and technological progress has come at the cost of ecological destruction, and an existential threat from climate change.

To help policymakers and other actors move in the most productive ways, this chapter looks as the medium- and long-term context for achieving the SDGs, and the extent to which governments and others have taken up the SDGs to establish the long-term context for action. It then examines the latest science on how the SDGs interlink, and what we know about international spillovers related to SDGs. Although countries are at different stages of development and have their own needs, priorities, and challenges, universal science-based tools can be adapted and applied to different contexts to address common barriers and impediments and accelerate transformation towards the SDGs.

Dynamic conditions shaping SDG achievement

While dealing with immediate crises leaders and stakeholders must at the same time consider medium- and long-term developments and trends that are having a systemic effect across the SDGs and which, if unaddressed, could undermine current and future progress. Those considered in the following section are climate change, biodiversity and nature loss, digitalization, demographic change, and inequality. Other significant influences include the state of democracy and rule of law, and dangers of social disintegration, the development of artificial intelligence and deep-learning technologies, along with changes in consumption, production, and globalization, and the opportunities for financial and technical assistance.

Climate change

The global mean temperature in 2022 is currently estimated to be about 1.15°C above the 1850-1900 pre-industrial average and the world is on a trajectory toward two to three degrees warming in the next century.[215] Today's emission levels will leave young and future generations with greatly diminished carbon budgets within which to meet their own development goals.[216]

This trend means that the SDGs will have to be achieved, and progress maintained, in a significantly warmer world and with the prospect of extensive loss and damage. [217] All countries will need to make changes, particularly those with very high per capita emissions. All development must become more climate-resilient and adaptation measures must be significantly scaled up and enhanced to bridge the current 'adaptation gap'. Actors need to seek to avoid 'maladaptation', and to address 'loss and damage' due to climate change. There are many limits to adaptation, soft or hard.[218] Soft limits are those when no solutions appear feasible, but might become available in the future, in coastal floodplains for example, and in places exposed to extreme heat. Hard limits are reached when adaptive actions are ineffective and there are no additional options, as with the loss of coral reefs, coastal wetlands, rainforests, polar and mountain ecosystems.[219] Mitigation measures and low-carbon innovation must also increasingly account for a changing climate, through developing integrated approaches. Fortunately, there are synergies and co-benefits for many SDGs by taking action on mitigation and adaptation, that can lead to 'triple wins' under carbon-neutral, climate-resilient development pathways.[220]

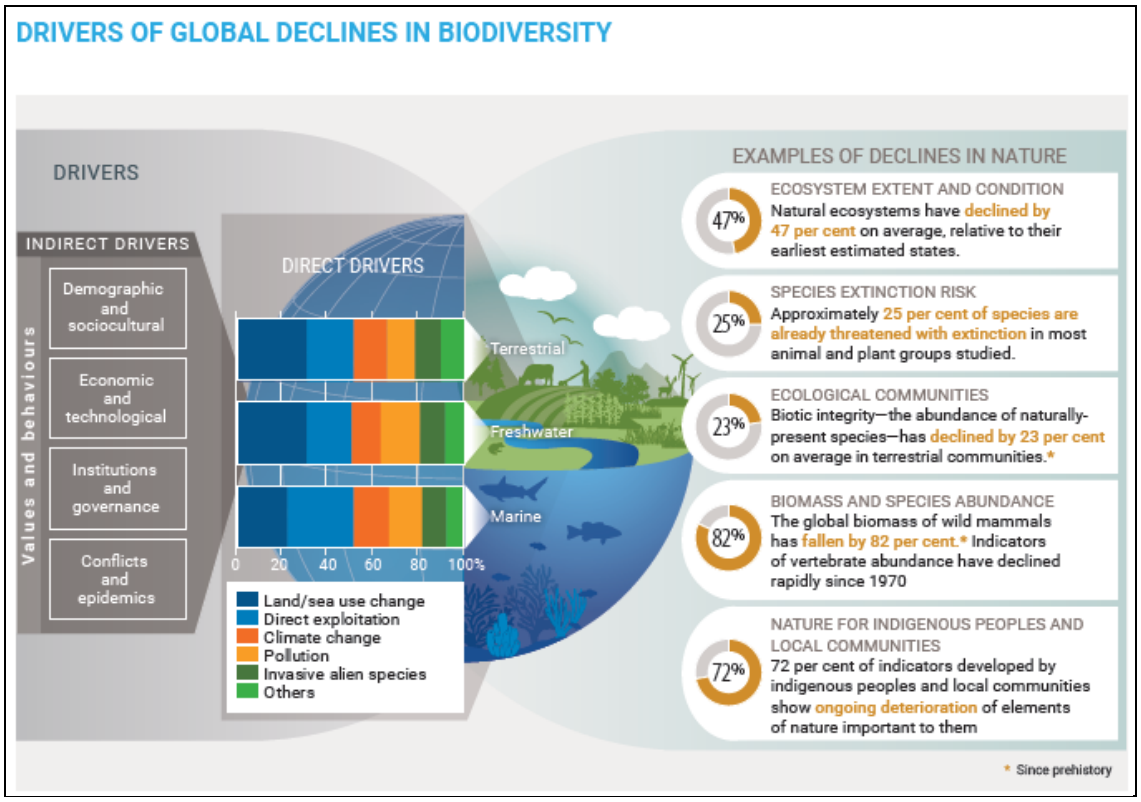
With momentum for decarbonization, the climate transition must be managed well to ensure that it is just, equitable and orderly. Vulnerable groups must be protected and economic diversification is needed to avoid disruption and high exposure to 'stranded assets'. Actively seeking synergies and co-benefits with other SDGs may serve to build social acceptance for climate transition measures, such as fossil fuel subsidy reform.

Biodiversity and nature loss

Over recent decades, increases in production and consumption have been accompanied by a serious loss of biodiversity and degradation of nature – human activities have altered 75 per cent of the world's land surface and 66 per cent of ocean areas (

Figure 2-). More than 85 per cent of wetlands have been lost. About 25 per cent of all assessed plant and animal species, around one million, face extinction, with amphibians particularly at risk.

Figure 2-1: Drivers of global declines in biodiversity



Source: IPBES, 2019

This loss of biodiversity has huge implications not just for the natural world but for human health and wellbeing.[221] Genetic diversity enables crops and livestock to adapt to changing environmental conditions and provides resilience against diseases, pests and parasites. According to the World Economic Forum, in 2019 nature supported around half of global GDP, especially in construction, agriculture, and the food and beverage industries. Unless countries stop degrading nature, the achievement of any SDGs will be short-lived. But from integrated approaches like nature-based solutions, action taken to protect and restore nature can have multiple benefits across many SDGs[222].

The digital transformation

Digitization is the process of converting analogue information into a digital format so that it can be electronically stored, processed, managed, and transmitted – for example, the conversion of analogue music to MP3 files. A related term, digitalization is the process of using digital technology and data to improve business processes, models and productivity. Both digitization and digitalization feed into the broader societal change that is 'digital transformation' – a new development paradigm that incorporated many disruptive technologies including faster connectivity and networks, Artificial Intelligence (AI), the manipulation of big data, and the Internet of things.[223]

The digital transformation has already brought profound social benefits with opportunities to build more inclusive societies. Digitization can make essential goods more affordable and help diversify to cleaner energy production and water supplies. [224] [225] [226] Human beings can now process and store massive amounts of information and study and shop online.

Digitalization enables different groups to work together through low-cost communication systems. Digital systems for the provision of government services (e-government) allow users easy access to social protection programmes and benefits such as maternity care, child subsidies, pensions, and housing and food allowances; and can enable dynamic responses and service provision during crises like the COVID-19 pandemic.[227] They can also target people living in poverty, persons with disabilities, older individuals, immigrants, women, and youth.

Moreover, digitization can improve the urban environment. Policymakers and other stakeholders can gather data to improve city management. And rather than using cars, city dwellers can telecommute saving energy and reducing carbon emissions.[228] They and people living in peri-urban and rural areas can install smart-energy saving home control systems. They can also improve access to health care through teleconsultation services.[229] Likewise, digital technologies are useful for spatial planning. In the ocean, for example, technologies such as remote sensing, artificial intelligence, and machine learning are already providing valuable data for marine spatial planning. In short, digitalization can help bring visibility to important issues by making things measurable; it can help identify where people are left behind and what types of resources are needed.

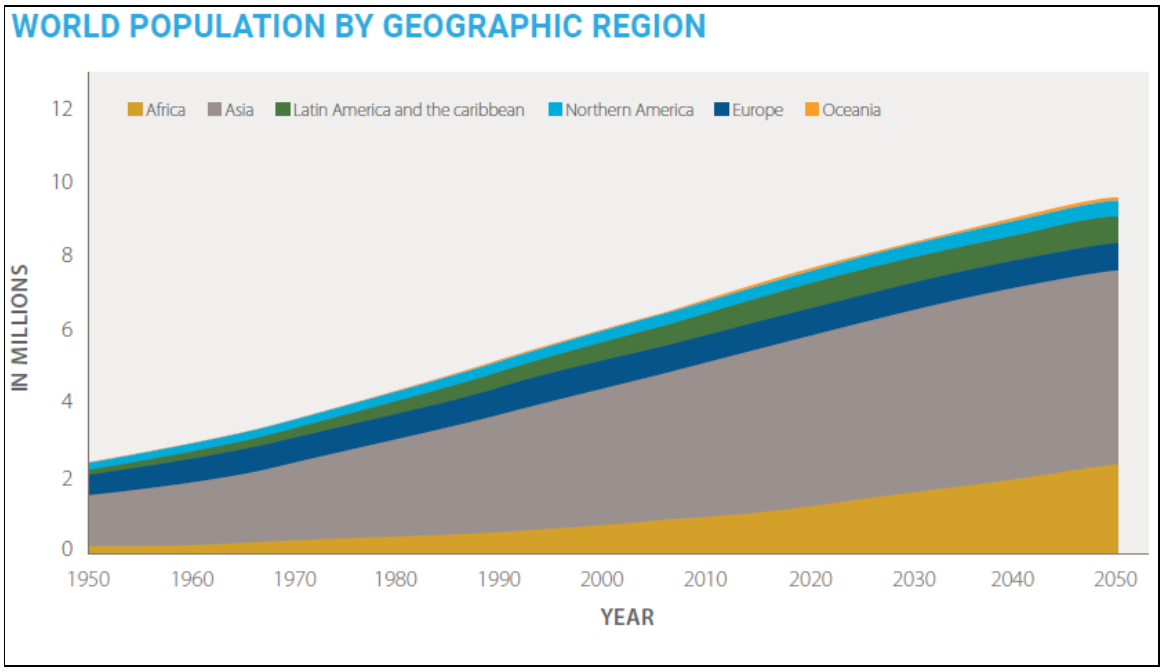
However, the benefits of digital transformation to communities and individuals have been uneven. Over 60 percent of the world's population is now online, but fewer women than men have access, and access is much higher in high-income than in low-income countries. In LDCs, fixed broadband has only 1.4 subscriptions per 100 inhabitants.[230] As education, work, and public services move onto digital platforms, divides in access to crucial services could deepen. In addition, while the increasingly sophisticated and powerful digital transformation provides new opportunities to reach the SDGs, risks such as the misuse of AI to spread misinformation or inaccuracies should be carefully addressed. Potential legal and ethical issues around privacy, as well as data collection and biases that tend to be built into machine learning technologies, also require attention.[231]

Demographic change

Global population continues to grow, albeit at a slower pace than in previous decades (figure 2-2). Since the turn of the century, annual global population growth has fallen from 1.3 to 1.0 per cent. In 2022, world population reached the milestone of 8 billion; by 2030, that number is set to reach 8.5 billion.

More than half of the world's population are in just seven countries: India, China, United States of America, Indonesia, Pakistan, Nigeria, and Brazil. By 2050, around half of world population growth will come from nine countries – Democratic Republic of Congo, Ethiopia, Egypt, Nigeria, United Republic of Tanzania, Pakistan, India, and the Philippines. By the end of 2023, India's population will exceed 1.43 billion people, overtaking China as the most populous country in the world. On the other hand, most countries in Europe, North and South America and Eastern Asia have annual population growth rates below one per cent, or even declining.[232]

Figure 2-2: Projected world population by geographic region



Source: 2022 Revision of World Population Prospects

In addition to considering population size, a long-term perspective on SDG action must consider population age structures, fertility rates, ageing and rural-urban distributions – all of which have important implications for the SDGs. For example, countries that reduce their fertility rates rapidly can benefit from a 'demographic dividend', which is a temporary economic phenomenon resulting from a favourable age-structure of fewer young dependents relative to people in the economically productive ages. If countries take advantage of this temporary phase by investing in the wellbeing and capabilities of their workforces, along with economic reforms and increasing investment, this can yield huge economic benefits.[233, 234 235 236]

Another major demographic change is population aging. Many East Asian countries, including Singapore, Republic of Korea and China, and most countries in Europe, now have fertility rates below the replacement level of 2.1. births per woman. At the same time people are living longer; the life expectancy at birth has increased by an average of about five years since 1990. The outcome is 'ageing societies' with fewer workers supporting an increasing population of older dependents – an imbalance that makes it more difficult to finance social protection and can dampen economic progress.

A third major demographic trend with implications for the SDGs is urbanization. In this case the pattern differs between developing and developed countries. Developing countries typically have lower levels of urbanization, and their cities are still expanding with the arrival of urban migrants but often without concomitant expansion of housing and basic water and sanitation services. The developed and emerging economies, on the other hand, typically have high levels of urbanization, with long-established cities that are relatively complete and close to saturated, with wide coverage of infrastructure and services. However, if they

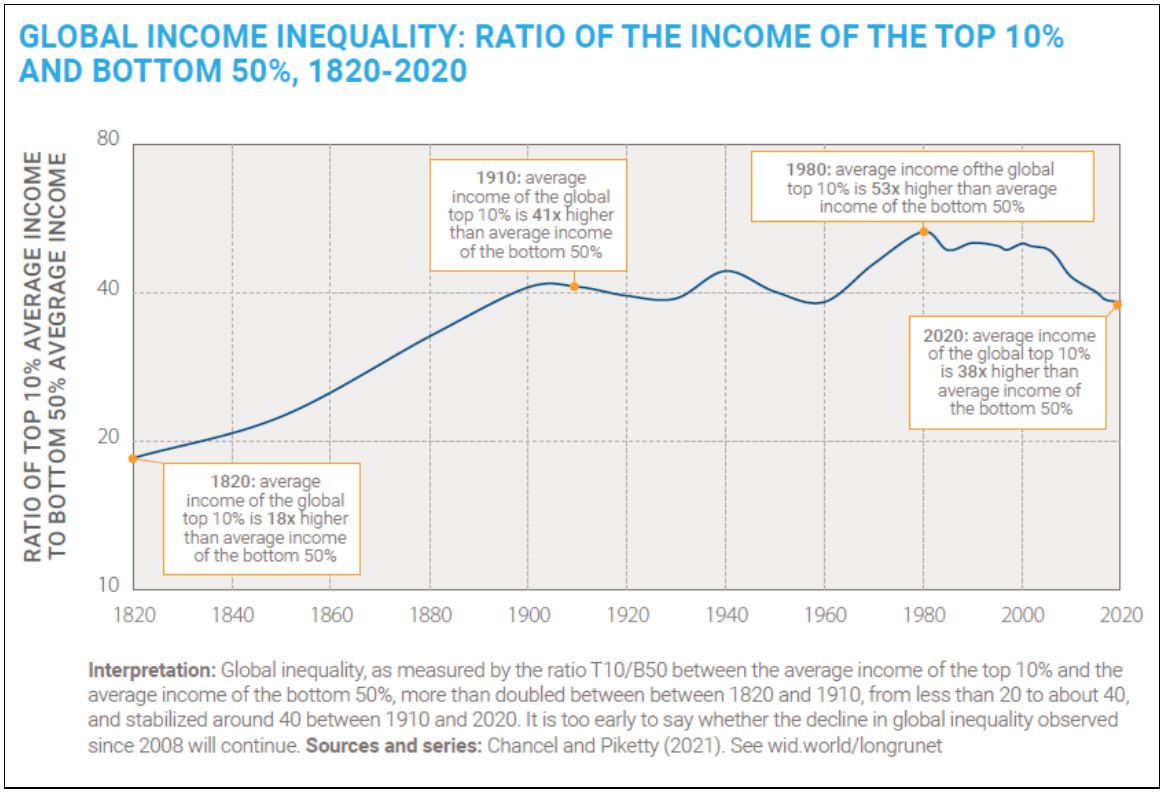
are to survive as liveable spaces, well established cities must continuously renew their built-up environments and boost the productivity of their industries and services. [237]

Economic inequality

Inequality in the distribution of resources and opportunities features in many aspects of human life but the most commonly measured dimension is inequality in income. Over the past two decades, income inequality has increased within most countries while global inequalities between countries have declined. Today, income inequality is as high as it was at the start of the 20th century (Figure 2-3). The richest 10 per cent of the global population takes 52 per cent of global oncome, while the poorest half earns 8.5 per cent of it.[238]

Recent shocks including the COVID-19 pandemic have pushed inequality higher. The Global Gini coefficient increased by about 0.5 points from 2019 to 2020.[239] Given that many low-income countries are in fragile situations, facing high inflation and debt distress, between country inequality could begin to widen.

Figure 2-3: Global income inequality, ratio of top 10 per cent to bottom 50 per cent, 1820-2020

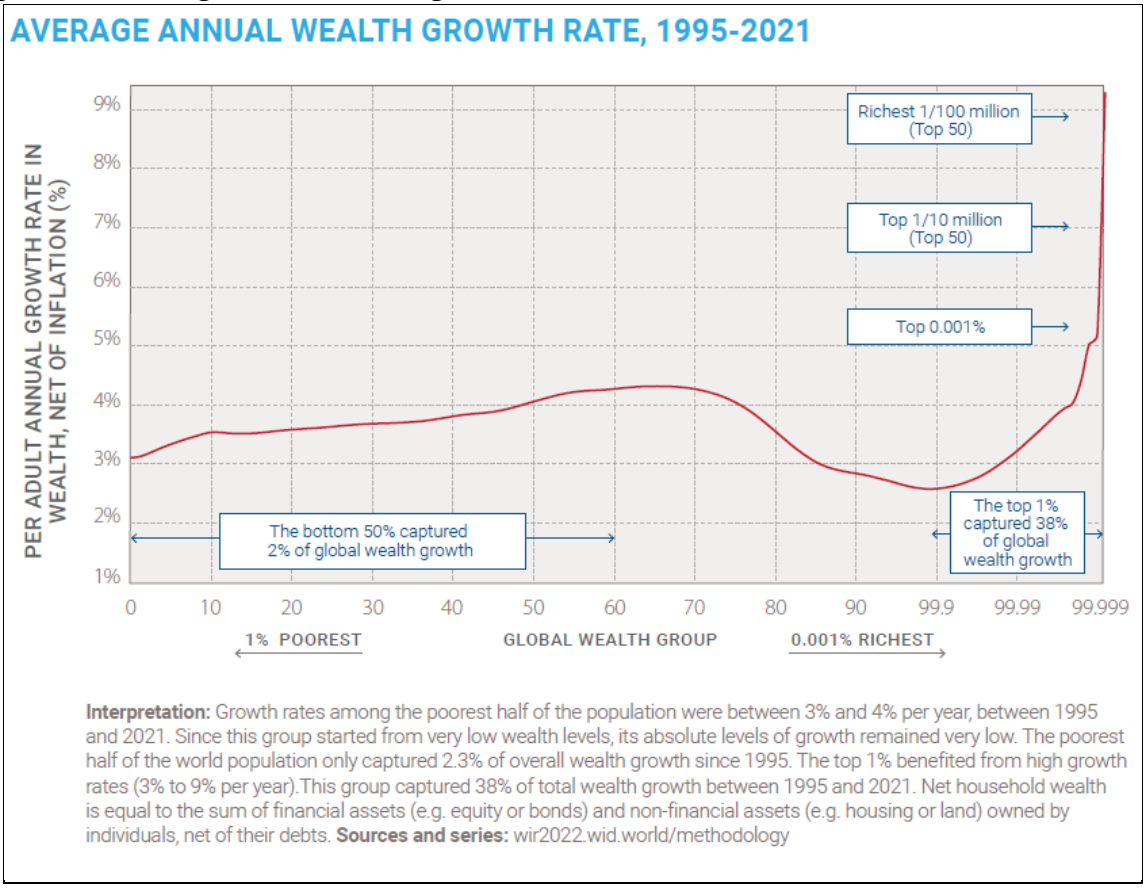


Source: World Inequality Report, 2022

Less easy to measure, but potentially more impactful in shaping life opportunities and outcomes for individuals and groups; wealth inequality has been increasing starkly in recent years (figure 2-4). The richest 1 percent globally captured nearly two-thirds of all new wealth worth $42 trillion created since 2020. This comes on top of a decade of historic gains. The number and wealth of billionaires has doubled over the last ten years.[240] In addition, in some parts of the world private wealth is increasing faster than public wealth

with implications for public spending on SDG implementation or tackling crises impacting the public at national or global levels whether climate change or conflict or threats to public health.[241]

Figure 2-4: Average annual rate of growth in wealth, 1995-2021



Source: World Inequality Report, 2022

Some groups are also faring much better than others. The World Inequality Report 2022 estimates that women's share of total income from work (labour income) is around 35 per cent when it should be 50 per cent in a gender equal world, and has not changed in the past three decades.[242] On the other hand, girls and women bear the brunt of unpaid care and domestic work, creating large gender inequality for unpaid care work. Many of the inequality indices rely on estimates from a limited number of countries and/or modelled data. More high-quality data are needed for better tracking of within-country and gender inequalities.

SDG 10 aims to reduce inequalities within and between countries. But inequality also has serious consequences for the achievement of many of the other SDGs. Unequal societies tend to be less environmentally sustainable with higher social tensions. There is also the danger of elite capture of government that weakens public policies, as well as the loss of public resources through tax evasion, with wealth transferred out of the country to tax havens. Considering that inequalities can generate unrest, violence and conflict; there are also strong synergies to be leveraged between reducing inequality and furthering progress toward peaceful communities.

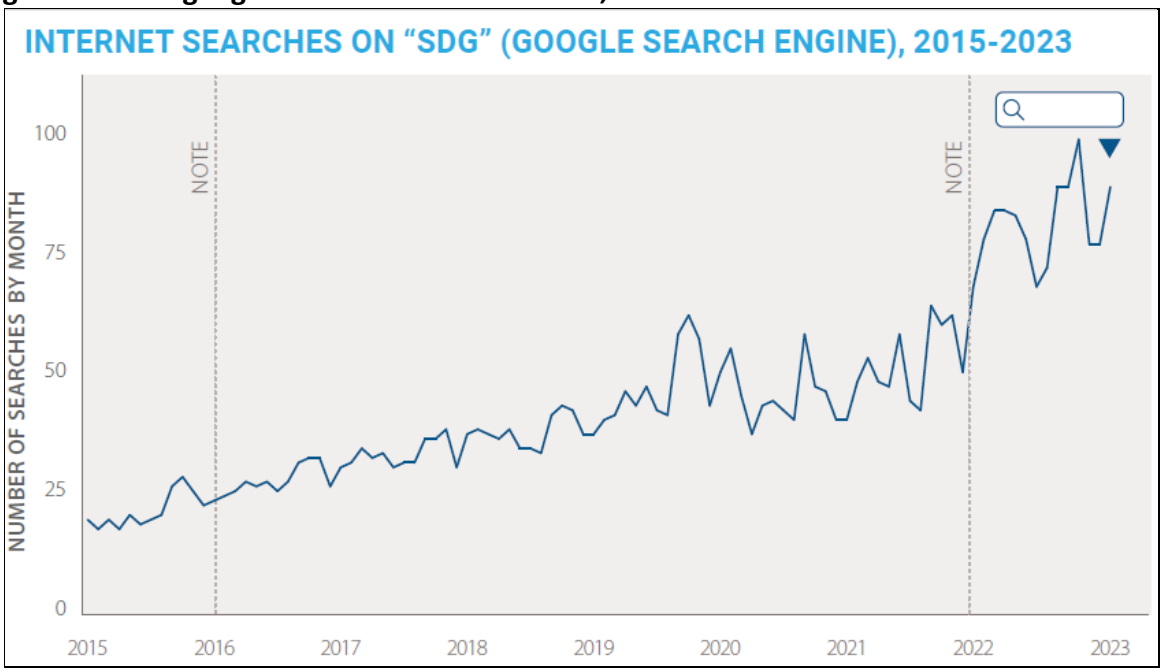
Greater awareness and uptake of the SDG framework

While many conditions and circumstances are making it more difficult to attain the SDGs, in some respects, the prospects for achieving the Goals have improved. More people and organizations have learned about the SDGs and support them. And governments and other institutions are integrating the SDGs into existing legislation and frameworks.

Knowledge and awareness of SDGs

Over time, the public has become more aware of the SDGs and are thus in a better position to press governments and businesses to support them and put pressure on companies to operate more sustainably. [243] One indicator of increasing awareness and general interest in the SDGs is the number of times they appear in Internet searches (Figure 2-5).

Figure 2-5: Googling 'SDGs' - interest over time, 2012-2021



Source: Google Trends (https://trends.google.com/trends/

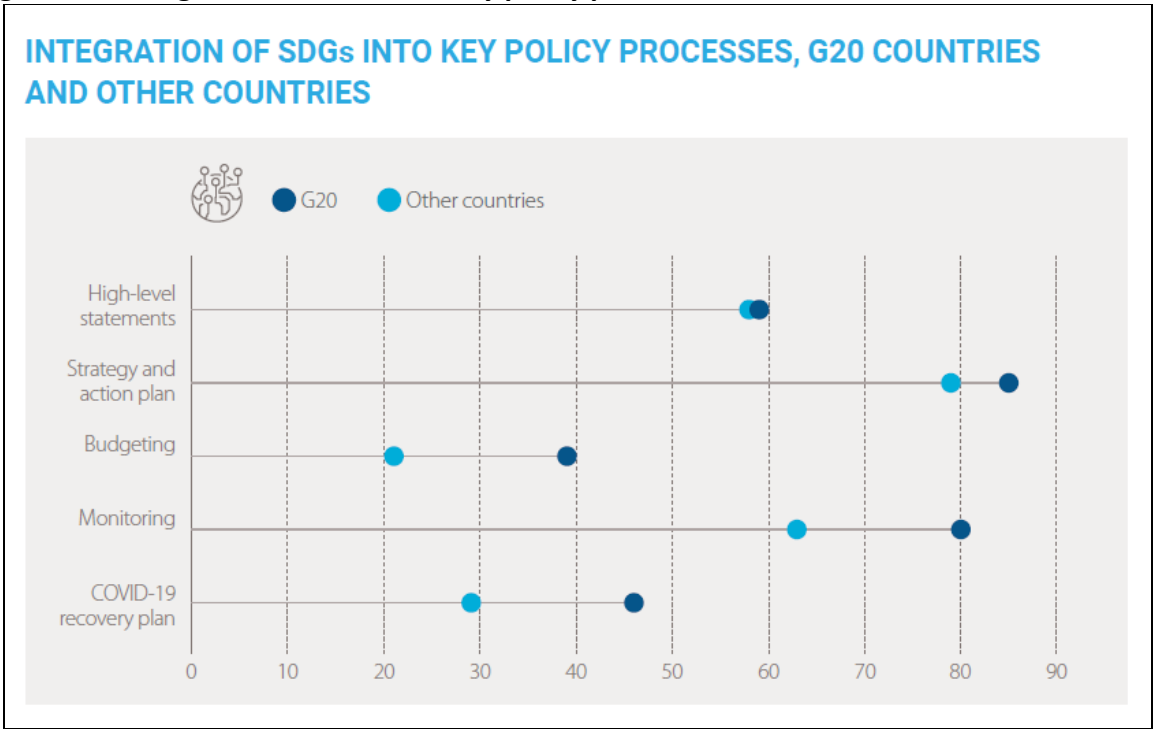
Note: Interest over time represents Google searches for 'SDGs' as a proportion of all searches. It does not show the absolute proportion, but rather the trend over time as a percentage of the maximum achieved. For the SDGs, the maximum proportion was reached in March 2021 which is the value set at 100. Thus since 2015 the interest by this measure has roughly quadrupled.

Knowledge about the SDGs is further demonstrated in opinion surveys, though as yet there are no data for a time series. In 2019, one survey of 27,000 people in 174 countries found that almost half of respondents were aware of the SDGs; respondents considered the three most important Goals to be SDG13 (climate action), SDG3 (health) and SDG 4 (education). [244] In 2021, a survey of 20,000 respondents in 28 countries found that the three priority Goals were SDG2 (hunger), SDG1 (poverty) and SDG3 (health), but when it came to achieving the Goals more than half of respondents thought their governments were taking less than their share of responsibility.[245] In addition, as indicated in Chapter 4, there has been substantially more academic research. Researchers, funders and academic institutions are increasingly using the SDGs to frame their research, teaching and societal outreach strategies. The SDG framework has inspired much new science, and there is a wealth of SDG-related knowledge and evidence to draw on.

Aspirations, commitments and partnerships

Likewise, broad support can be found when it comes to aspirations and new initiatives from many actors. A recent survey of 60 countries showed that by 2021, 75 per cent of governments had developed SDG strategies and action plans, though this did not show levels of resources and responsibilities for implementation (figure Figure 2-6).[246] G20 countries on average have been less ambitious than other countries despite representing the majority of the world's population and income. The same survey indicated that over half of the sample countries had official speeches by the head of government mentioning the SDGs. Another indicator of SDG commitment is the setting of nationally adapted targets as has happened in Denmark[247], or developing a national level Sustainable Development Act or Law as the case in Canada or the Republic of Korea.[248,249,250,251] Finally, some countries and regions have integrated SDGs in their high-level development strategies: China incorporated the SDGs in its 13th and 14th Five Year Plan and 2035 development targets[252] and the African Union has linked the SDGs with its Agenda 2063.[253]

Figure 2-6: Integration of SDGs into key policy processes, G20 and other countries



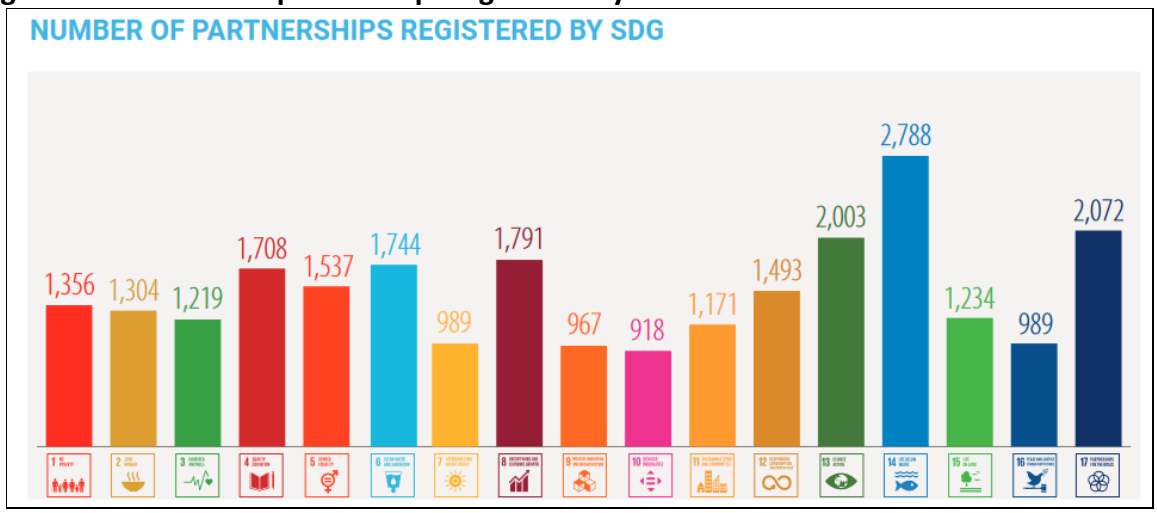
Source: Sachs et al. (2022a) Sustainable Development Report 2022: From Crisis to Sustainable Development

Local governments have been particularly active in engaging with the SDGs. Local governments have legal and fiscal responsibility for a number of SDG targets and can be more resilient and politically sustainable with stakeholders recognizing mutual interdependence and to the value of shared problem-solving.[254] These include, for example, the Local 2030 Coalition, SDG Cities hosted by UN-Habitat, the OECD Roundtable on Cities and Regions, and the ICLEI Local Governments for Sustainability network. The number of Voluntary Local Reviews (VLRs) has grown steadily[255]. Civil society organizations have also been strengthening communities and voices and holding others accountable.[256] In addition there have been SDG commitments and pledges from the private sector, – as with the Science-Based Targets initiative bring businesses' emissions reduction targets in line with climate science, further spurred on by the global net zero emission objective and targets for

other environmental goals. And voluntary reporting of ESG metrics (Environmental, Social, Governance) has skyrocketed in recent years rising from 35 per cent of firms in the S&P 500 releasing reports in 2010 to 86 per cent in 2021.[257]

Beyond promises by individual governments and organizations, there have also been voluntary commitments through new, multi-stakeholder partnerships. The UN partnership platform has registered over 7,700 partnerships across the SDGs representing concrete measures for different groups to work together to achieve the 2030 Agenda (Figure 2-7).[258]

Figure 2-7: Number of partnerships registered by SDG



Source: https://sdgs.un.org/partnerships, accessed June 6 2023. Some partnerships involve more than 1 SDG.

SDG integration into decision-making

Aspirations and commitments have to some, but limited extent been translated into institutional mechanisms by integrating SDGs into existing legislation and frameworks. By 2022, most countries in a survey of 60 had a lead unit or agency responsible for the SDGs, though less than one-third of these were at the centre of government.[259] Only a few countries, such as Bangladesh, Denmark and Germany, set national SDG targets, per paragraph 55 of the 2030 Agenda.[260],[261],[262],[263] A review of 137 Voluntary National Reviews (VNRs) submitted between 2016 and 2019 collected self-reported SDG scores on five criteria – political leadership, horizontal coordination, vertical coordination, variable horizontal accountability, and societal participation and social accountability. Only three countries had the highest score across all criteria. Countries tended to perform best on horizontal coordination by having more than two line ministries represented in the SDG body, and on political leadership by having this body led by the centre of government. Scores tended to be low on vertical coordination and accountability.[264] A review in Latin America showed that ten countries had created new institutional arrangements such as commissions or councils, and six countries had reformed existing institutions.[265]

There is substantial scope for integrating the SDGs more strongly and consistently in measurement and policy impact assessments across sectors.[266] For example, the EU Impact Assessment Guideline and Toolbox refers to the SDGs and their indicators for assessing the impact of proposed legislation.[267] It does take time for institutional innovations to have effect though, and so far, there is not strong evidence that the SDGs have improved policy

coherence. Often governments are not providing adequate mandates or resources and lack the political will to face difficult trade-offs or choices for long-term sustainability and instead cherry-pick among Goals in line with prior agendas.[268]

Similar weaknesses exist at the local and regional government level, but there is some evidence of innovation.[269] Malmo in Sweden and several cities in Japan for example, have formed administrative units to integrate participatory policymaking for the SDGs.[270] Shimokawa city in Japan created a Shimokawa Version of the SDGs, with a future-oriented policy package.[271] And in Accra, Ghana, an SDG investment fair was organized to encourage private investments in the SDGs.[272]

International organizations and institutions too have widely adopted the SDGs and aligned their policy agendas accordingly. [273] For marine plastic waste, for example, the United Nations framed this as an issue not just for SDG14 but also of SDG12 and aimed to involve the waste management community.[274] Institutional changes have been more extensive and rapid compared with the Millennium Development Goals, but global sustainability governance is still quite fragmented with mandates, practices and resource allocation in international organizations remaining fragmented in some cases relative to the integrated nature of the SDGs.[275]

The private sector has increased its engagement through, for example, SDG-aligned business strategies and business sector targets and roadmaps, corporate sustainability programmes, public-private partnerships, and impact-investing. [276] It is still difficult to assess private sector contributions and to detect 'SDG-washing' for example through initiatives that have little to no actual impact on SDGs.

A key feature of governance and institutions for the SDGs is inclusiveness. In Brazil, the National Commission for the SDGs includes substantive participation from non-state actors – similar to Finland's National Commission. Overall, however, while there have been efforts to instil the 'leave no-one behind' principle in governance, in practice countries are still failing to target marginalized groups.[277]

Overall, awareness and uptake of the SDGs as a guiding framework is taking root, but not yet at the level that leads to visible results on goal attainment. In the second half of Agenda 2030, actors can integrate the SDGs into their core decision-making processes and institutions more and strengthen the accountability for making progress.

Interlinkages between the SDGs and international spillovers

Addressing challenges such as climate change, biodiversity loss, and rising inequality requires balancing environmental, social, and economic objectives. The 2030 Agenda offers a comprehensive framework to think about these challenges in a systematic and integrated way. Although the SDGs are defined individually, their design clearly includes many interlinkages and spillovers. Indeed, the 2030 Agenda states that the SDGs should be treated as an integrated and indivisible whole. Science has responded enthusiastically in identifying, characterising and quantifying these interlinkages, with substantial progress since 2019. This section reviews the most up-to-date science published between 2019 and 2022 on how deeply interconnected the SDGs are, including through transborder connections, and what this means for SDG action (for further detail, see Appendix 1).

The interlinkages between the SDGs work in different ways. Some interlinkages involve trade-offs, as when carbon offsetting projects can threaten local livelihoods. Others are synergistic, as when better education for women, for example, improves child health (Box 2-1 includes additional examples). Understanding SDG interlinkages enables governments to prioritize and leverage the impacts of SDGs and targets that have strong synergistic or systemic effects across all Goals. Knowledge about interlinkages also makes it possible to account for and manage actions to achieve SDGs and targets that may involve conflicts and trade-offs, through compensatory measures.

Box 2-1: SDG synergies and trade-offs linked to clean energy

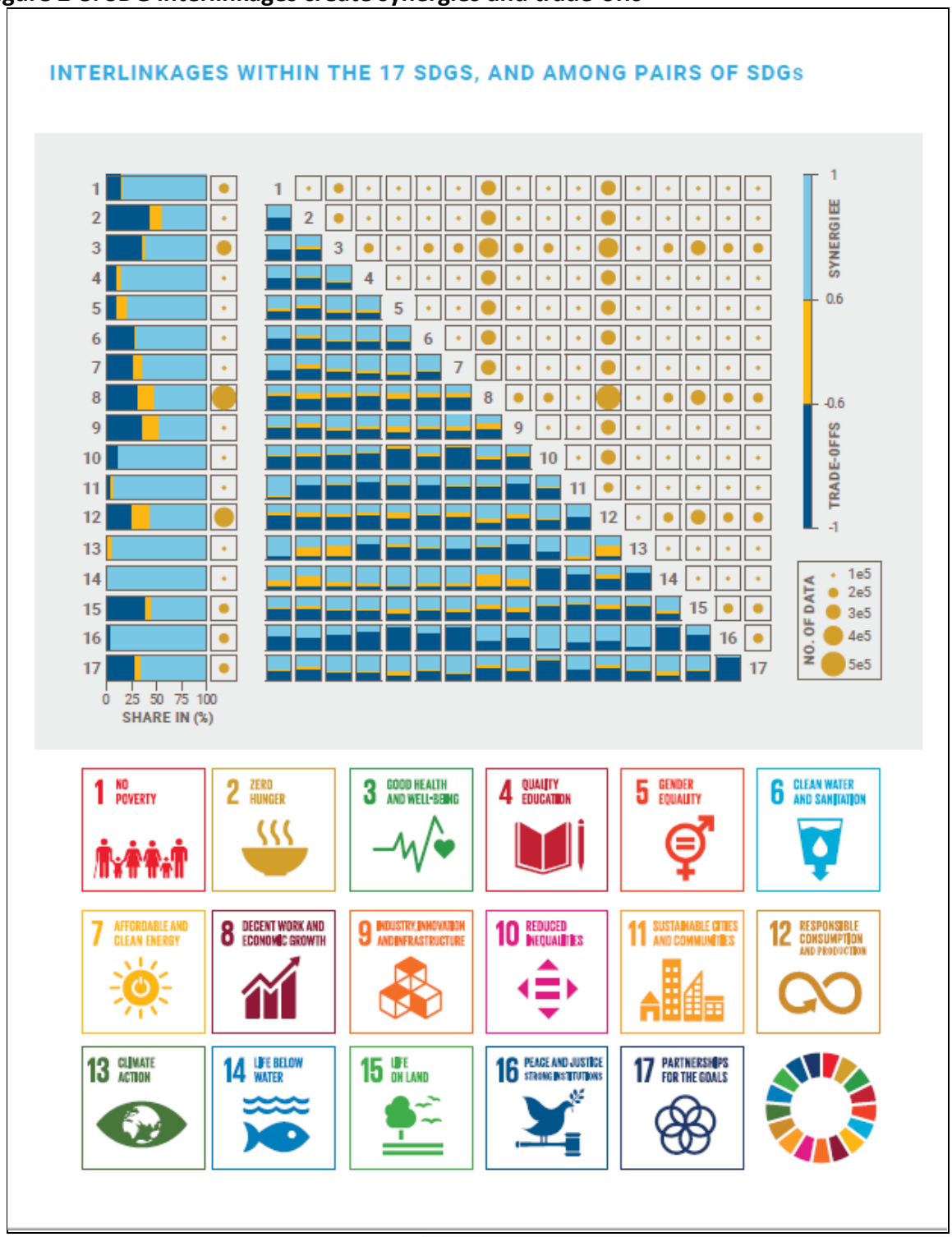
The interconnectedness of the SDGs can be used to boost progress in multiple areas. For example, a study in Tanzania[278] shows how investments in photovoltaics directly enable progress on SDG 7 (affordable and clean energy), but how such investments can indirectly support progress also on SDG 4 (education) as students can spend more time on their studies with access to better quality light. Further, investments in photovoltaics could reduce indoor air pollution as it allows phasing out the use of solid fuels for cooking, enabling progress on SDG 3 (good health and well-being). Hence, investing in solar energy ends up supporting progress on three SDGs simultaneously.

On the other hand, some SDG interlinkages are associated with trade-offs or conflicts. For example, large-scale investments in renewable and clean energy are key to combating climate change. However, the transition to renewable and clean energy technologies is largely reliant on critical minerals such as copper, lithium, cobalt, and rare earth elements. If not managed properly, efforts to meet the increasing demand for such critical minerals can lead to negative social and environmental impacts. These negative impacts include significant greenhouse gas emissions from mining and processing, biodiversity loss, water pollution, human rights violations, and work-related fatalities and injuries[279]. Hence, if these trade-offs are not carefully managed, clean energy transitions could undermine progress on several SDGs, including SDGs 8 (decent work and economic growth), 14 (life below water), and 15 (life on land).

SDG synergies and trade-offs

The 2019 Global Sustainable Development Report included an analysis of SDG interlinkages. The findings highlighted that most SDGs are synergistic, stressing that both social and environmental Goals have systemic impacts that drive overall SDG progress. Since 2019, the literature on SDG interlinkages has grown rapidly. Several studies reaffirm that SDG synergies outweigh trade-offs (see an illustrative example in figure 2-8). There is high and not yet fully tapped potential for making simultaneous progress on multiple SDGs, through integrative policy planning and business strategies. For example, progress on SDG 5 (gender equality) is also linked to economic development. One study in 2019 found that accelerating progress on gender equality in Africa could boost African economies by the equivalent of 10 percent of their collective GDP by 2025.[280] In the recent literature on SDG interlinkages, seven SDGs come across as particularly synergistic: SDG 1 (no poverty), SDG 3 (good health and well-being), SDG 4 (quality education), SDG 5 (gender equality), SDG 6 (water and sanitation), SDG 7 (clean and affordable energy), and SDG 17 (partnerships). These goals are repeatedly associated with co-benefits or identified as drivers of progress. Hence, strategic interventions targeting these synergistic Goals could generate simultaneous progress and important gains on several other Goals.

Figure 2-8: SDG interlinkages create synergies and trade-offs



Results from an illustrative study of SDG interlinkages. Note: Interactions within the 17 SDGs (left) and among 136 SDG pairs (right) based on SDG data from 2018 (United Nations Statistics Division 2019). The shares of synergies (blue), non-classifieds (yellow), and trade-offs (orange) are represented by the colour bars. The number of data pairs of SDG indicators is depicted by the areas of the circle in the boxes. Here, 1e2, 1e3, 1e4, 1e5, and 5e5 are 100, 1,000, 10,000, 100,000, and 500,000, respectively.
Source: Anderson, C.C., Denich, M., Warchold, A. *et al.* A systems model of SDG target influence on the 2030 Agenda for Sustainable Development. *Sustain Sci* **17**, 1459–1472 (2022).

There are also important trade-offs that must be actively managed and accounted for in policy. For example, business-as-usual strategies to promote targets belonging to SDGs 2 (zero hunger) and 8 (decent work and economic growth) carry risks of undermining SDG

progress in other areas. For instance, actions to meet SDG 2 might generate competition and conflict for cultivated land and intensive agricultural practices can lead to soil degradation, pollution, and biodiversity loss. SDG 8 promotes sustained economic growth which can create negative impacts, as when growth in economic activities leads to natural resource exploitation exceeding sustainable limits.

Further, the literature on SDG interlinkages shows that SDGs 14 (life below water) and 15 (life on land) seem to be most negatively affected by progress in other areas[281]. The 2030 Agenda builds the conflict between socioeconomic and environmental Goals into the SDGs but leaves it to policymakers to resolve. Chapter 6 gives examples of actions that may help manage the inherent trade-offs in the 2030 Agenda, including suggestions to employ alternative measures to GDP for measuring human progress and welfare, and to promote multifunctional agriculture, scale up agro-ecological practices, scale down resource use, lower inequality, and develop integrated public-, business-, and innovation policy solutions.

Context specific variations in SDG interlinkages

The nature of SDG connections differs between contexts and over time[282]. Patterns of trade-offs and synergies vary significantly by region, country groupings and population groups. For example, poverty reduction seems to generate compound positive effects on the 2030 Agenda in low-income countries, while integrated strategies that tackle climate change and inequality are more decisive to overall SDG progress in high-income countries.[283]

On the whole, high-income countries appear to face more trade-offs than low-and middle-income countries, which could partly explain their slow rate in improving SDG progress.[284] Policymakers in high-income countries need to identify mechanisms to identify and address trade-offs**.** For low-and-middle-income countries, a relatively high share of synergies means that progress on one SDG is likely to have co-benefits with others, and a lower risk of undermining progress in other areas.

The distribution of trade-offs and synergies also differs between population groups. For example, synergies appear to be higher for female, younger, and rural populations for whom trade-offs are more negligible. In other words, progress on an SDG indicator for these groups will generally foster progress for the group on other SDG indicators. Women and girls, youth and rural populations face disadvantages in many contexts; removing barriers for these groups is an important step to leveraging synergies in the 2030 Agenda, in line with the pledge to “leave no one behind”.[285]

The different patterns of trade-offs and synergies across regions, income-, and population groups call for context-specific and disaggregated analysis to support SDG implementation. Further, it warns against global benchmarking and instead encourages goal-setting that considers regional challenges and opportunities.[286]

Interventions must address SDG interlinkages

A better understanding of patterns of synergies and trade-offs can support strategic decision making and promote game-changing interventions for the SDGs. Here, the scientific community can help by carrying out comparative analysis and creating data repositories.

Overall, there must be a stronger focus on understanding SDG interlinkages in relation to specific policy proposals, to complement scientific research on general patterns. For example, the EU Impact Assessment Guideline and Toolbox refers to the SDGs and their indicators as a framework for ex-ante assessing a new policy's impact.[287] There is substantial scope for integrating the SDGs more strongly and consistently in existing and legally required impact assessment procedures globally, including in policy impact assessment, regulatory impact assessment, and environmental/social/health impact assessments.[288] Similarly, private sector decisions – both strategic and operational – could take systematic consideration of impacts across SDGs.

The availability of tools and methods for integrated SDG analysis and decision support has grown in recent years, and the process of identifying and evaluating positive and negative interlinkages can boost learning and creativity.[289] Researchers and policymakers should be encouraged to work together to leverage existing knowledge and tools and to design interventions that maximize synergies, mitigate trade-offs, address uncertainties, and consider context-specific challenges and opportunities.

International SDG spillovers

Most of the Goals and targets can have spillovers – defined as 'any effect – intended or not – originated in one country that crosses national borders through flows of capital, goods, human and natural resources, and that is able to affect positively or negatively the sustainable development prospects of another country.'[290] Analysis by the Organisation for Economic Co-operation and Development (OECD) suggests that as many as 57 per cent of all 169 SDG targets have transboundary components.[291] To accelerate progress on the SDGs, countries cannot afford to generate negative and costly impacts elsewhere. Failing to recognize positive spillovers, however, leads to missed opportunities.

One long-evident spillover, for example, is from education. Creating an educated and skilled workforce not only underpins national development in the educating country, but also, through temporary or permanent migration, spills over to the destination economies and communities – though this may be regretted by the educating country as a brain drain.

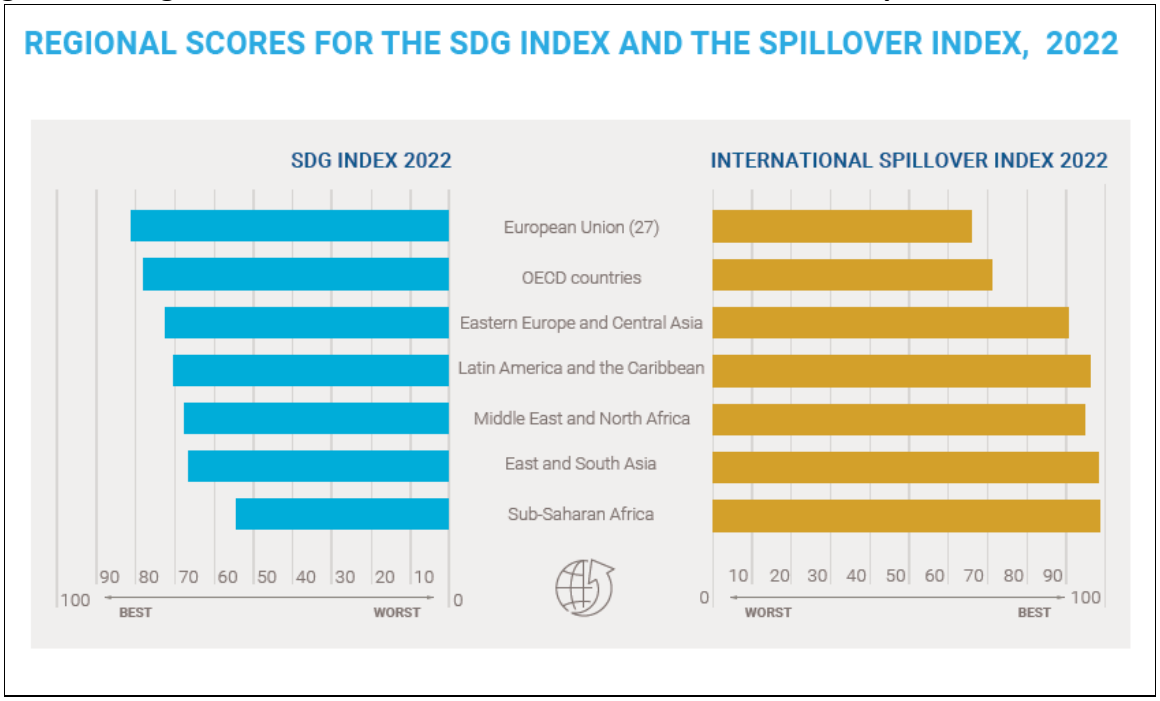
An example of a generally negative spillover is 'embedded carbon' – which is carbon emitted for the production of goods that can subsequently be exported.[292] The five BRICS countries – Brazil, Russia, India, China and South Africa – for example, are net exporters of embedded carbon, accounting for 13.5 per cent of total emissions, while the OECD countries are net importers of carbon – with 13 per cent of total emissions.[293]

In addition, there have been damaging spillovers from the COVID-19 pandemic which has disrupted global supply chains and caused losses in tourism in low-income countries. [294]. The pandemic and its spillovers have set back overall SDG implementation, though the full impact on global sustainability is still unfolding.

Transboundary impacts can be tracked using a 'spillover index' that considers direct cross-border flows of air and water, and the environmental and social impacts embodied in trade, economy and finance, and security (**Error! Reference source not found.**9)[295]. A higher score m eans that a country causes more positive, and fewer negative, spillover effects. The related SDG index in figure 2-9 communicates overall progress in the region on achieving the SDGs

with a higher score indicating greater progress towards the SDGs. The figure indicates that although Sub-Saharan Africa has lower achievements on the SDGs on average than other regions, it is also the source of fewer negative spillovers than other regions. For OECD and EU countries the opposite is true – countries on average have the highest SDG achievements, but also impose more costs on other countries that are not internalized in their national measures of SDG progress. On average, more negative spillovers are generated by high-income countries, to the detriment of low-income countries.

Figure 2-9: Regional scores for the SDG index and the International spillover index, 2022



A comparison between the regional average SDG Index score (https://dashboards.sdgindex.org/rankings) and the International Spillover Index score (https://dashboards.sdgindex.org/rankings/spillovers). The comparison illustrates how countries perceived to perform well on the SDGs nationally are the same countries that hamper SDG progress elsewhere. Source: Sachs, J., Kroll, C., Lafortune, G., Fuller, G., & Woelm, F. (2022a). *Sustainable Development Report 2022* (1st ed.). Cambridge University Press. https://doi.org/10.1017/9781009210058.

For identifying and analysing spillovers, promising methods and examples of their applications include the use of input-output analysis to assess transboundary impacts of the EU's food supply chain[296], the use of a computable general equilibrium economic model to understand the transboundary impacts of implementing the Paris Agreement, a scoping study of the ability of the SDG synergies tool to measure international spillovers, and discussions on the relevance of life-cycle analysis for assessing transboundary impacts in the context of SDG 12[297]. The thinking about international spillovers can also be supported by various conceptual frameworks. [298]

The need to tackle international spillovers is increasingly recognized by policy makers. The EU, for example, is taking action to reduce negative environmental and social impacts across supply chains[299] and is also presenting its first Voluntary Review which covers the topic of international spillovers. The Voluntary National Reviews of Finland in 2020, Sweden in 2021, and the Netherlands in 2022 recognized the importance of tracking and addressing international spillovers[300]. Consumption-based CO2 emissions targets have been adopted at the city level, as in San Francisco, Paris, and Portland.[301]

Framing a future of progress

While progress to date is not on track, this chapter showed that actors from all sectors of society can intensify and accelerate their efforts for sustainable development in the second half of Agenda 2030. Recent science and assessment show that our societies and economies can expect major change, that has already been started and to some extent locked-in – such as climate change, biodiversity loss, and demographic change. But depending on how these trends and changing conditions are tackled, there are also many wins across a broad spectrum of SDGs. The SDG framework has not only inspired new knowledge and ways of systematically identifying positive and negative interlinkages. It has also led to a plethora of initiatives, partnerships and commitments that can be intensified and delivered upon in the second half of Agenda 2030.

Chapter 3: Pathways to achieve the SDGs

Business as usual will not deliver the SDGs by 2030 or even 2050, yet the SDGs are the survival kit behind the transformation process that the planet needs. Global scenario projections reveal plausible future pathways where rapid progress can be made towards the SDGs. Harnessing these opportunities will require an increased level of ambition, transformative policies, and an integrated approach to organise and coordinate efforts. Using a framework of entry points and levers, countries can strategically embark on six systems transformations to achieve the SDGs. This chapter highlights important shifts and interventions that could accelerate these transformations sourced from global scenario projections. There are opportunities for rapid gains on the SDGs by leveraging new policies, technologies, investments, and behaviours. Approaches focus on reducing complexity prioritizing interventions, and giving practical guidance.

As efforts to achieve the SDGs intensify in the time remaining to 2030, policy makers and all actors need practical guidance on what can be done to accelerate progress. However, providing evidence on what works for achieving each of the 17 SDGs in every country's context is not possible in this report. There are many potential interventions and levers that can deliver positive gains, however each country has its own priorities and circumstances and context is important.

One source of knowledge on important shifts and interventions that could accelerate progress lies in the many scenario projections undertaken at various scales. This chapter first shows what global scenario projections reveal about accelerating progress towards the SDGs and possible outcomes by 2030. The framework of entry points and levers from the 2019 Global Sustainable Development Report are then re-examined in light of these scenarios as spaces for integrated and transformative action. Finally, decisive shifts and ambitious interventions are outlined for each entry point that could be deployed by governments and other actors to accelerate progress on the SDGs.

While this yields important insights on 'what' can be practically done to achieve the SDGs, the solutions also face a range of impediments which undermine their feasibility and efficacy. These impediments will need to be overcome to accelerate progress in the remaining years to 2030. It is therefore important to underpin these actions with knowledge on 'how' decisive changes can be enabled, which is the focus of chapter 4.

Global scenario projections for the SDGs

Scenario projections have been used for several decades to explore the implications of continuing on current trajectories or shifting to alternative plausible futures. The growing research interest in the SDGs in recent years is also reflected in global scenario modelling studies. These address critical questions facing decision-makers: where is the world currently heading, and what are the consequences of not achieving the SDGs? What pathways and interventions can shift the outcomes in 2030 or in 2050 even?

Chapter 1 indicated that the world is not on-track to achieve the Goals. Those forecasts are based on a continuation of recent trends, but provide little guidance on what can be done to accelerate progress. Scenario projections on the other hand provide coherent 'plausible

futures' conditional on certain assumptions or on the implementation of certain policies and measures.

To date, most global scenario projections have not been carried out specifically for the SDGs but rather for climate change.[302] The best-known global scenarios are the five 'socio-economic pathways' (SSPs) based on different narratives and assumptions about how the future will unfold (Box3-1). [303] This includes a 'sustainability' pathway (SSP1) which is generally most aligned with the SDGs, and a 'middle-of-the-road' pathway (SSP2) which is used to represent the current trajectory. Each of these pathways is supported by global projections provided by a range of integrated assessment models (IAMs) [304] but they have only limited coverage of SDG targets for 11 of the 17 Goals.[305]

Box 3-1: Scenario frameworks for global change

Scenarios have been a key component of global change research for several decades and are used to explore how the future may evolve under different conditions and how to achieve more desirable outcomes. [306]

The shared socioeconomic pathways (SSPs) and representative concentration pathway (RCP) framework combines alternative socioeconomic developments and atmospheric concentrations and associated climate change outcomes. The five SSPs include different assumptions for societal factors such as demographics, human development, economic growth, inequality, governance, technological change and policy orientations. They are designed to span a range of outcomes for two key characteristics: the challenges that the underlying factors present to adapting to climate change, and the challenges they present to mitigating climate change. These factors are described in the pathway narratives developed for each SSP.

SSP1 - Sustainability – The world shifts gradually, but pervasively, toward a more sustainable path, emphasising more inclusive development that respects perceived environmental boundaries. Management of the global commons slowly improves, educational and health investments accelerate a demographic transition, and a shift from economic growth toward a broader emphasis on human wellbeing. Driven by an increasing commitment to achieving development Goals, inequality is reduced both across and within countries. Consumption is oriented toward low material growth and lower intensity use of resources and energy.

SSP2 - Middle of the Road – A business-as-usual scenario. The world follows a path in which social, economic, and technological trends do not shift markedly from historical patterns.

SSP3 - Regional Rivalry – A resurgent nationalism, concerns about competitiveness and security, and regional conflicts push countries to increasingly focus on domestic or, at most, regional issues.

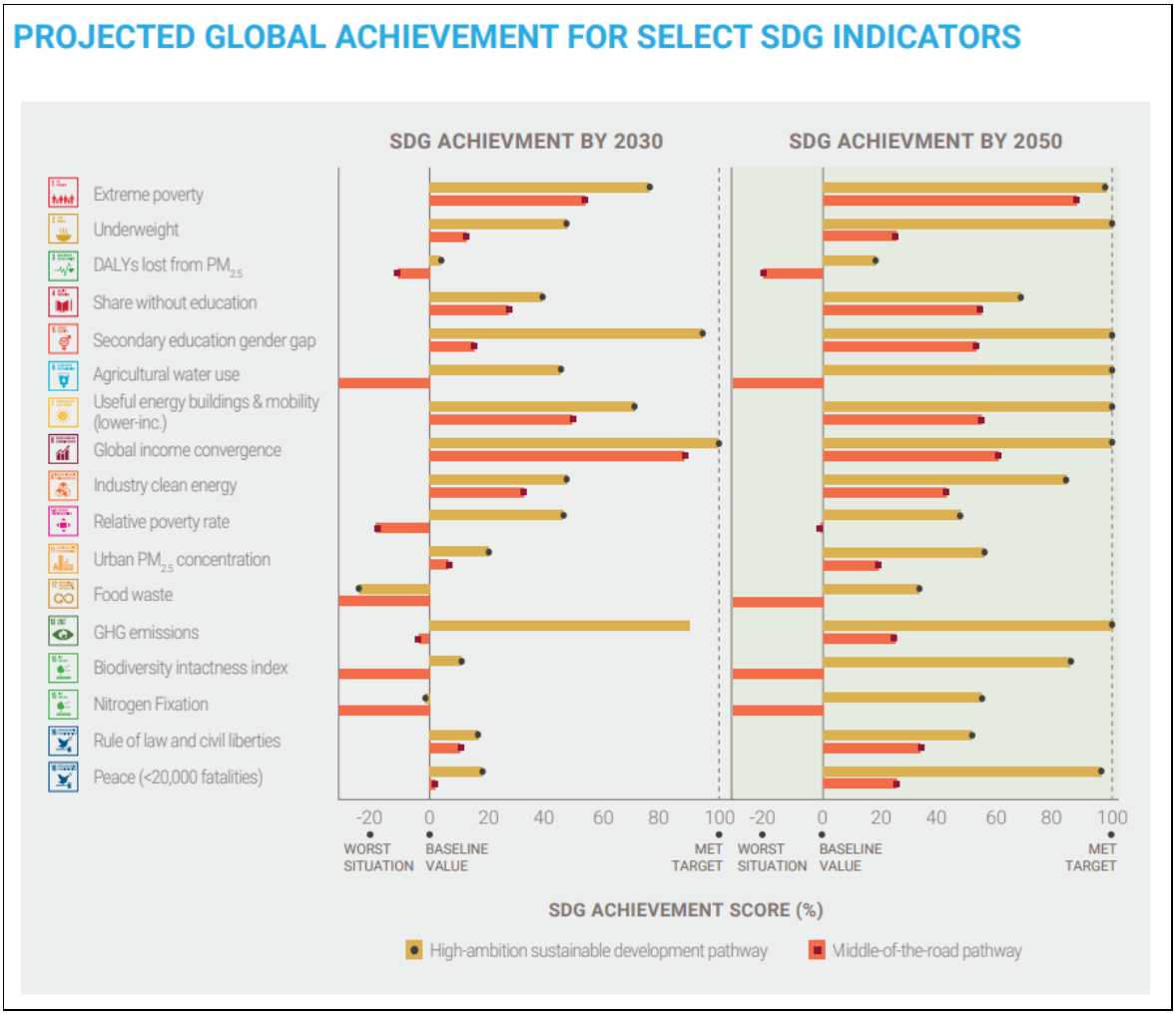
SSP4 - *Inequality* – Highly unequal investments in human capital, combined with increasing disparities in economic opportunity and political power, lead to increasing inequalities and stratification both across and within countries.

SSP5 - Fossil-fuelled Development – This world places increasing faith in competitive markets, innovation and participatory societies to produce rapid technological progress and development of human capital as the path to sustainable development.

The projections indicate that, even under the more optimistic sustainability-oriented scenario (SSP1), none of the SDG targets in the scenarios would be achieved by 2030, or even 2050. There would be some progress in extreme poverty and hunger, as well as in access to water, sanitation and electricity, but performance would regress on targets relating to greenhouse gas emissions and air pollution. While this paints a pessimistic picture, the SSPs were not designed to represent ambitious pathways.[307] What can be concluded from these projections is that in the lead up to 2030, transformative policies will be critical to accelerate progress towards the SDGs and global climate targets.

A recent global study considers four scenarios including a 'middle-of-the-road pathway' (SSP2) which incorporates nationally determined contributions (NDCs) on climate change as well as a new 'Sustainable Development Pathway'(SDP) (figure 3-1).[308] The projections from this study indicate that on the middle of the road pathway, the SDGs will not be achieved. Gains are made in key areas including extreme poverty reduction and global income convergence. But progress is minimal on targets relating to malnutrition, gender gaps in education, and governance, and the world would regress in air pollution and associated health impacts, agricultural water use, relative poverty rates, food waste, greenhouse gas emissions, and biodiversity and nitrogen use. [309] Continuing with business-as-usual or tepid changes will not begin to match the ambitious aspirations of the 2030 Agenda.

Figure 3-1: SDG progress -The middle of the road versus the high-ambition sustainable development pathway



Note: A value of zero represents the baseline value of the indicator in 2015, while 100 per cent means the target is fully met. Left panel provides results for 2030 and right panel for 2050. Negative values represent a worsening of the situation. The main scenarios, middle-of-the-road (SSP2-NDC) and the ambitious (SDP-1.5C), are shown as bars. Intermediate scenarios, SSP1-NDC and SSP1-1.5C, are indicated by symbols.
Source: Sörgel et al., 2021

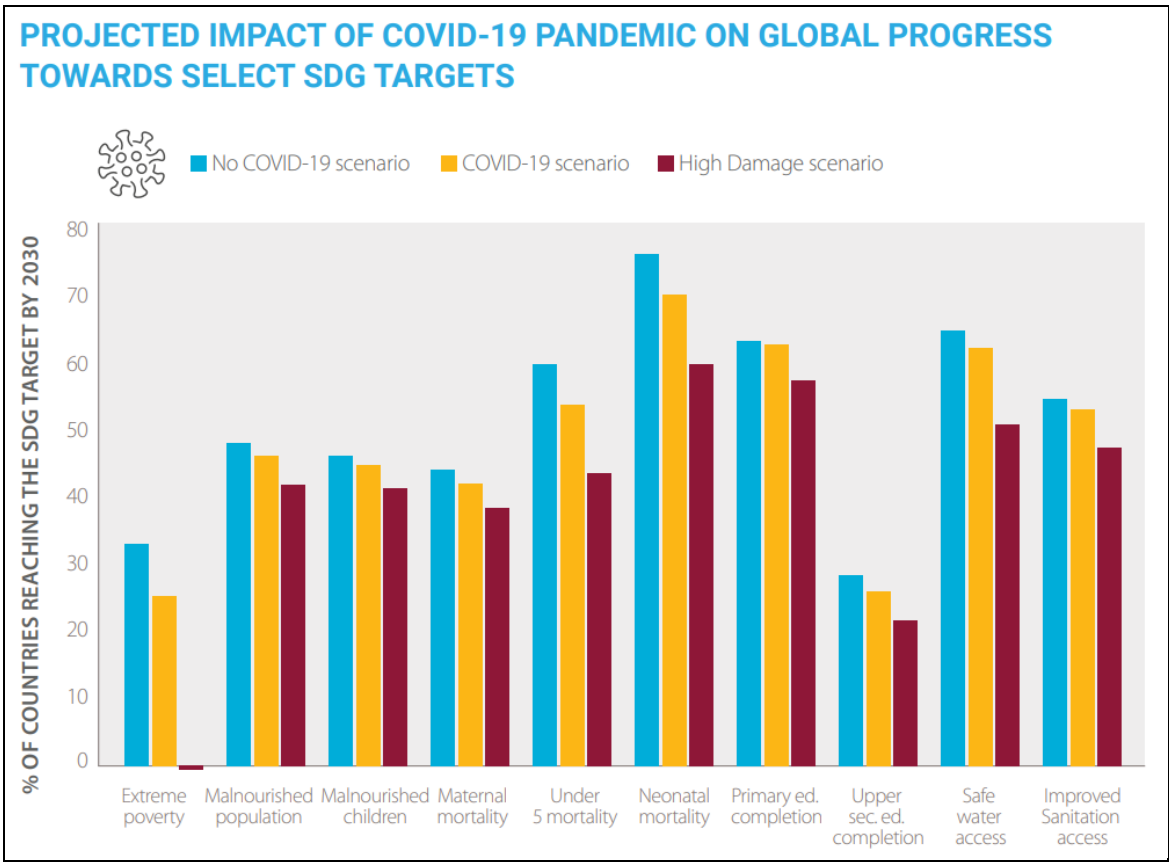
In comparison, the more ambitious Sustainable Development Pathway that is compatible with global warming of 1.5° C highlights that strong gains can be made through additional interventions (labelled SDP-1.5°C). This pathway assumes continued population and GDP growth as well as ambitious climate policies compatible with the 1.5°C target including a

price on carbon, phasing out coal and biomass, mandating electric vehicles, and adjusting energy subsidies. Other measures include using international carbon revenues and climate finance to support poverty alleviation, policies on sustainable energy- and land-use-systems and a more determined shift towards sustainable consumption and diets.[310] Under this scenario, progress accelerates with solid gains across most of the Goals by 2030. The long-term projections for 2050 show that progress continues to advance and stabilise, with most Goals achieved or nearing their target levels. Nevertheless, some Goals continue to lag, including on air pollution and management of food waste. The projections also do not include the impacts of the COVID-19 pandemic.

Studies that do take the pandemic into account focus primarily on the SDG targets related to human development (figure 3-2).[311] One study finds that even before the pandemic the world was off-track for many of the targets for poverty, nutrition, health, education, and water and sanitation, and that 76 countries would have failed to eliminate poverty by 2030.[312] The impact of COVID-19 is then assessed on the basis of moderate and high-damage scenarios. Without additional action, in the moderate COVID-19 scenario 48 million more people would be in poverty in 2030 and in the high-damage scenario that number would rise to 213 million (figure 3-3).

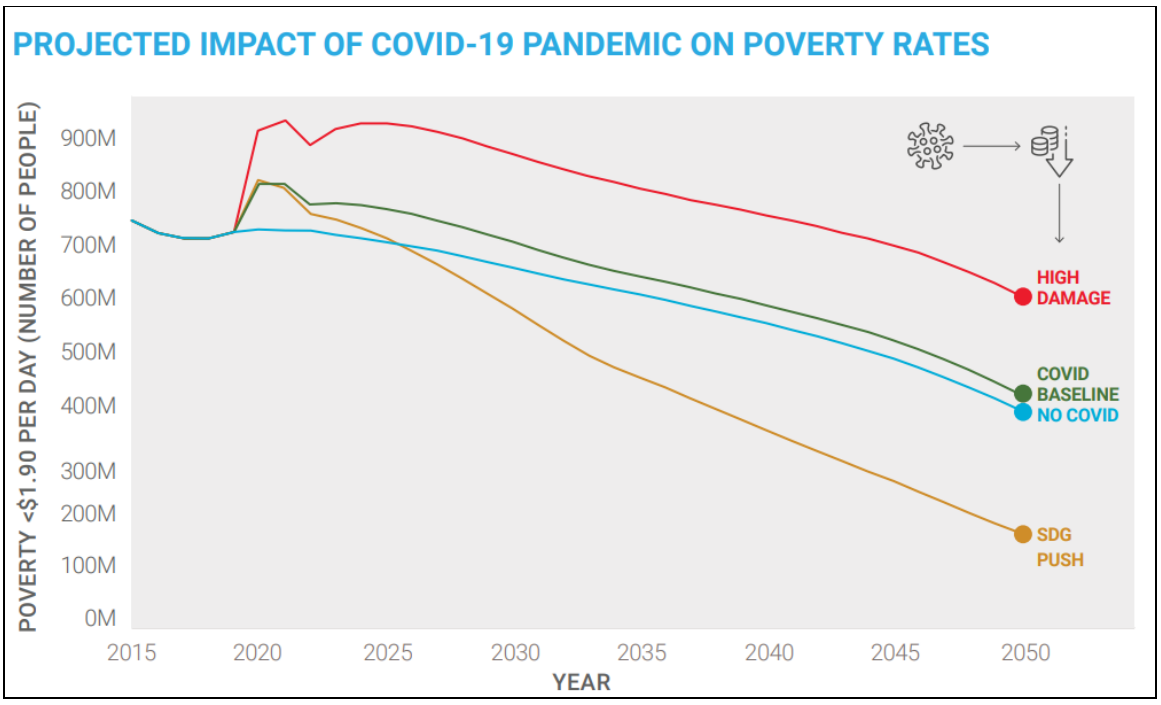
A more optimistic picture emerges from an 'SDG-push' scenario – with ambitious worldwide improvements on social protection, strengthening governance, promoting a green economy, and addressing digital disruption, with improvements in secondary education and science. Specific interventions considered include doubling of public health budgets; a 50 to 100 per cent increase in social welfare transfers; a 30 per cent improvement in governance measures including participation, effectiveness and control of corruption; and a doubling of budgetary allocations for education, research and development, and infrastructure. By 2030, this would lift 124 million additional people out of poverty (figure 3-3), with 113 million fewer people malnourished. It would also generate gains across other SDGs in health, nutrition and education (figure 3-4).

Figure 3-2: Projected impact of COVID-19 on global progress towards SDG targets



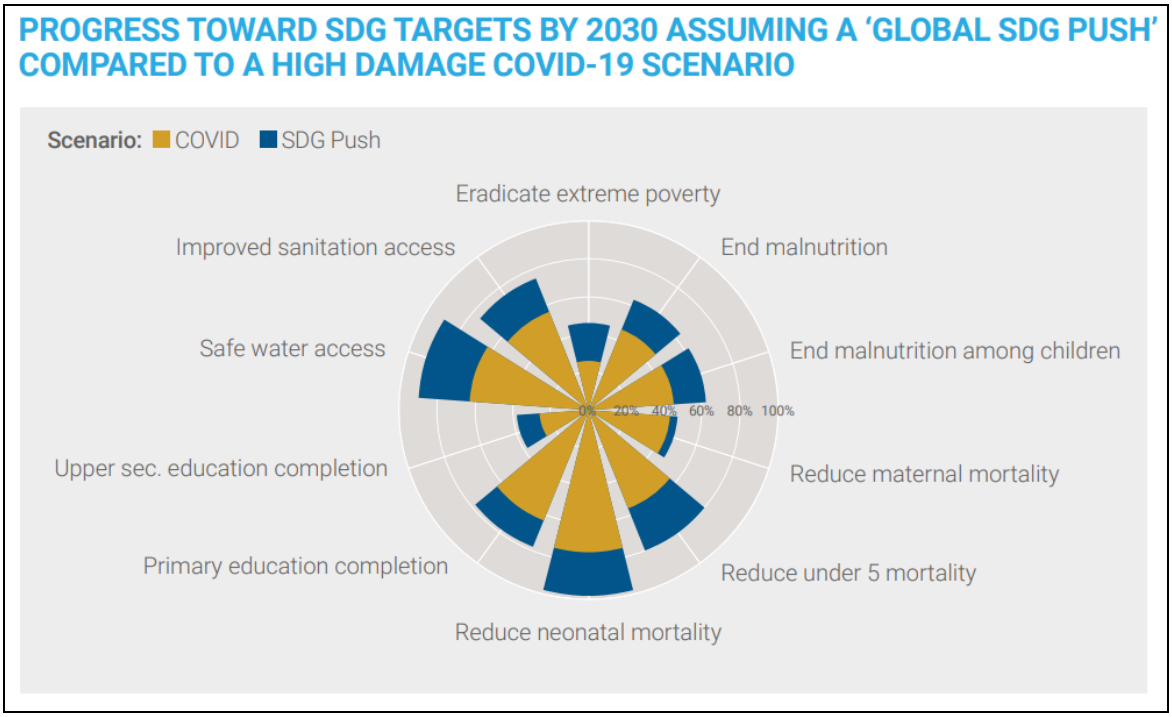
Note: zero represents the baseline value of the indicator in 2015, while 100 per cent means the target is fully met. This chart projects the situation with and without COVID-19 and also a High Damage' scenario if the economic impacts of COVID are more severe than expected.
Source: Hughes et al., 2021

Figure 3-3: Impact of COVID-19 on projections for people in poverty



Source: Hughes et al., 2021

Figure 3-4: Progress toward SDG targets by 2030 assuming a 'global SDG push' compared to a high damage COVID-19 scenario



Note: This chart shows the global population's percentage progress toward the target value between 2015 and 2030 (the portion closed of the gap-to-target that existed in 2015. It compares and outcome with heavy COVID-19 damage (red), and one with a global push (turquoise).
Source: Hughes et al., 2021

The message from these global scenario projections is clear. Business-as-usual actions will deliver limited gains on the SDGs. However, with increased ambition, transformative policies can accelerate progress. The sets of assumptions and policies included in more ambitious sustainable development scenarios provide guidance for decision makers on important shifts and priority interventions. Changes in societal goals, policies, incentives, institutions, technologies, and practices are included. Given the diversity of the Goals and targets, it is critical that an integrated and coherent approach is taken to implementation to ensure that interventions target priority entry points for systems change and that trade-offs are managed, and synergies are harnessed.

The 2019 *Global Sustainable Development Report* put forward an organizing framework for the transformations needed to achieve the SDGs. It proposed six 'entry points' – closely related systems with opportunities to take advantage of synergies among many SDG targets and resolve or ameliorate trade-offs with others (figure 3-5).[313] The entry points are:

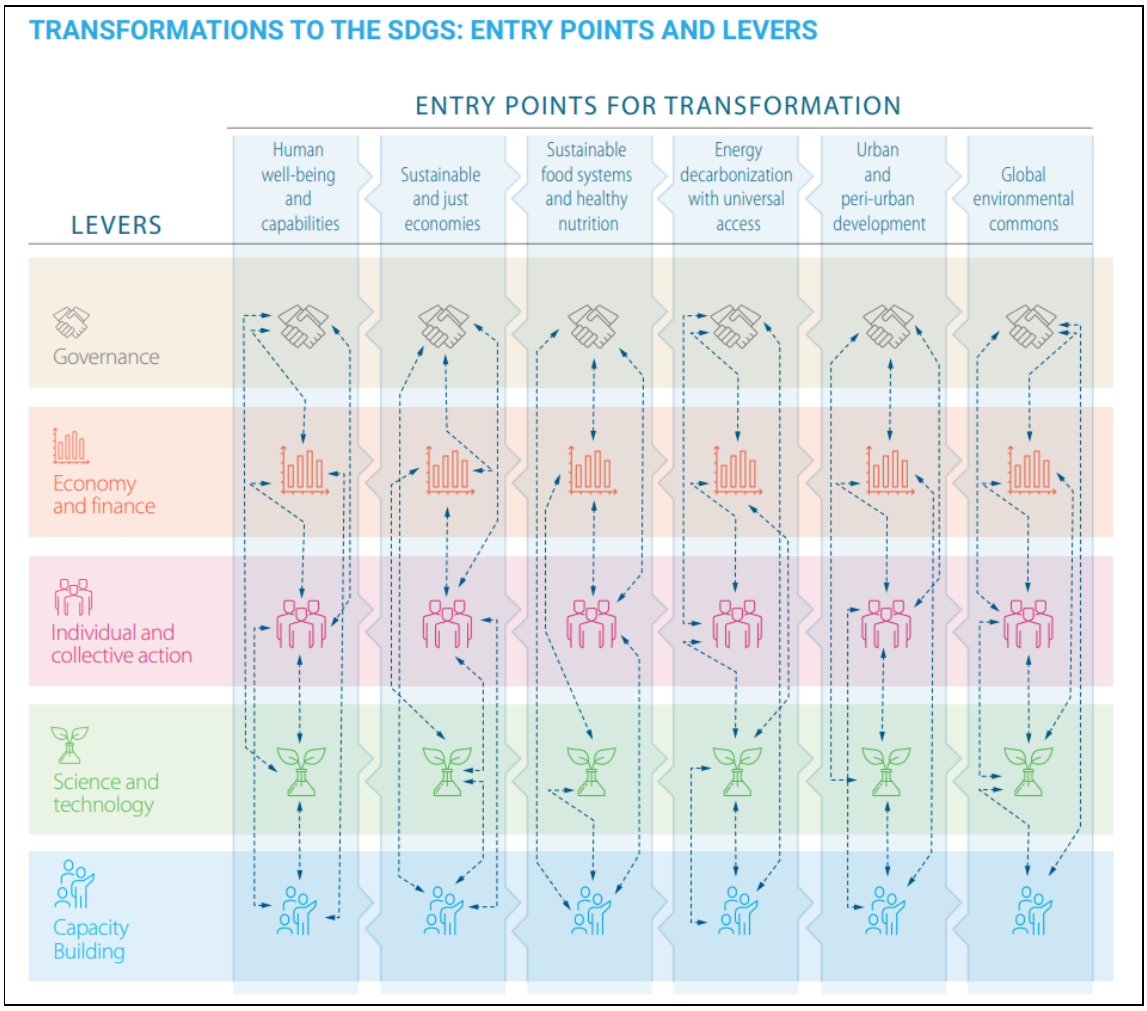
1. *Human wellbeing and capabilities* – Material well-being and livelihoods, health, security, education, voice and empowerment, and access to a clean and safe environment are all part of human wellbeing. When people's basic needs are met, they develop the capabilities to drive global social, economic and environmental progress and transformations.
2. *Sustainable and just economies* – Economic development and activity are valuable because they can contribute to human wellbeing, not as ends in themselves. The current economic status quo is defined by severe inequality and environmental

destruction, and to move toward an economic system that is sustainable and just, major changes in the way people live, work, produce and consume will be needed.

3. *Sustainable food systems and healthy nutrition* – The current food system is a complex combination of local, national, regional and global unsustainable agricultural, processing, trade and transport, and retail systems, with obvious links to health and equity issues around the world. Moving to sustainable food systems will require deep shifts in production, distribution, retailing, consumption, diets, dealing with food waste and losses including re-use.
4. *Energy decarbonization and universal access* – The 2030 Agenda commits to both universal access to energy and decarbonization of energy sources across the globe. Addressing the climate crisis will mean moving away from fossil fuels and ending the use of polluting solid fuels for cooking - critical to avoiding the current 3.8 million annual deaths from indoor air pollution.
5. *Urban and peri-urban development* – Half of the world's population now lives in cities, and urbanization is projected to grow. Equity, health, social wellbeing and cohesion, and environmental sustainability have to be prioritized in urban and peri-urban areas. It will also be important to revitalize rural areas.
6. *Global environmental commons* – Achieving the entire 2030 Agenda will depend on protecting shared resources – atmosphere, hydrosphere, global oceans, cryosphere, polar regions, forests, land, freshwater, and biodiversity.

To produce widespread transformative effects in these entry points, the 2019 Report also suggested four 'levers' of transformation - governance, economy and finance, science and technology, and individual and collective action, to which this 2023 report adds a fifth lever 'capacity building' which is of value in itself while also supporting the other levers. [314, 315, 316] The development and or mobilization of capacity is essential for the transformation process.

Figure 3-5: Entry points and levers for transformation



Source: Independent Group of Scientists, 2019.

Governance – Governance provides the institutions and the spaces for establishing an overall direction of development, setting targets, coordinating actions, providing regulations, creating specialised organisations, and enabling the flow of finance at national and sub-national levels. Parliaments and state audit offices should ensure accountability for reporting on progress and learning from failures. Formal government institutions also need to work closely with the private sector, and civil society, providing 'safe arenas' for deliberation on policies and instruments of transformation. Good governance enhances synergies and identifies trade-offs and connections while building engagement between politicians, civil society, businesses, youth, labour, media, indigenous peoples and local communities. [317, 318, 319]

Economy and Finance – Transformations will require significant public and private investment. Global estimates of additional annual investment needed to achieve the SDGs range from $1.4 trillion to $2.5 trillion. [320, 321, 322] In low-income countries, annual outlays related to education, health and infrastructure would have to increase by 14 to 15 percentage points of GDP. [323, 324] Achieving these levels would require an increased global tax base and, specifically for low-income countries, new forms of international support, including debt relief and financial intermediation. [325] At the same time, financial capital will

need to be redirected to more sustainable technologies, industries and practices. [326, 327, 328] Releasing the large sums needed may mean reforming the financial system to discourage short-term speculative investments and stimulate long-term investment in the real economy[329].

Science and technology – Advancing the SDGs requires social and technological innovation, and feasible, cost-effective and scalable technologies.[330, 331] This will mean investing in R&D and shifting subsidies and incentives towards new sustainable technologies and practices. When technologies reach a tipping point in cost and market conditions, investors can then scale finance throughout the transition. [332] The least developed countries need better access to mature technologies as well as research and development cooperation on technology development that meets their own needs. Beyond technologies more investment in international cooperation is needed for research and development that covers social, economic, environmental, cultural and political aspects of transformation. Scientific research can help public understanding of complex and emerging sustainable development, working with governments and others to devise evidence-based solutions.

Individual and collective action – Large-scale societal change is often achieved first in people's hearts and minds, through social organisation and mobilisation at the grassroot level, and only afterwards enshrined in legislation and economic policies. [333] Major paradigm shifts take time. [334, 335, 336] But if a critical mass of people adopts an innovation, practice, norm or behaviour, along with collective action by social movements and coalitions, this can be enough to draw in the rest of the population.[337] Behaviour change can be supported by education, information strategies and campaigns, financial incentives, regulatory processes and legislation.[338]

Capacity building – The capacity needed to support the transformation process to achieve the SDGs is highly variegated: different SDGs require different transformations, which themselves might require different kinds of capacity; different stages of transformation require different kinds of capacity; and capacity needs vary greatly among countries. The capacities needed for enabling and navigating transitions are required principally in five areas:

- *Strategic direction and foresight* – Making decisions in a complex and integrated world requires the capacity to develop visions for long-term sustainable development and to engage actors to create ownership over shared goals; to strengthen the science-policy interface and processes for producing, validating and disseminating robust knowledge for the SDGs; to better understand and respond to new opportunities; and define strategies and steer action in line with shared goals.
- *Innovation and generation of new alternatives*– This requires the capacity to innovate, generate, and select suitable and sustainable alternatives; to scale and replicate these solutions over time; and to provide protected and informal spaces to nurture innovation.
- *Orchestration, engagement and negotiation* - Working across siloes and with all stakeholders is based on the capacity to coordinate action across various actors, sectors and scales; take a systems approach to synergies and trade-offs; to foster political willingness and public awareness for change, including disruption of

unsustainable trajectories; and to recognize and manage conflicts and create safe spaces for effective engagement with all citizen and marginalized groups.

- *Identifying and overcoming impediments* – Shifting away from business-as-usual approaches demands the capacity to recognize unsustainable trajectories, diagnose system lock-ins, and undesired effects, and foster political willingness and public awareness for change.
- *Learning and resilience* – Generating knowledge about system dynamics and feedback will help governments and other stakeholders build more effective and resilient strategies. This involves strengthening institutions and networks through decentralization, increasing diversity and redundancy, and monitoring and continuous learning.

The framework of entry points and levers provides a systematic organising framework for action on the SDGs. Using the framework, countries can embark on the priority systems transformations needed to achieve greater progress on the SDGs, as seen in the cases of Curacao and Germany, for example (Box 3-2). All levers will need to be deployed coherently to enable and accelerate transformations across each of the six entry points, resulting in a diverse mix of interventions. While knowledge on important shifts and interventions is advancing, greater synthesis and consolidation of what works in different contexts is needed in formats readily available to decision makers. The role of science in supporting this endeavour is discussed further in Chapter 5. It is also critical to complement this evidence with an understanding of common impediments that prevent progress and how governments and other actors can overcome these.

Box 3-2. Applying the entry points and levers framework in Curacao and Germany

The entry points and levers presented in the 2019 Global Sustainable Development Report have been a basis for organizing reviews of SDG progress and informing institutional arrangements and policy.

Curacao used the six entry points as an organizing framework to review and report on progress on the SDGs in their 2022 Voluntary National Review (VNR).[339] This approach was taken to make the complex information about the SDGs more accessible to different stakeholders. The VNR includes an assessment of how the locally determined SDG Roadmap with accelerators and drivers are linked to the entry points. It also considers successes in SDG progress through each entry point as well as remaining challenges. The involvement of diverse stakeholder groups through dialogues and networks for the six entry points are a key feature and show promise for applying leavers in a cohesive manner that allows for managing trade-offs and building synergies.

Germany has used the entry points and levers to guide policy. Germany's sustainable development strategy is now guided by six "transformative areas": human well-being, capabilities and social justice; energy transition and climate protection; circular economy; sustainable building and mobility transition; sustainable agricultural and food systems; pollutant-free environment. These areas aim at providing a more integrated view on the SDGs for policies and also look at synergies and conflicts between goals and targets.

In 2022, six fixed interdepartmental and interagency project teams ("transformation teams") were established around these areas plus one team focusing on international cooperation. The teams organise the meetings of the State Secretaries' Committee on sustainable development on the respective topics including the preparation of draft resolutions or reports (with concrete goals and measures), and inform implementation measures. The German Sustainable Development Strategy 2021 also highlighted the following five levers: Governance; Social Mobilization and Participation; Finance; Research, Innovation and Digitalization; and International Responsibility and Cooperation.

Key shifts and interventions to accelerate transformations

Global scenario studies point to actions for stronger gains on the SDGs by 2030. Many of these actions are general at the level of scaling up investment in primary healthcare and social welfare in low-income countries, dietary change, or whole-of-economy carbon pricing. Implementation will require more specific interventions by countries utilising a combination of levers. Capacity building to effectively deploy these levers is also important but is not generally modelled in global scenario projections. However, the studies highlight that capacity gaps remain an important impediment to achieving the SDGs, and capacity building for transformation is addressed further in Chapter 4.

Aligning evidence from scenarios with the entry-points and levers can inform integrated and transformative action. Some of the key shifts that show promise for SDG acceleration from the scenarios in line with each entry point are outlined here:

Entry-point 1 – Human wellbeing and capabilities – Global scenario projections suggest that current rates of improvement will not achieve the SDGs for health, education or water and sanitation by 2030, particularly in Sub-Saharan Africa and South Asia.[340][341] But transformative policymaking, scaled-up investment, and the deployment of existing technologies could deliver rapid gains if common impediments can be overcome (Figure 3-6).

- *Health* – Priority shifts towards the goal of healthier societies include establishing universal health coverage (UHC) and ramping up investment in primary healthcare in lower and middle-income countries (LMICs) on a core set of interventions for preventative and outpatient care[342], ensuring that every pregnant woman has access to lifesaving interventions[343], and optimising health systems and scaling up community-based initiatives.[344] Additional investment requirements for primary health care are estimated at $200 billion per year in LMICs through 2030, predominantly in Sub-Saharan Africa and South Asia.[345]
- *Education* – Priority shifts include accelerating secondary enrolment and completion, ensuring all girls and boys are enrolled in secondary education so that global mean years of schooling increases[346]. Expanding access to tertiary education and increasing girls' participation in science, technology, and mathematical subjects.
- *Water and sanitation* – Key interventions include universal piped water access and wastewater collection and the capacity to treat at least half of all return flows by 2030.[347] This would require incremental investments reaching $260 billion per year by 2030, largely in Africa and Asia.[348] Behaviour change to increase end-use efficiency provides an opportunity to reduce these additional investment requirements.[349][350][351]

Together, these shifts could result in accelerated outcomes for the human development SDGs, including averting 60.1 million deaths[352], saving the lives of 5 million neonates[353] , increasing average life expectancy by 3.7 years[354] , and achieving universal access to water and sanitation[355].

Figure 3-6**: Human wellbeing and capabilities: key shifts, interventions and impediments from the global scenario literature**

Sources: (Parkinson, Krey et al. 2019, Stenberg, Hanssen et al. 2019, Friedman, York et al. 2020, Paulson, Kamath et al. 2021, Allen, C. et al (2023 forthcoming))

Entry-Point 2 – Sustainable and just economies – Projected pathways that accelerate progress towards poverty targets generally rely on a combination of slower population growth, steady economic growth, and progressive redistribution, particularly in low-income countries.[356] Transformative policy and revenue reforms will also play a crucial role (Figure

3-7). For example, in the form of a universal cash transfer system with equal per capita payments, or more progressive distribution towards lower-income households.[357] If countries are able to achieve more equitable growth trajectories after the COVID-19 pandemic, the average national Gini Index could fall to or below 30 in developing regions by 2030 and the target of ending extreme poverty ($1.90/day) could be largely met.[358359]

Other opportunities for making economic activity more sustainable are encouraging lifestyle changes away from unsustainable goods and practices,[360] and boosting innovation and research in green technologies, resource efficiency, and circular and sharing economies.[361] The global rollout of national good practice climate policies could accelerate progress over the period to 2030 and pave the way for more a more comprehensive global carbon pricing scheme and see emissions decline in line with a 1.5^{o}C target[362].

Financing for progressive national redistribution could come from reformed and more effective tax-based revenue, and from domestic carbon-pricing revenues, with a portion of the revenues from developed countries committed to financing global poverty reduction in lagging countries.[363] The recycling of revenues from global carbon pricing would be more than adequate for financing poverty reduction when supplemented by international transfers from developed countries. This would ameliorate potential trade-offs between climate and poverty targets.[364]

Figure 3-7. Sustainable and just economies: key shifts, interventions and impediments from the global scenario literature

Sources: (Millward-Hopkins, Gouldson et al. 2017, Moyer and Bohl 2019, Fujimori, Hasegawa et al. 2020a, Liu, Fujimori et al. 2020, Schandl, Lu et al. 2020, Bjelle, Wiebe et al. 2021, Hoy and Sumner 2021, Pereira, Asrar et al. 2021, Soergel, Kriegler et al. 2021a, Soergel, Kriegler et al. 2021b, van Soest, Aleluia Reis et al. 2021, Lakner, Mahler et al. 2022, Moallemi, Eker et al. 2022, Moyer, Verhagen et al. 2022)

Entry-Point 3– Food systems and healthy nutrition – Food systems transformation depends on a mix of supply side measures including making inputs accessible and affordable for all; increasing yields sustainably where agricultural productivity is low, while reducing inputs of fertilisers and pesticides; making water use and international trade more efficient; and reducing negative impacts especially on biodiversity and climate; and more sustainable and efficient measures in retailing, processing and distribution. Measures on the demand side, most importantly include shifting towards healthier and more diversified diets (e.g. plant-based) with food produced in a sustainable manner, and reducing post-harvest losses and food waste[365] (Figure 3-8). Large shifts are required, such as 70 per cent improvement in fertiliser efficiency,[366] 32 per cent increase in yields,[367] a doubling of agricultural production with a 20 per cent increase in cropland,[368] global reduction in meat consumption of around 40-50 per cent,[369] and a 50 per cent reduction in global food waste by consumers and supply chains by 2050.[370]

Greater economic circularity and behavioural change[371] can accelerate these shifts as well as a rapid uptake of improved technologies especially in Africa, Asia and Latin America.[372] New R&D investments of around $4 billion per annum,[373] increased trade liberalization,[374] and public health, education and incentives are needed to influence social norms towards healthy diets supported by sustainable food systems and better food-waste management.[375] Scaling up 18 proven nutrition interventions could accelerate progress on stunting and wasting[376], while agricultural subsidies or food aid could help reduce those at risk of hunger[377]. Technological options can reduce land-sector emissions targeting enteric fermentation and manure management.[378]

Figure 3-8. Food systems and nutrition patterns: key shifts, interventions and impediments from the global scenario literature

Sources: (Doelman, Stehfest et al. 2019, Eker, Reese et al. 2019, Gil, Daioglou et al. 2019, Moyer and Bohl 2019, Pastor, Palazzo et al. 2019, van Soest, van Vuuren et al. 2019, Gerten, Heck et al. 2020, Leclère, Obersteiner et al. 2020, Moyer and Hedden 2020, Scott, Delport et al. 2020, van Meijl, Tabeau et al. 2020, Wang, Dietrich et al. 2020, Pereira, Asrar et al. 2021, Soergel, Kriegler et al. 2021, van Soest, Aleluia Reis et al. 2021, Zhang, Runting et al. 2021, Doelman, Beier et al. 2022, Moallemi, Eker et al. 2022, Rosegrant, Sulser et al. 2022)

Entry-Point 4 – Energy decarbonization and universal access – Accelerating progress requires the large-scale deployment of renewables and best available technologies, appliances and equipment,[379] rapidly scaling up infrastructure investment and support for universal electricity access and clean cooking alternatives,[380] phasing out of coal generation and biomass cookstoves by 2030,[381] major changes in global consumer behaviour to reduce energy consumption,[382] and end-use electrification[383]. Policy measures include carbon pricing, energy efficiency regulations and standards, mandatory renewable energy targets, forced phase-out measures, and consumer incentives and subsidies, particularly for low-income households[384] (Figure 3-9). Progress could also be accelerated through investment in renewable and digital technologies,[385] divestment from fossil fuels,[386] recycling carbon revenues to support clean energy,[387] and scaling up investment in electricity infrastructure in Africa.[388] Annual investment gaps for low-carbon energy and energy efficiency to 2030 in line with a 1.5 °C pathway are estimated at $460 billion.[389]

2408 **Figure 3-9. Energy decarbonization and universal access: key shifts, interventions and**
2409 **impediments from the global scenario literature**

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2411

Sources: (Millward-Hopkins, Gouldson et al. 2017, Batinge, Kaviti Musango et al. 2019, Campagnolo and Davide 2019, Parkinson, Krey et al. 2019, Dagnachew, Hof et al. 2020a, Dagnachew, Poblete-Cazenave et al. 2020b, Liu, Fujimori et al. 2020, Millward-Hopkins, Steinberger et al. 2020, Philippidis, Shutes et al. 2020, Pereira, Asrar et al. 2021, Poblete-Cazenave, Pachauri et al. 2021, van Soest, Aleluia Reis et al. 2021, Warszawski, Kriegler et al. 2021, Doelman, Beier et al. 2022, Moallemi, Eker et al. 2022)

Entry Point 5 – Urban and peri-urban development – Important shifts include doubling the recycled and composted share of municipal waste by 2030 and a more circular waste cycle,[390] more use of electric cars,[391] better public transport[392] with cities' infrastructure oriented to people and pedestrians and not cars, and good-practice policies for transport, buildings and waste.[393] These shifts would be enabled by investments in waste collection systems,[394] in public-transport networks and incentives, educational initiatives for waste and transport behaviour change, incentives for electric vehicles, vehicle efficiency regulations, and stronger building standards[395] (Figure 3-10). It is also important to tackle the deprivations of slum communities including the lack of adequate and safe housing conditions, clean water supply, sanitation and secure land tenure. Sustainable transitions in food and energy systems, human wellbeing and the economy would also have strong synergies with sustainable urban and peri-urban development.

Figure 3-10. Shifts and interventions from global scenarios for transforming urban and peri-urban development: key shifts, interventions and impediments from the global scenario literature

Sources: (Chen, Bodirsky et al. 2020, Liu, Fujimori et al. 2020, Pereira, Asrar et al. 2021, Soergel, Kriegler et al. 2021a, van Soest, Aleluia Reis et al. 2021)

Entry Point 6 – Global environmental commons – A broad range of shifts across land and water systems include expanding protected areas to 40-50 per cent of terrestrial areas by 2050,[396] abandoning intensive agricultural practices in protected areas,[397] ambitious reforestation of all degraded forest areas,[398] and preserving 85 per cent of tropical/boreal forest and 50 per cent of temperate forest on each continent.[399] Others could include shifting societal preferences towards conservation land use ,[400] reducing water consumption and ensuring environmental flow requirements,[401] and adopting a 1.5°C land-sector roadmap to 2050 combining ambitious protection, conservation, restoration and lifestyle changes.[402] A range of policies could support these shifts, including protected areas and land

regulations, integrated land-use planning and sustainable forest management, securing land tenure, payments for ecosystem restoration and nature-based solutions[403] (Figure 3-11). If implemented effectively, by 2050 these ambitious measures can ensure that primary forest is fully conserved, terrestrial biodiversity loss is halted with modest improvements in biodiversity,[404] and around 3-11 per cent of terrestrial area is restored.[405] However there are still notable gaps in scenario projections, in particular relating to ocean systems and life below water.

Figure 3-11. Global environmental commons: key shifts, interventions and impediments from the global scenario literature

Sources: (Gil, Daioglou et al. 2019, Moyer and Bohl 2019, Pastor, Palazzo et al. 2019, Roe, Streck et al. 2019, Stehfest, van Zeist et al. 2019, Gerten, Heck et al. 2020, Leclère, Obersteiner et al. 2020, Liu, Fujimori et al. 2020, Pereira, Asrar et al. 2021, Soergel, Kriegler et al. 2021a, Zhang, Runting et al. 2021, Doelman, Beier et al. 2022)

Scenario projections show that significant gains in SDG progress can be made with new policies, technologies, investments, and behaviours. In some cases, the solutions may seem obvious, such as the expansion of public health systems, improving social transfer schemes, legislating carbon pricing instruments, or incentivizing the rapid uptake of sustainable technologies and practices. Governments clearly have a central role to play in implementing such measures.

However, the scenario studies also point to a range of impediments that can hamper both the feasibility and efficacy of these solutions. For example, deficits in governance and institutional capacities for prioritising policies, mobilizing resources, delivering services, and coordinating efforts.[406, 407] Achievement of the SDGs will be severely constrained if institutional reforms do not occur and violent conflicts continue.[408] Sunk investments in existing capital (e.g. food production and distribution systems or fossil-fuel dependent infrastructure) as well as perceived trade-offs between development objectives (e.g. decarbonisation, food security and jobs and livelihoods) may create resistance from vested interests and undermine political feasibility of taking action.[409,410,411] The substantial upfront investments associated with large-scale infrastructure and social policy measures are also hampered by public and private financing gaps, particularly where tax systems and markets are underdeveloped.[412413] Large-scale changes will have to take place against engrained behaviours such as those associated with vehicle use, waste burning, or dietary patterns[414415416].

Faced with these impediments, it is critical to build understanding not only on 'what' needs to be done but also on 'how' systems change can happen. Transformations typically take time to unfold and move through different stages of phases which face different impediments that change what is needed from different actors. Common impediments experienced at different phases of transformation and solutions to overcome these are the subject of the next chapter.

Chapter 4: Accelerating transformations to the SDGs

A clear lesson from history is that transformation is inevitable. But change can also be steered in positive directions by human determination. If the governments and communities of the world are to create successful transformations for the SDGs by 2030, they must take bold and unprecedented action. They can do this by strategically enabling promising SDG solutions to move from emergence to acceleration to stabilization – tracing an S-curve. This may appear to be more difficult at a time of multiple and compounding crises, but these crises paired with strategy considering the interlinkages between SDGs can also clear spaces for action that previously would have seemed over-ambitious or extreme. Initiatives must be broad-based and inclusive, driven by a diverse set of actors all across the world. Transformations will fail if they leave people behind.

Over the last 200 years, human societies have steered many rapid and profound transformations – in human rights, the economy, health, technology and living standards.[417] A fundamental achievement in the 19th century was an expansion in many countries of education and social welfare, which accelerated in the 20th Century after World War II with many countries moving toward universal health care and more comprehensive social security systems.[418]

In the 1970s, similar achievements spread to many developing countries, which succeeded in improving health and in reducing poverty and hunger, but they rarely achieved universal coverage. An important element of this was the Green Revolution which transformed farming systems, using high-yielding crops along with fertilisers and irrigation.[419] But the Green Revolution also offers a cautionary tale, illustrating both the benefits and the risks of a science-driven transformation. From the 1970s, crop yields rose rapidly, consumption increased, and undernutrition plummeted. At the same time, however, the Green Revolution left many smallholders behind, excluded by inequitable land distribution, poor tenancy rights, and lack of access to credit.[420] Women farmers were especially disadvantaged. The intensive, chemical-heavy farming approaches that dominated the Green Revolution also affected soils, water, biodiversity, and nutrition.[421]

The Green Revolution is a reminder of the importance of taking a whole-of society approach that embraces co-benefits and faces up to trade-offs and risks – weighing up positives and negatives to optimize human wellbeing while safeguarding the planet. All the more important in an age of looming environmental catastrophe and high interconnectedness.

Transformations should involve dynamic interactions between science, business and government that amplify and nurture grassroots energy. While the priorities inevitably differ from country to country, there are some principles and useful tools. This chapter contributes to this toolkit with a stylized model that can help policy makers understand the transformation process, and how levers need to work together across different phases to identify game-changing interventions for achieving the 2030 Agenda.

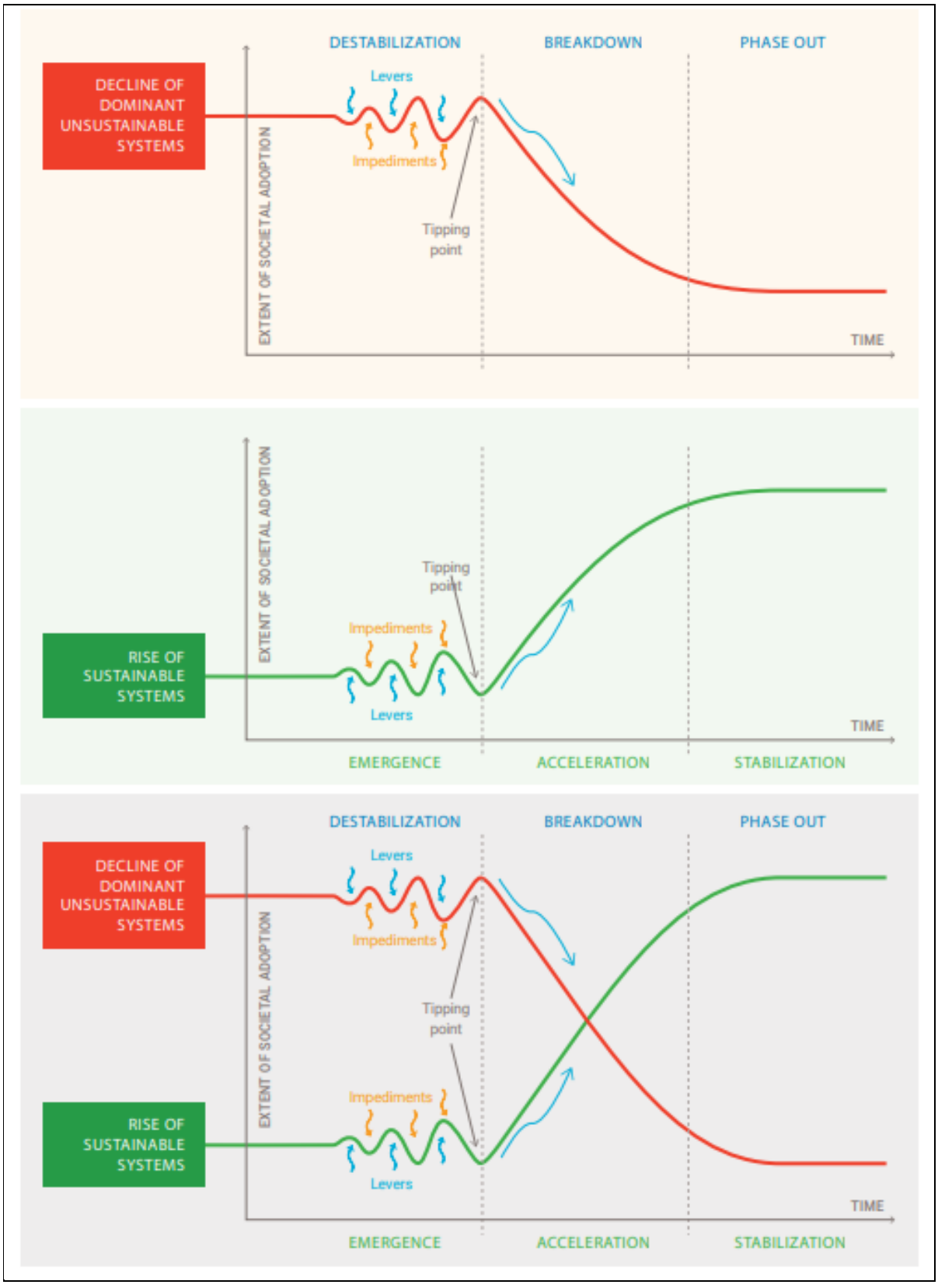
S-curve transformations

A successful transformation can be considered in three phases – emergence, acceleration and stabilisation – that trace an S-curve (figure 4-1).[422] The first, emergence phase is when innovative ideas slowly give rise to new technologies and practices that operate in niches

and on the fringe, often through experimentation and learning. During the second, acceleration phase these innovations gain momentum and reach tipping points beyond which they are widely shared and adopted, leading to rapid, non-linear growth. Finally, in the third, stabilisation phase these technologies and practices become embedded in daily life as the new normal.

S-curves work in both directions. The rise in innovative technologies and practices aligned with the SDGs would be mirrored by a decline in unsustainable technologies, institutions and practices. This reverse S-curve has three corresponding phases: destabilisation, breakdown and phase-out.[423] For example, the rise of renewable energy systems or electrified transport, is being matched by the decline of fossil-fuel energy and internal combustion vehicles. Similarly, the rise of sustainable agricultural systems and dietary practices will be accompanied by a decline in conventional, unsustainable agriculture and diets. Policy makers can intervene along both of these curves – using different levers to overcome impediments and support positive options while also destabilising and breaking down unsustainable configurations.[424]

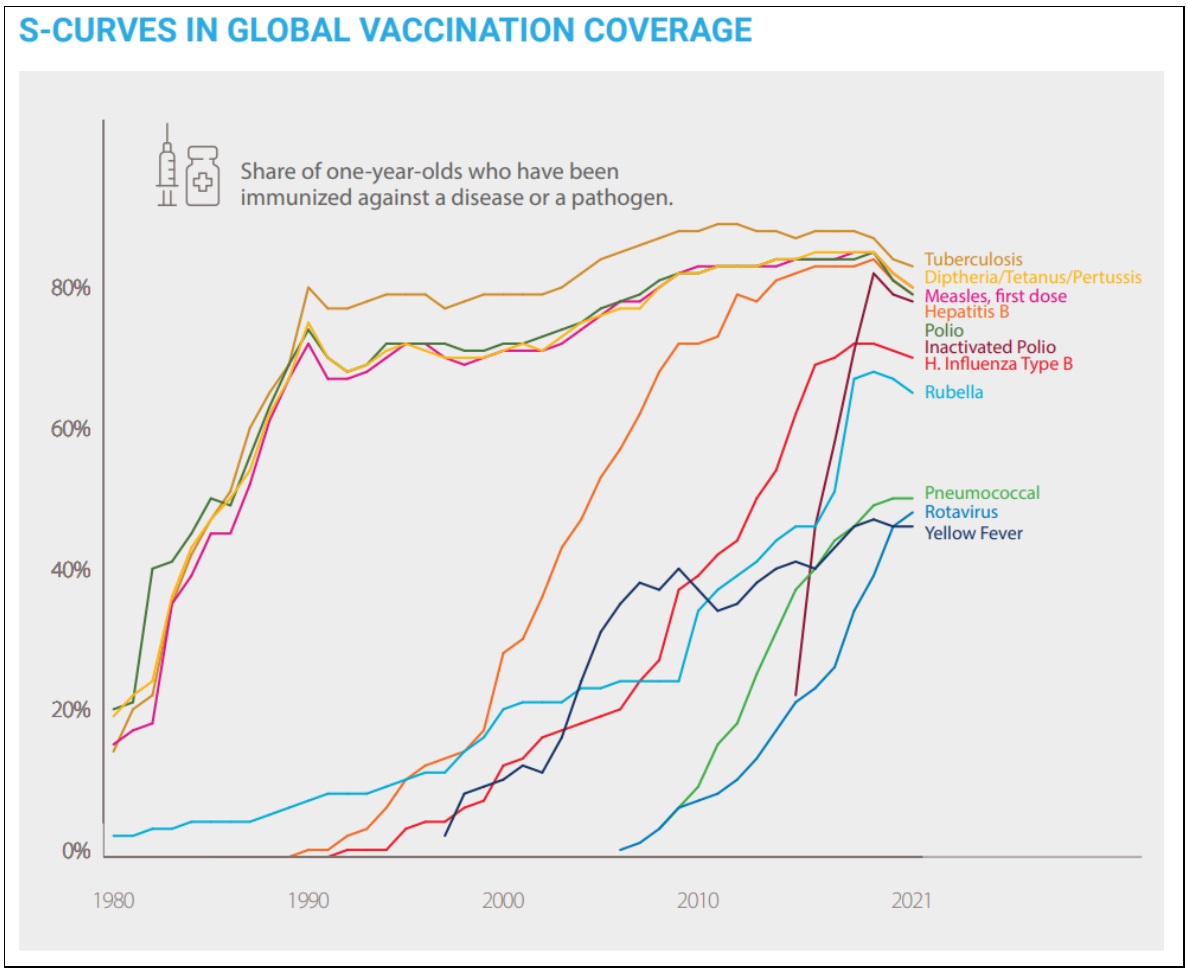
Figure 4.1: Three phases of transformation



The S-Curve is a familiar pattern in scientific research where it may represent the life of a system,[425] a social-ecological transformation,[426] or the diffusion of innovation.[427] An

example of a science-based S-curve transformation relevant for the SDGs is global immunisation, which was a key part of the 'child survival revolution' from the 1990s, as governments, international organisations and others significantly boosted global vaccination coverage (figure 4-2**).**

Figure 4-2: S-curves in global vaccination coverage



Source: Samantha Vanderslott, Saloni Dattani, Fiona Spooner and Max Roser (2013) - "Vaccination". Published online at OurWorldInData.org. Retrieved from: 'https://ourworldindata.org/vaccination'

Diffusion of new innovations and practices is important in transformations and can be seen as involving five groups of people.[428] First in are the 'innovators' who may be motivated by the status and excitement that comes with newer technologies or practices, whatever the price. Next come the 'early adopters' who consider the costs and weigh the advantages and disadvantages of the innovations, followed by the 'early majority' and 'late majority' who are often influenced by social pressure. Last are the 'laggards' who are less susceptible to social pressures and who may consider innovations unnecessary and expensive or even competitive with other interests, and only adopt them if there is no other option.[429]

Along this trajectory, the innovations themselves evolve, typically becoming cheaper and more effective as they are embedded with other complementary institutions, norms, technologies and infrastructure (Box 4-1). Beyond a tipping point, an innovation reaches a critical mass and could become self-sustaining.[430] It has been estimated that having 20 to 30

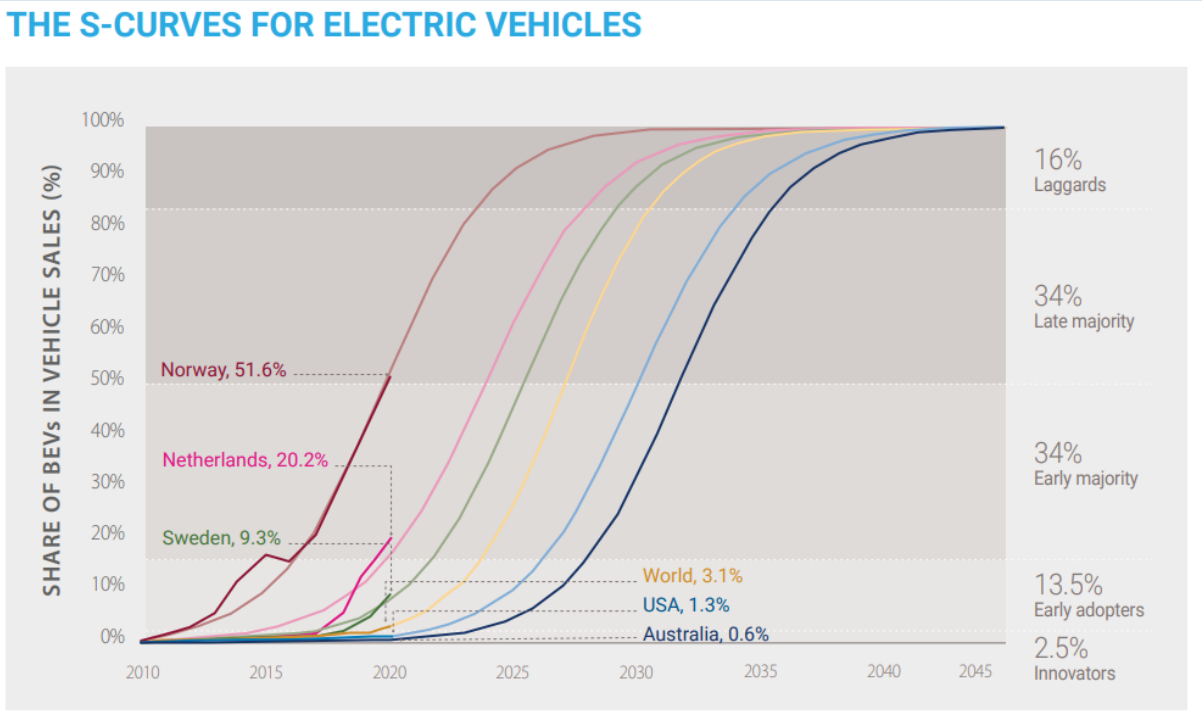
percent of a population engage in an innovative activity can be sufficient to tip the whole society.[431]

Box 4-1: The S-curves for electric vehicles

In 2021, sales of battery electric vehicles reached around 6 per cent of new car sales.[432] At the global scale, this places them in the 'early adopters' category. However, several countries, such as Norway and the Netherlands advanced rapidly along the S-Curve, moving into acceleration and towards stabilisation. Key factors for potential adopters are the up-front costs and availability of an adequate charging network.[433] Governmental policy and tax incentives also helps acceleration.

However, this transition can also cause damage and trade-offs and spillovers must be accounted for and managed. For example, there are growing concerns about resource availability, labour rights, and non-climate environmental impacts. There are also the costs of critical minerals needed for lithium-ion batteries, though there are considerable opportunities for recycling and for circular and closed-loop systems.[434]

Share of battery electric vehicles in new passenger vehicles sales and projected S-curves, by 2020[435]



Nevertheless, innovation can also fail or divert along undesirable pathways (figure 4-3). This can happen, for example, if innovations are not complemented with necessary infrastructure, markets or supportive policies.[436] For example, emerging technologies may find it hard to compete with lower cost and high-performance incumbent technologies, requiring policies and incentives to promote their adoption.

Other sources of failure include lock-ins to old technologies and practices, as a result of large sunk investments in existing infrastructure, skills and industries that can create vested interests opposed to change – as with decades of investment in fossil-fuel based infrastructure. Such vested interests may use their access to policy processes to resist or water down policy changes that could accelerate the uptake of new innovations.[437] Or there can be backlashes as people protest against lost livelihoods or perceived loss of status when

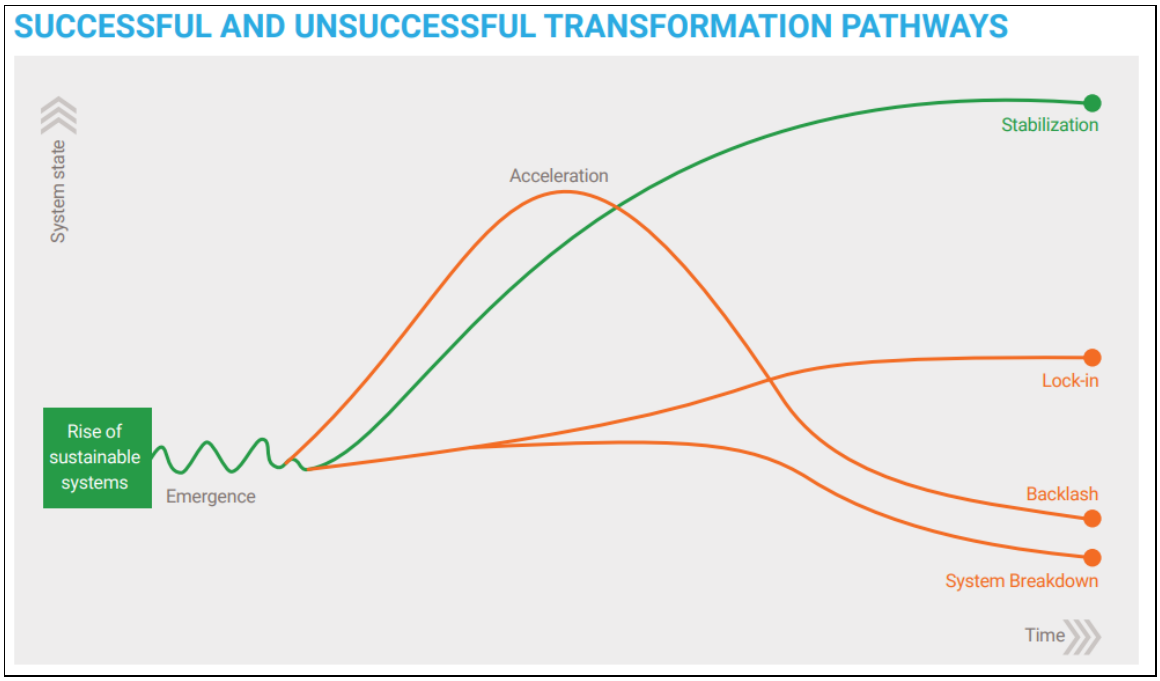
automation displaces them from their jobs. Or there can be system breakdowns, as a result of continuing conflict fuelled by strong coalitions of vested interests or political corruption. In countries with ongoing conflicts, it can be too dangerous even to send children to school.

Other impediments that undermine transitions include critical gaps in human, financial and institutional capacities and threats against peace and security;[438] existing regulations, standards, and incentives that favour incumbent firms and interests and create an uneven playing field for emerging sustainable alternatives;[439] unanticipated or unmanaged trade-offs and spillover effects from other actions; as well as behaviours and entrenched social norms where lifestyles become organised around particular technologies, practices and behaviours and are difficult to change.[440]

For example, particularly for innovations that benefit women, existing social norms and behaviours can create barriers to innovation. According to the Gender Social Norms Index, 91 per cent of men and 88 per cent of women show at least one clear bias against gender equality in areas such as politics, economics, education, intimate partner violence and women's reproductive rights. Men show higher biases across all dimensions.[441]

Countries can also remain locked into older systems if governments settle for 'low hanging fruit' or only adopt piecemeal solutions. They may, for example, adopt natural gas as a transition fuel but go no further towards renewable energy. This may improve system performance for a while but will not support the related SDGs or climate objectives. 'Small wins' can buy time and build up capabilities and momentum, but if they fail to address fundamental problems they can delay decisive transformations and lead ultimately to system breakdown.

Figure 4-3: Successful and unsuccessful transformation pathways[442]



Source: Loorbach *et al.*, 2017.

SDG curves

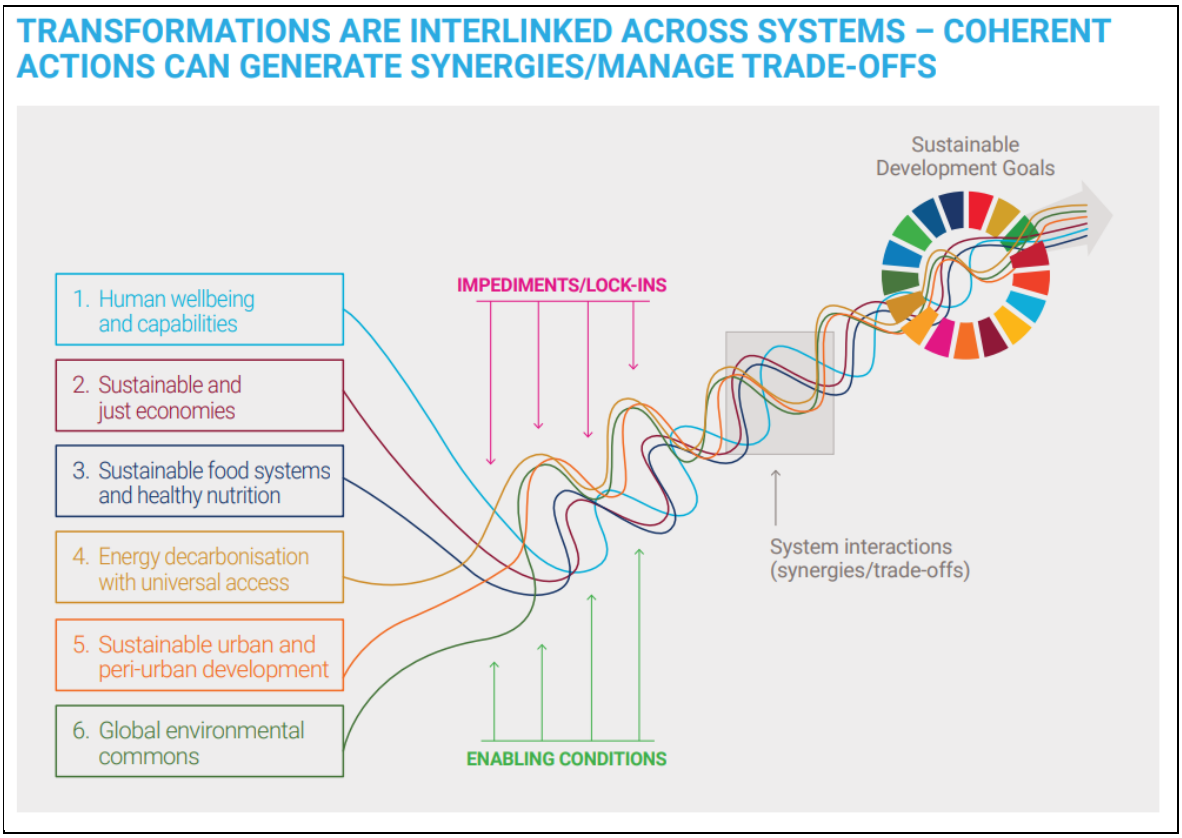
To achieve the SDGs, many systems need to transform simultaneously, so it is essential to track the interactions between different systems transformations and identify the important synergies and trade-offs. The transformations required to achieve the SDGs working through the six entry points summarized in Chapter 3 must be mutually reinforcing (Figure 4-4). For example, decarbonization of energy systems can achieve climate goals but also destroy jobs and livelihoods in the fossil-energy industries. This underscores the importance of also considering 'just transitions' that leave no-one behind and ensure a fair distribution of benefits.

Another consideration relates to how transformations involve interactions across geographies and scales as raised in chapter 3. Interactions between actors and institutions from local to global levels allow for sharing good practices and innovations and spreading ideas across scales. For example, in response to slow progress on climate action at national and global levels, cities have shown local climate leadership, such as through the C40 Cities alliance.[443]

Positive spillovers can also be generated through global technological innovation and dissemination. For example, decades of investment in innovation and market incentives for renewable technologies bring cost-effective opportunities for universal energy access in low-income countries (through 'leapfrogging') and could trigger a global-scale acceleration in the energy transition.[444] However, tensions and negative spillovers may also occur, for example where there are barriers to technology diffusion, unequal sharing of benefits and opportunities, conflicts between jurisdictions and actors, or where desirable transitions to the SDGs in some jurisdictions impede progress or create set-backs in other jurisdictions.[445]

Calls for transformation do not come without challenges. As figure 4-4 indicates and as discussed in Chapter 3, there are significant impediments to SDG achievement across entry points including the lock-in of existing patterns and social and political backlash against change.[446] Identifying common impediments to transformation and creating enabling conditions can underpin a strategic approach for accelerating transformations towards the SDGs. The five transformation levers introduced in chapter 3 provide the means for various actors to create these enabling conditions.

Figure 4-4: Multi-system transformations and interlinkages for the SDGs



Source: Allen, C., et al., 2023 Modelling six sustainable development transformations and their accelerators, impediments, enablers, and interlinkages. manuscript under review by *Nature Communications*, DOI: https://doi.org/10.21203/rs.3.rs-2437723/v1

As transitions evolve across the S-curves, countries can minimise impediments by creating supportive technological, social and political conditions. They can also work to build trust and consensus, provide the finance, and safeguard against undesirable consequences.[447] This will require bold leadership, a shared vision and direction, collective effort using the levers in a coordinated way, and mutual accountability. And even if leadership falters at the national level, it can still forge ahead at the local level (Box 4-2).[448]

Box 4-2: Bouaké Sustainable City Project

Bouaké, the second most populated city in Cote D'Ivoire, had remained for years under control of the armed forces, becoming the capital of the rebellion.[449] The Bouaké Sustainable City project has a budget of $2 billion over four years and is funded by the city (20 percent) and the European Union (80 percent). The project aims to integrate urban development in the city by strengthening partnerships and resilience in the face of climate change. It develops activities related to participatory and inclusive governance, training and awareness-raising, greening by the network, the inclusion of youth (including 40 percent girls) in the green economy, as well as promoting urban greening, mapping, and geographical information systems.[450]

The following sections unpack the different phases of transformation for SDG achievement and describe the mutually reinforcing use of the five levers – governance, economy and finance, science and technology, individual and collective action, and capacity building.

Phase 1 – Emergence of the new and destabilisation of the old

The Covid-19 pandemic, the wars and violent conflicts in Ukraine, the Sahel and other regions, and the intensifying impacts of climate change create severe shocks. But these

challenges can also trigger experimentation, innovation and learning which are common in the emergence phase of transformations.

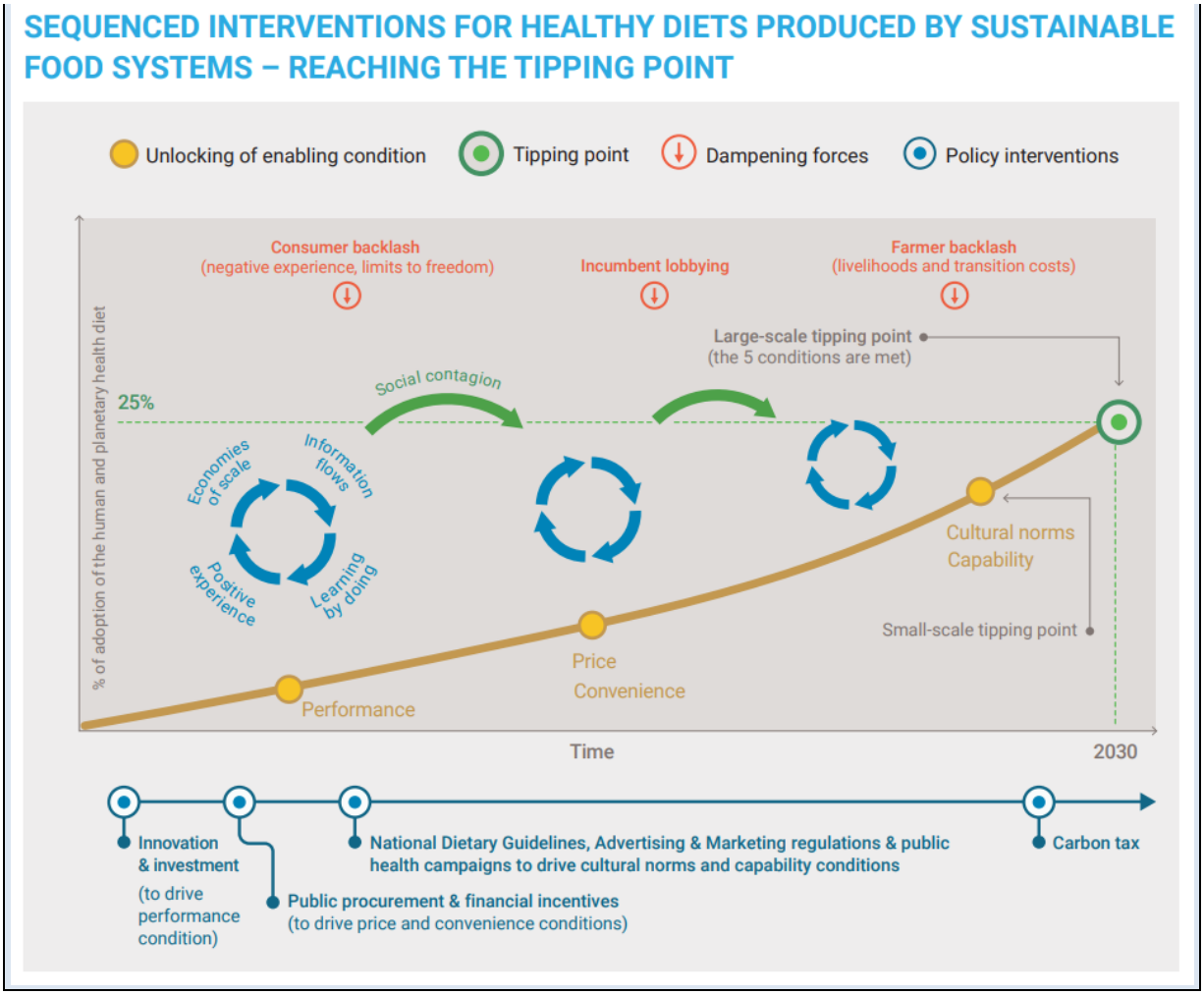
Climate change and food insecurity, for example, are causing people to rethink their diets (Box 4-3). Partly in response, food systems are likely to be transformed in the next ten years by a diverse pipeline of technologies including consumer-ready artificial meat, intelligent packaging, and vertical agriculture.[451]

Box 4-3: Tipping-points for healthy diets[452]

The nutrition-related SDGs require healthier diets supported by sustainable food systems with less consumption of ultra-processed foods and meats, and more of plant-based foods and whole staple crops.[453]

In 2019, the EAT-Lancet commission proposed a planetary health diet. The commission illustrated the proposal in which half of the plate is filled with fruits and vegetables, and the other half primarily with whole grains, plant proteins such as beans, lentils, pulses, and nuts, unsaturated plant oils, modest amounts of meat and dairy, and some added sugars and starchy vegetables. The diet is flexitarian and allows for adaptation to dietary needs, personal preferences and cultural traditions. Vegetarian and vegan diets are two healthy choices that fall within the planetary health diet.[454]

It has been estimated that a dietary tipping point may be reached in Europe, for instance, in 2030 once a quarter of the population has adopted the planetary health diet. Momentum can be sustained with a mix of well-sequenced interventions including public procurement, national dietary guidelines, marketing regulations and public health campaigns.[455]



Congestion and pollution in cities is causing urban managers to consider how they can improve the quality of city life, and make it more sustainable with nature-based solutions.[456] The city of Barcelona, for example, has installed a series of 'superblocks' with areas closed to motorised vehicles and preference given to pedestrians who can enjoy recreational areas, meeting places and green spaces.[457] In Bandung, Indonesia, in collaboration with businesses and other stakeholders, the provincial government is redesigning the street layouts to be more liveable, and establishing social areas, where people can sit and relax, including wi-fi - enabled benches for children to do their homework, and spaces for celebrating culture, festivals and events.[458] Similarly the city of Chengdu in China, is creating a liveable "park city" aiming to reduce the urban heat island effect by expanding green space, building up ecological resilience, and providing for leisure and physical exercise."[459]

New technologies can also create new opportunities for civic participation and digital engagement.[460] For example, in the city of Dar es Salaam in Tanzania, university students and local residents have worked on a community-based mapping project, Ramani Huria, to create accurate maps of the city's most flood-prone areas. Data collected from participatory mapping is digitised into OpenStreetMap and enhanced with GIS analysis and aerial photos from drones to model flood risk and improve planning for resilience.[461] Similarly the user generated accessibility application, Wheelog!, provides an interactive map with accessibility information for public and commercial facilities for persons with mobility challenges including for wheelchair users.[462]

For each of the different entry points, and systems transformations there have been many social and governance innovations. In Canada, Germany, Netherlands, and Switzerland, for example, social innovation networks are addressing inequality by experimenting with universal basic incomes. In Argentina and Uruguay cooperative housing organisations are supporting affordable, inclusive housing. In Chile, Hungary and other countries the organisation Via Campesina is promoting social justice and dignity through family farming.[463] Another example is the Wellbeing Economy Governments Partnership comprising Scotland, New Zealand, Iceland, Wales and Finland which is pursuing the transition to a wellbeing economy. New Zealand has introduced a 'wellbeing budget' that distributes public funding based on wellbeing considerations.[464]

Innovations like these are the product of many different actors experimenting, learning and adapting. During the emergence phase, the innovations may not immediately disturb the status quo, but they can plant the seeds for long-term transformations.[465]

Levers and actors

To bring about transformation, actors must apply all five levers – governance, economy and finance, science and technology, individual and collective action and capacity building – and do so in a synergistic way.

Governance – The emergence phase should involve deliberative processes and collective sense-making, as governments and other stakeholders build common narratives and visions, and explore alternative pathways through scenario planning and modelling[466] – as with Agenda 2063 in the African Union,[467] the European Green Deal in the EU,[468] or the Green New Deal in the United States.[469] Such mission-oriented change requires private and public actors and civil society to recognize that development not only has a rate of change but also a direction aligned with the SDGs. The Fossil Free Sweden initiative is an example of applying governance to align multiple levers to accelerate the climate transition (Box 4-4).

Goal setting is an important global governance strategy, which can emphasize the consequences of policy choices and corporate strategies.[470] For the private sector, examples include the Science-Based Targets initiative that aligns emission goals with climate science, the RE100 initiative for 100 per cent renewable energy, and actions among businesses to address the use of wasteful packaging materials.[471]

In the emergence phase, effective monitoring and analysis of progress can provide vital inputs. The 2030 Agenda encourages Member States to conduct voluntary national reviews (VNRs). As of May 2023, 189 countries had submitted at least one VNR, to a total of 341 since 2015.[472] Most reviews are conducted by national governments, while some include reviews by stakeholders. VNRs would be more useful if they took the form of evaluations and included more inter-country peer review. In addition, by 2022 local governments had submitted 120 sub-national Voluntary Local Reviews which allowed for new forms of data collection with more participation and inclusion.[473]

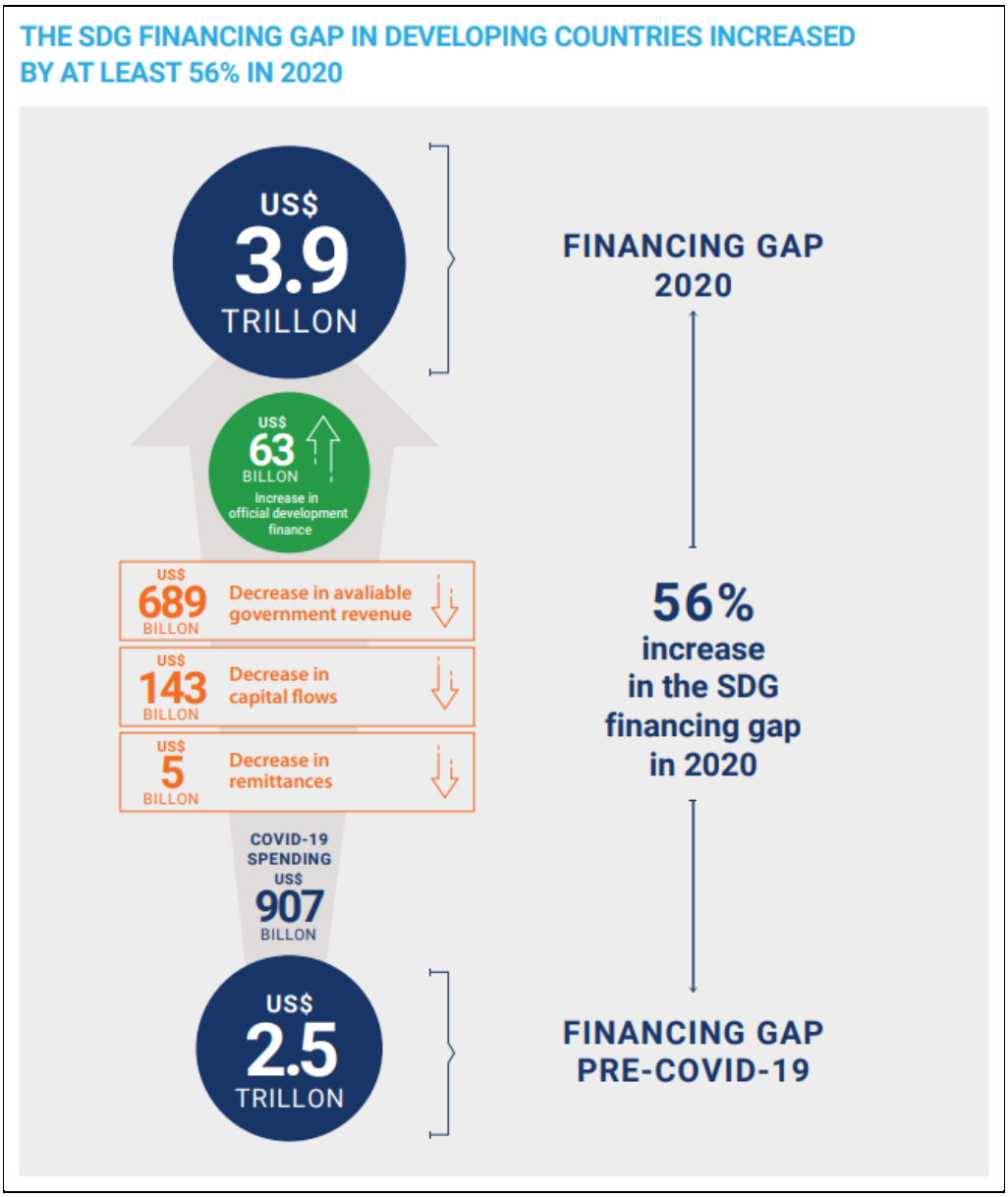
Box 4-4: Fossil Free Sweden – industry roadmaps identifying needed policy change

Ahead of the Paris Agreement in 2015, the "Fossil Free Sweden" initiative was started by the Swedish Government to mobilise companies, trade associations, municipalities, regions and organisations and deliver on the objective for Sweden to become one of the first fossil free nations in the world.[474] Led by a small

secretariat operating outside of the government ministries, the initiative convened key actors and started developing industry-led roadmaps. To date, 22 business sectors have developed such roadmaps, including sectors facing significant challenges in transitioning to net zero emission: agriculture, aviation, heavy transport, cement, steel, ski resorts, forestry, digital sector, food, and fast-moving consumer goods. The roadmaps have a dual purpose; to present the sectors' own commitments and to identify and propose policy change. They seek to outline a roadmap to net zero emissions, but are also built on the assumption that business and industry need remain competitive. In this way, the initiative has served to internalize the net zero climate targets in industry and business at large, to the extent that they develop their own pathways and become active stewards. Further, business and industry have proactively demanded policy change and clear regulatory frameworks that support implementation of their roadmaps. In this way, Fossil Free Sweden can be seen as a governance innovation, that could potentially be replicated in other places and with a view towards other societal objectives.[475]

Economy and finance – It has been estimated that achieving the SDGs could require additional annual investments of $1.4 trillion to $2.5 trillion,[476] though because of COVID-19 the cost could now be $4.2 trillion.[477] The gaps are certainly large (figure 3-5), but they are equivalent to only 1.1 per cent of the $379 trillion of total financial assets held by banks, institutional investors and asset managers.[478]

Figure 4-5: The SDG Financing Gap



Source: OECD 2022b

To fill the gaps and give governments some space to foster ideas in the emergence phase, innovative financing mechanisms need to be used. These include SDG bonds, still very much a work in progress, which can help developing countries access international financial funds. Mexico issued SDG Sovereign Bonds in 2020 and 2021.[479] Many countries are already dealing with crushing debt repayments and interest. Barbados, Belize and Seychelles have issued climate for debt swaps or blue bonds.[480] Developed economies, international financial institutions and multilateral development banks will need to support reforms that enable highly indebted countries to avert further worsening fiscal conditions.[481]

Governments, multilateral development banks, private finance, philanthropists and others will need to support the piloting, prototyping and commercialization of new knowledge. In developing countries, private finance is often prohibitively expensive so transformation will rely more on public finance.[482] Grants and concessional finance are also needed to offset

public debt and debt-servicing costs, particularly in the poorest countries which need comprehensive debt relief. Game-changing visions for finance are also important. The Bridgetown Initiative launched in advance of COP27 includes five specific proposals to make the global financial system more responsive to the climate and development crises (Box 4-5).[483]

Box 4-5: Bridgetown Initiative: making financial markets work for the Paris Agreement and the SDGs

While high-income countries borrow in the market at rates one to four per cent, lower-income countries, which are perceived as riskier, are charged an average of 15 per cent.[484] In these circumstances low-income countries find it difficult to fund the cost of technological advances, infrastructure, and investments for the transformation to low carbon economies. In 2022, the Bridgetown initiative proposed a Climate Mitigation Trust, that would borrow on the international capital markets and then lend for green investments in developing countries. The aim is to draw on up to $5 trillion of private finance.[485]

Bridgetown also calls on the World Bank and regional development banks to take a new approach to risk ratings, making more concessional lending available for adaptation. Bridgetown also advocates for a tax on oil companies to finance reconstruction following climate disasters. To provide relief from crushing debt-servicing payments it also calls for outstanding loan repayments to be temporarily paused when a country undergoes a climate disaster.[486]

While some investors are moving toward sustainable and ESG investment by selecting ESG indices,[487] some other investors, such as public pension funds, argue that they cannot move in new directions because they have to follow regulations, avoid risk, and maximise returns to shareholders.[488] In these cases, governments should alter the rules of the game, sending clear market signals through new regulations and providing credible long-term policies and targets.[489] For example, to encourage people to use renewable energy or electric vehicles, governments can introduce tax rebates, require electricity providers to offer feed-in tariffs, or provide purchase subsidies.[490]

Science and technology – Food, energy, transport, health and urban systems are often driven by innovations that come from academic, government and corporate laboratories. In the quest for sustainable oceans, for example, these institutions have contributed technologies such as remote sensing, artificial intelligence, and machine learning that provide valuable information for marine spatial planning.[491] Scientific research, if well-communicated and accessible to those who need it, can help to build awareness of critical challenges and stimulate experimentation.

The science and technology lever can be "pushed" – for example, through investments in universities and other research institutions earmarked for research relevant to the SDGs. Some awarding schemes include financial and scaling support as a prize, such as the case of The Earthshot Prize.[492] But it can also be "pulled" through interventions that create demand, as with Japan's Sunshine Project, the German Renewable Energy Sources Act, and the Southern African Solar Thermal Training and Demonstration Initiative (Box 4-6).[493]

Box 4-6: Southern African Solar Thermal Training and Demonstration Initiative

In the Southern African Development Community region, 80 percent of electricity is generated from coal. The Southern African Solar Thermal Training and Demonstration Initiative SOLTRAIN is a regional initiative that supports countries in changing from a largely fossil-energy supply system to a sustainable supply structure based on renewable energy, and particularly on solar thermal.[494]

Key components include training and internships for artisans and engineers on design and installation of solar water heaters, and advocacy for replacement of electric geysers with solar water heaters. By the end of September 2022, over 3,000 people had been trained in 110 courses and 320 solar thermal systems had been installed.[495]

In order to support broad rollouts of solar thermal systems in all six countries in the initiative, solar thermal roadmaps and implementation plans were developed in broad stakeholder processes in close cooperation with ministries and governmental bodies. Social institutions also provided funding to install solar water heaters in their infrastructure. This initiative promotes energy access, poverty alleviation, decarbonization and inclusion.[496]

Individual and collective action – In the emergence phase this can involve micro-level actions, such as individuals changing consumption patterns, or meso-level actions, such as workers' cooperatives and community energy projects, or through feminist movements, or political lobbying such as the Fridays for the Future youth movement (Box 4-7).[497] Here, too, the current spate of crises can spur new behaviours and patterns.

Box 4-7: The African Youth SDGs Summit

The United Nations High-Level Political Forum (HLPF) and its preparations and related processes can provide a fruitful capacity-building experience for people within and outside governments, particularly when countries nurture inclusive approaches. In 2022, Youth Advocates Ghana, in collaboration with Talent Youth Association Ethiopia, the United Nations Association of Ethiopia and the Office of the UN Resident Coordinator in Ethiopia, convened an African Youth Summit in Addis Ababa.[498] The Summit included capacity strengthening sessions for 40 youth groups, consultations with state institutions, and sessions on strategies that networks can adopt to restructure their programmes and mobilise resources to build back from COVID-19.[499]

In 2019, protests in Chile against high inequality spread to the rest of Latin America and were also echoed in the Middle East. There have also been social movements for women's equality notably in Iran. If governments are to encourage behaviour change, they have to address structural barriers and social movements can be the impetus.

Capacity building – The emergence phase also requires the capacity to innovate and generate sustainable alternatives – and provide informal and protected spaces for innovation and dialogue (Box 4-8).[500] Certain capacities may be required for effective governance and policy implementation. For example, increasing capacity in health technology assessment can help focus limited government resources on essential and useful health technologies and interventions that help speed up the implementation of universal health care.[501] Capacities are also needed in setting strategic direction and the use of foresight and scenario analysis methods. Countries may also need to refine ideas, practices and technologies and encourage people to switch to new systems such as rapid energy-efficient transit transportation systems and move to more sustainable forms of consumption, or to contraception to empower women to choose their family sizes.[502]

Box 4-8: Backyard Farming in the Bahamas

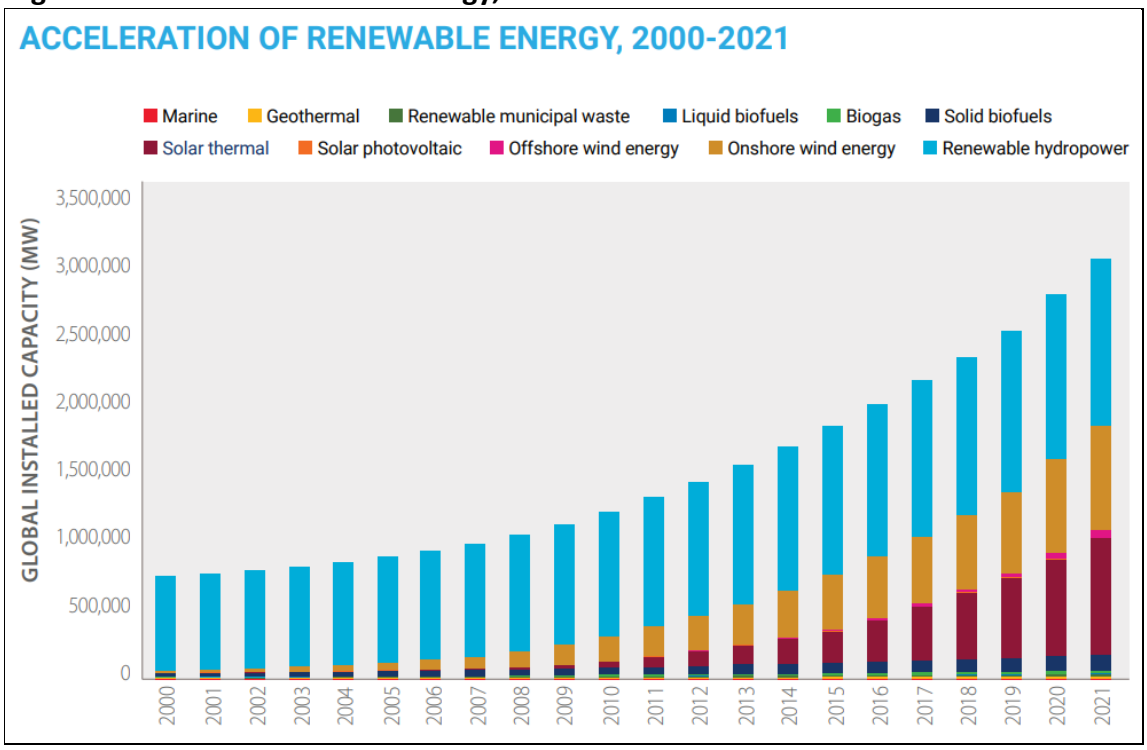
Launched in 2008, the Backyard Farming project in the Bahamas is an effort to strengthen food security in an import-dependent country and increase technical knowledge in economically depressed communities.[503] It has been spearheaded by women and girls who are the primary food producers in homes and has led to an increase in technical skills for rural communities. In 2020, as the country struggled with food-import and supply-chain issues related to the COVID-19 pandemic. The Government distributed 30,000 backyard kits, as well as hydroponic kits to grow leafy greens, and is working to allocate 50,000 more in the near future.[504]

Phase 2 – Acceleration of the new and breakdown of the old

After they emerge, innovations can eventually reach a 'tipping point' – with a rapid acceleration beyond which it is hard to reverse.[505] Tipping points can be difficult to predict, but they often coincide with major societal shifts in perspectives such as feelings about single-use plastic, or when innovations suddenly become easier to use or more socially desirable, as happened with the smartphone.[506] They can also become cheaper as with renewable energy through solar and wind installations and the development of complementary technologies[507] (figure 4-6).

Importantly, there are also negative tipping points, beyond which it is impossible to diverge from a damaging or dangerous trajectory. This is the case for a number of environmental "points of no return," including climate change and biodiversity loss that are threatening ecosystem collapse which will have negative implications for many SDGs. But there can also be social, economic and governance tipping points when inflation, corruption and conflict lead to failed states.[508]

Figure 4-6: Rise of renewable energy, 2000-2021



Source: Global Energy Outlook

There are many examples of technologies and innovations accelerating. This was the case for cooking stoves in China from the 1980s. The Ministry of Agriculture sponsored the National Improved Stove Program, which between 1982 and 1998, helped increase penetration of improved stoves from less than 1 per cent to 80 per cent .[509] Another important example is that of lighting in Sweden which was able to phase in energy-efficient lighting in commercial buildings in about nine years, using a multi-pronged approach of standardization and quality assurance, direct procurement, stakeholder involvement, government subsidies, and pilot demonstrations.[510]

Innovation can be given a sudden jolt by shocks or crises – creating windows of opportunity for new technologies, practices and norms. COVID-19, for example, has accelerated the use of virtual meetings, and more flexible work practices around the world. And in many developing countries the pandemic spurred governments to support struggling workers and households by expanding systems of social protection (Box 4-9). Powerful actors may also add their support and influence new ways of thinking, doing and acting, as has happened with the electric car.

Box 4-9: Universal social protection is boosted by crises

Social protection is the set of policies and programmes designed to 'reduce and prevent poverty and vulnerability throughout the life cycle'. This includes health protection along with benefits for children and families, maternity, unemployment, and employment injury, as well as for sickness, old age, and disability. National social protection systems address some or all these areas through a mix of contributory schemes, social insurance, and non-contributory tax-financed benefits, including social assistance.[511]

A century ago, few countries had social protection systems and by 2017, only 45 per cent of the global population were effectively covered by at least one social protection benefit. The remaining 55 per cent – as many as 4 billion people – were left unprotected.[512] SDG 1.3 calls upon countries to implement nationally appropriate social protection mechanisms for all, including floors. A 'social protection floor' ensures that over the lifecycle all those in need can afford and have access to essential health care and have income security at a nationally defined minimum level.

Many developing countries have a bifurcated system with support going primarily to two groups. The first comprises workers in the formal sector who receive benefits corresponding to their contributions and those of their employers. The second comprises people living in poverty who are targeted to receive tax-funded 'social assistance' in the form of cash, vouchers, or benefits in-kind such as school meals. They may also receive conditional cash transfers – payments conditional, for example, on their children going to school or attending medical clinics. They may also earn wages from employment in public works programmes. This can leave a 'missing middle' of people who are not in poverty but earning modest incomes in the informal economy, or people who form part of the emerging middle class yet are vulnerable to sudden shocks such as a loss of employment or catastrophic health expenditures.[513]

During the COVID-19 pandemic, governments acted quickly to protect their citizens. According to the World Bank, during the pandemic, 203 countries increased their coverage. Around two-thirds of expenditure was on social assistance, [514] most in the form of cash transfers, and in-kind and food transfers and the rest on labour market programmes and social insurance.[515] In 2020-2021, social protection expenditure reached $3 trillion – 4.5 times higher than was spent in the 2008-2009 financial crisis. However, more than 60 per cent of this total was in the United States.[516]

As with social protection generally, it proved difficult to reach informal workers. In Latin America these included people who were not poor enough to qualify for cash transfers but also did not qualify for unemployment schemes based on public or private insurance. Nevertheless, the lockdowns and economic downturn put them at high risk and during the worst parts of the pandemic many lost their livelihoods.[517] In Africa, too, many informal workers were left out.[518]

In September 2022, to fight inflation and the cost-of-living crisis, governments announced or implemented a total of 609 additional social protection and related measures across 158 economies.[519] Countries need to constantly improve and update information systems on poor and vulnerable groups. To be more inclusive, datasets should go beyond the extreme poor and include the next income brackets and vulnerable populations.[520]

The pandemic illuminated major blind spots in the labour market, including informal and self-employed workers and highlighted the need to rethink unemployment insurance, social assistance and other tools. It also encouraged new forms of financing, such as the monotax in Argentina, Brazil and Uruguay and sin taxes in

Mauritius, Panama, Tunisia and the Philippines.[521] The current cost-of-living crisis may also encourage other financing options, aligning taxation with SDGs and innovative earmarked taxes.[522]

However, early success in innovative technologies and practices does not directly translate to scale-up, acceleration and wider societal adoption. During the acceleration phase progress can be slowed by high financing costs, lower risk-reward profiles, and inertia in market design and business models.[523] Capturing, documenting, review and evaluation, and then situating learnings from early interventions is key to later and ongoing success. Conflicts, tensions and political struggles are also common in the acceleration phase, as different actors, interests and coalitions may seek to promote or delay the transition.

Levers and actors

During the acceleration phase transitions can be steered by judicious use of the five levers.

Governance – Proactive and decisive governments can shape markets, by stimulating research and innovation, investing in public infrastructure, setting targets and regulating businesses.[524] This entails an interventionist and deliberate government, ideally reorienting economic activities towards sustainable development goals.[525] Early interventions are generally easier and can build a foundation for later activities that are harder to implement and more controversial.

There can, however, be internal conflicts or trade-offs within government. Political leaders must often balance the goals of different ministries – as economic ministries argue for boosting food consumption and car production, for example, while health ministries worry about obesity and air pollution.

In addition, there can be competing voices within ministries – for agriculture, for example, where a more widespread use of biomass for biofuels has increased the risk of monocultures that compete with food production.[526] It is important to have horizontal policy coordination across different portfolios and ministries to ensure coherence, as well as across levels of government (Box 4-10).[527] For example, in Germany not only does the Federal Chancellery have a coordination role, it is also steering the policy process and providing important inputs to relevant ministries.[528] In Canada, the Federal Sustainable Development Act has designated lead departments and agencies for each of the 17 SDGs.[529]

Box 4-10: Cross-ministry efforts in food systems

Brazil — The school catering system dates back to the 1950s.[530] Since 2009, however, the Government has radically changed the system, through the National School Feeding Program (PNAE) which uses public procurement and works with various ministries to simultaneously advance food security, education and rural development objectives.[531] PNAE offers a premium of up to 30 per cent for certified organic and agro-ecological products. The programme also uses at least 30 per cent of its budget to purchase from local family farmers, helping integrate them into markets for specific local foods and alternative trade networks. [532] PNAE has proved successful at reducing child malnutrition, increasing access to healthy foods, improving eating habits, and reducing school absenteeism.

France – In 2001, France instituted a food policy that aims to ensure that the population has access, under conditions that are economically acceptable to all, to safe, diverse food in sufficient quantity, of good taste and nutritional quality, and produced under sustainable conditions.[533] The second national food programme developed in 2014, advocates the establishment of 'territorial food projects' (TFPs) to bring together

producers, processors, distributors, local authorities, civil society actors and consumers.[534] The management and coordination of the TFP system has been carried out within the General Directorate of Food by a sub-directorate that relies on correspondents in the social ministries.[535]

From 2014 to 2020, 181 TFPs were created. France's recovery and resilience plan following COVID-19 increased the number of TFPs to 332, reaching 45 million people, or about two-thirds of the population.

Acceleration is usually accompanied by breakdowns of existing systems – which often causes distress for workers, as has happened in manufacturing and coal mining communities.[536] Governments can ameliorate this by investing in training for workers. In the Republic of Korea, the 2021 Carbon Neutrality Act requires the Government to address "inequality that could arise in the societal transition to carbon neutrality" and provides for support to populations vulnerable to both climate change and loss of jobs related to climate action, and also stipulates support for small enterprises and support for reemployment.[537]

Governments can also help ensure just transitions by increasing social protection (Box 4-11). An emerging approach is 'adaptive social protection' which integrates social protection with disaster risk reduction and strategies for climate change mitigation and adaptation.[538] Adaptive social protection can help communities become more resilient and better able to cope with shocks. This may be through payments for environmental services, or for employment in public works programmes to build disaster-resilient infrastructure.[539]

Social protection can also help accelerate the attainment of other SDGs. For example, in the Philippines, coupling cash transfer programs to specific prerequisites such as utilizing of prenatal care for pregnant women and immunisation of children between 0 – 5 years has helped increase the utilisation of such basic health services for the attainment of universal health care.[540]

Box 4-11: Social protection enables just transitions to low-carbon economies

The transition to green energy and low carbon economies requires the phase out of fossil fuel-based energy and other high-emissions technologies, inevitably resulting in losses of employment in these industries. It has been estimated that between 2021 and 2030, in the United States, 12,000 workers in the coal industry will lose their jobs each year, and over the period 2031-2050 as oil and gas use decrease, about 34,000 workers in these industries will lose their jobs each year.[541]

These impacts can be cushioned by agile social protection systems. In countries that provide universal social protection, workers supported by benefits, including employment and health insurance are in a better position to find new lines of work. In South Africa in 2022, for example, a presidential commission presented a Framework for a Just Transition, which recommended income support for workers and communities impacted by green transitions.[542] One problem is that the benefits from green transitions are not necessarily in the areas that bear the brunt of shut-down industries, as recognised by Chile in its Strategy for a Just Energy Transition, and by the province of Alberta in Canada.[543]

Effective mechanisms for SDG accountability are needed – at all levels and in all sectors – to ensure that decision-makers are answerable for results on transformation towards the SDGs. A 2020 survey of peoples' perception of government accountability on the SDGs found perceived accountability highest in Europe and in Asia and the Pacific and lowest in the Middle East.[544] The Voluntary National Reviews (VNRs) provide one mechanism for regular and inclusive reviews of national progress towards the SDGs.

Economy and finance – To accelerate progress, existing financial mechanisms need to be improved in order to deliver tangible results, within a well-aligned domestic and international financial architecture. To support these efforts UNDP has integrated national financing frameworks (INFFs) to strengthen the links between aspirations and the financing strategy that aligns with the SDGs. By 2022, 86 countries had designed at least 250 reforms to mobilise and align both private and public finance for sustainable development.[545]

Most countries have also been affected by the economic fallout of the COVID-19 pandemic and the conflict in Ukraine.[546] In a fraught financial climate, governments are finding it more difficult to generate sufficient domestic revenue and there is increasing pressure on ODA. With high inflation and high interest rates, many are strained by debt servicing costs. At the same time, private capital flows to developing countries have been increasingly volatile Credit rating agencies have downgraded their sovereign ratings and many developing countries are finding it difficult to access the international capital markets.[547]

It will take political leadership to shift resources to better serve people and the planet and ensure that no one is left behind. This will also mean re-evaluating what counts as national success beyond traditional GDP yardsticks and measuring the right things (Box 4-12).

Box 4-12: Beyond GDP: Measuring sustainable progress as a key accelerator

Gross Domestic Product (GDP) is the market value of all the final goods and services produced and sold in a specific time period. This has become the standard measure of a country's progress but has many limitations and may be leaving out more than it captures. It does not, for example, take into account the degradation and depletion of the environment. The activity of tearing down a forest, for example, is likely to show up as GDP growth.[548]

Target 17.19 of the SDGs says to build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product. Many alternatives and complements to GDP have been proposed over the years, but none has displaced GDP as the main indicator of progress.[549] Perhaps the earliest alternative to GDP is Bhutan's Gross National Happiness. Proposed first in 1972 by the 4th King of Bhutan, King Jigme Singye Wangchuck, it has supported policy-making in the country.[550] Also, the World Happiness Index, now in its 11th year is used to assess the progress of nations on a range of indicators including subjective wellbeing.[551]

Another alternative to GDP is the human development index (HDI) which evaluates a country's progress in education, health, and income.[552] With the rising intensity of the climate and biodiversity crises, the world needs metrics that capture nature and planetary aspects, such as in the HDI adjusted to planetary boundaries.[553] Similarly, UNEP has proposed to consider Inclusive Wealth and reports on this every two years to track progress on the sustainability of economy and wellbeing.[554] Other measures include the Social Progress Index (SPI), which is calculated by the Social Progress Imperative group led by Michael Green[555] and is influenced strongly by the ideas from Amartya Sen, Douglass North, and Joseph Stiglitz. SPI is based on 12 components, from nutrition and basic medical care to access to advanced education. The Index has 60 indicators in total. In 2022, Norway, Denmark, Finland, Switzerland, and Iceland were in the top five for SPI, while the biggest improvers included countries such as Sierra Leone, The Gambia, and Uzbekistan. The Legatum Institute[556] has been calculating the Prosperity Index, to rank prospects of economic growth, since 2007, using data from 12 pillars and 67 policy-focused elements.

The UN has introduced the System of Environment-Economic Accounting (SEEA) which includes a dashboard of indicators that capture the health of the economy and the natural assets of a country. The SEEA Central Framework, adopted in 2012, can help countries understand and track their greenhouse gas emissions, their material consumption, and their productivity of resource use.[557] SEEA Ecosystem Accounting, adopted in 2021, measures the size and health of ecosystem assets.[558]

The UN Statistical Commission is in the process of revising the global System of National Accounts (SNA) by 2025. Important considerations during this revision are measuring sustainability, and valuing nature and other aspects of the economy that are not captured by GDP. The SNA is followed by all countries when measuring their economies. No country wants to adopt a new yardstick of progress unless all the others do so. Sufficient momentum needs to be built to make sure all countries align and make the shift.[559]

Another important component is SDG budgeting – to assess needs and allocations and track the public expenditure at all levels of government.[560] A survey of 60 countries plus the EU showed that only around a third mentioned the SDGs or related terms in their official budget documents, and far fewer referred to the SDGs as central pillars in their COVID-19 economic recovery plans.[561] In 2021, 35 countries reported integration of the SDGs into national development policy frameworks, and 25 into local plans to align their budgets with the SDGs.[562]

While these initiatives and financing instruments can help, progress has been slow. For example, the INFF initiative is voluntary, and SDG budgeting is slowed by a lack of capacity while private capital markets for SDG bonds have yet to be fully explored.

Governments can stimulate the necessary investment for SDGs by shifting subsidies and incentives, which can hasten critical tipping points for new technologies and practices. For example, by shifting away from support for the fossil fuel industry and redirecting subsidies towards sustainable alternatives. Between 2015 and 2020, 34 countries reformed consumer subsidies, 14 countries increased fossil fuel taxation, and seven countries did both.[563] Cutting tax avoidance by multinational enterprises can also provide much needed domestic revenue for public investments in the SDGs.

While public finance, venture capital and private equity can be important during the emergence phase, banks and institutional investors are important for the later commercialisation and diffusion stages[564] which should also be supported by the government. A survey of investment and venture capital professions in Europe and North America, for example, found that when choosing whether to invest in renewables they considered the most encouraging element to be the availability of feed-in tariffs.[565]

To overcome system lock-ins, it may be necessary to erode the financial resource base, legitimacy and political support of unsustainable industries, technologies, institutions and practices.[566] Enterprises too need to reassess their viability and prospects. For example, over 1,500 institutions worldwide have made fossil-fuel divestment commitments,[567] which is also seen as an important positive tipping point for acceleration.[568]

For the private sector, supply chain management is one way to accelerate action. Apple and Volvo's call on global supply chains to decarbonize by 2030 and 2050 respectively are examples of utilizing convening power to influence supply chains for SDG implementation.[569] Certification and standardization programmes are also important devices for accelerating actions. International certificate schemes such as the Forest Stewardship Council (FSC), Marine Stewardship Council (MSC), Fairtrade and Roundtable on Sustainable Palm Oil (RSPO) help to change consumer behaviour as well as to provide incentives for resource mobilisation.[570]

Countries also need to expand their concept of capital. Current economic accounting systems severely undervalue natural capital (Box 4-13). In 1997, ecosystems goods and services were valued, for the first time at $33 trillion per year, almost twice the then global GDP.[571]One initiative that takes this into account uses 'payments for ecosystem services' – rewarding landowners for protecting their land to ensure clean water, habitats for wildlife, or carbon storage in forests, such as in cloud forest watersheds in Peru.[572] There has also been progress in the use of environmental accounting and natural capital valuation in frameworks such as the System of Environmental-Economic Accounting, which integrates economic and environmental data to provide a more comprehensive and multipurpose view of the interrelationships between the economy and the environment.[573]

More generally, public financial institutions need to recognize that nature must be an integral part of fiscal policy, budgets, and investments, especially regarding climate risks and adaptation plans. The OECD is currently supporting efforts to create a national database for ocean accounting.

Box 4-13: Food security, and creating an enabling environment to finance a sustainable ocean economy

When the value of natural capital and assets are rarely included in economic indices of progress, what is the transformation path forward? The oceans are a global commons that underlies culture and history through both its intrinsic value, as well as its provision of coastal livelihoods. Globally, in 2020, around 58.5 million people were directly employed in the fisheries and aquaculture sector, and an estimated 600 million people were dependent on fisheries for their livelihoods.[574] Despite efforts, anthropogenic threats to ocean health are deepening.[575] An international research group have come up with a conceptual framework towards creating an enabling environment to attract financial investment in sustainable activities. The goal is a Sustainable Ocean Economy (SOE).[576]

In the last decade, less than 1 per cent of the estimated USD 1.5 trillion economy[577] was of philanthropic and Official Development Assistance (ODA) origin.[578] One of the major barriers to attracting investment in sustainability is that the majority of public sector subsidies are directed to unsustainable activities, like oil and gas development. Public sector "capacity-enhancing" subsidization of fisheries, which can lead to over-capacity, accounted for 63 per cent of USD 35.5 billion in public subsidies in 2018.[579] Redirecting public sector subsidies towards social equity, sustainability and food security would align public financing with Agenda 2030 goals. There are signs of progress. Since the early 2000s, the WTO had been negotiating an agreement to end subsidies for illegal, unreported and unregulated fishing and limit harmful "capacity-enhancing" subsidies that lead to overfishing. An agreement was reached in July 2022. Progress is evident, but input is still necessary.[580]

What is a true valuation of the ocean's ecosystems goods and services? The ocean provides food, regulates habitat, climate, sequesters carbon, controls erosion and so much more. When goods and services are not factored into economic decisions, their subsequent degradation increases our risk of failure, especially in an era of climate change. Ecosystem goods and services can be evaluated and used in policy and planning.[581] Admittedly, there is much work to be done but there has been progress and the Global South is leading the way through a range of initiatives, including its prominent role on the High-Level Panel for Sustainable Ocean Economy.[582]

Science and technology – As emerging science and technologies mature and become more competitive, they also become self-reinforcing through positive feedback.[583] As the transformation progresses and users express their preferences, governments can work with industries on various types of standardization. This might require them to invest in corresponding infrastructure such as charging points for electric vehicles and strengthening public transport systems. In many cases, technologies diffuse through markets, but in other cases, for example in agriculture, diffusion can be facilitated through extension agents. All

levers can be applied together through partnerships to align emerging science and technologies with SDG achievements (Box 4-14).

Box 4-14: AI for the Global Goals

Opportunities for leveraging AI for SDG attainment are unbounded and need to be harnessed. Google has launched AI for the Global Goals, which will bring together research, technology, and funding to accelerate SDG progress. This commitment will include $25 million to support NGOs and social enterprises working with AI to accelerate progress towards the Goals.[584]

With the AI capabilities and financial support from Google, grantees may be able to halve the time or cost needed to achieve their goals. In addition to funding, Google will provide fellowships where teams of Google employees work alongside organisations for up to six months.[585] Importantly, projects will be open source so other organisations can build on the work.

AI lighthouse is another initiative with intelligence projects focused on the protection of the environment, climate, nature and resources with approximately 100 Million € committed to date.

Individual and collective action – Governments at all levels can influence, incentivize and constrain actions and behaviours.[586] But conversely, individual and collective action can also exert influence on policy making, via voting, advocacy and protest. Individuals and groups can also motivate action by firms, through their consumption choices or as stockholders – particularly on environmental, social, and governance issues (Box 4-15).[587] One study found that shareholder proposals on ESG reporting issues led to increases in transparency and more integrated reporting.[588]

Box 4-15: Corporations and foundations for the SDGs

Environmental, social and governance (ESG) was first mentioned in a 2004 report published/endorsed by 18 financial institutions from 9 countries and overseen by the UN Global Compact.[589] Global sustainable investments reached over $35 trillion USD in 2020, up from $30.6 in 2018 and $22.8 in 2016,[590] and ESG assets are expected to exceed $50 trillion by 2025, representing more than a third of the projected $140.5 trillion in global assets under management.[591]

Amidst an overall declining trust in institutions, people are looking to the private sector to fill that gap – holding CEOs and businesses to a new standard of leadership. According to one survey, business has emerged as the most trusted institution (61%), followed by NGOs (59%) and governments (52%).[592] There is increasing stakeholder support for sustainability, and investors are engaging in conversations about long-term growth and ESG-integrated investment decisions.

Multinational corporations with international partnerships and considerable financial capacity can drive socio-economic development through investments that improve living conditions.[593] Corporate foundations - rather than limiting their sphere of activity to financial intermediations of corporate philanthropic funds - may actively contribute to the achievement of the SDGs by acting as broker organizations in cross-sector collaborations for the SDGs.[594] Their potential for supporting the SDGs needs to be further explored in research and policy discussions.[595]

Two recent cases illustrate the potential. The Etisalat Corporation implemented STEM camps for girls, and career-counselling session for students of secondary schools across the country aimed at sharing knowledge of tertiary education career opportunities. Results from a qualitative analysis based on interviews of main stakeholders and actors involved indicate improvements in infrastructure and learning outputs (including teachers training), technology, and innovation among others.[596]

In 2022, the Bill & Melinda Gates Foundation, Open Society Foundations, and The Rockefeller Foundation announced a new grant fund aimed at innovative solutions and approaches that empower multilateral development banks (MDBs) to provide more financing to developing and emerging economies.[597] With an initial commitment of up to $5.25 million, the MDB Challenge Fund will help accelerate financing with technical assistance to address potential barriers to leveraging shareholders' capital contributions; operational funding pilot programs or parts of programs to implement the G20 report's recommendations and promote MDB reform initiatives for subsequent scaling; policy analysis to support policy changes necessary to build on the G20 recommendations and institutionalise and scale innovative solutions.[598]

Capacity building – The acceleration phase requires the capacity to assess, situate and learn from experience, and revise course accordingly. Important capacities during acceleration include coordination across various actors and resolving conflicts and trade-offs as they arise, and in identifying and overcoming other common impediments and system lock-ins. Since it is impossible to predict how things will transpire, local learning capacity is essential, as is the ability for, and openness to, course correction. Activities can involve widespread use of social messaging; standardization; establishing voltage standards for electricity networks; developing a business model that fits the local context, as with m-PESA in Kenya;[599] or mobilizing finance and organizational capabilities to scale-up manufacturing facilities, as has recently been the case with solar photovoltaics.

Phase 3 – Stabilization of the new and phase out of the old

In the stabilization phase, innovative practices and technologies become the new normal. All the levers and actors work together as innovations become institutionalized, and anchored in infrastructure, regulations, user habits, standards and technical capabilities.[600] It is during this phase that technologies and practices are adopted by the remaining late majority and laggards.[601]

For stabilization to take root, new institutions and infrastructure must be resilient. Unless these reforms are institutionalized, the whole process may break down if leaders are unable to sustain momentum or leave office. For example, for carbon pricing to have an impact the policies would need to be stable. However, such measure can be revoked. In Australia, Canada, and France legislation has at different times been repealed as a result of strong lobbying and political changes.[602] Innovations can also fail because of the lack of a long-term vision.[603] This can be seen, for example, when severe floods lead to fundamental reforms in flood management but fail to lead to permanent shifts in land use planning and regulations.[604]

Stabilization also requires a complete or partial phase-out of old dominant technologies, industries, practices and institutions – for example, restricting or banning carbon-intensive technologies, or power stations, or placing controls on smoking.[605] This can result in intense political and economic conflict and struggles, as witnessed for tobacco use, gun control or gambling.[606]

As noted earlier, in many countries electric vehicles have reached the acceleration phase, but Shenzhen, China, is moving to a stage of stabilization, having built the infrastructure of charging stations and initiated a follow-up cycle, with recycling of power batteries.[607] The ability to manage batteries throughout their lifecycle ensures that electric vehicle transport remains in the stabilization phase of the S curve for years to come.[608]

Levers and actors

Governance –Phase-out is likely to accelerate unintended consequences such as job losses or the decline in regional industries and economies, underscoring the need for a just transition.[609] The proposed reforms must be politically feasible. Within electorates, the most promising allies are the lower middle classes – who have the economic potential to contribute a meaningful amount of revenue but are also likely to benefit directly.[610]

Governments can provide incentives for existing industries and organizations who are willing to innovate and adapt to the new sustainable alternatives.[611] Governments should support affected workers by providing compensation, through redundancy payments, early-retirement benefits or social safety nets. Or they can help with skills upgrading, retraining, alternative employment, and regional innovation or development policies.[612]

This will help reduce resistance, increase public acceptance and ensure a just transition with fair outcomes for all.[613] In Germany, for example, policymakers are helping regions that are suffering from the decline of lignite mining by providing financial compensation, establishing innovation parks on energy efficiency, and supporting new industries.[614]

Similarly, the rapid transition away from coal to natural gas in the Netherlands did away with 75,000 mining related jobs, affecting more than 200,000 people.[615] What made the transition successful was that the Government steered it strategically, implementing countermeasures such as subsidies for new businesses, the relocation of government industries from the capital to regions of the country hardest-hit by the mine closures, retraining programmes for miners, and offering shares in the state mining company.[616]

Economy and finance – A strong tax base will be needed to maintain equilibrium in the stabilization phase – which will mean countering tax avoidance and abandoning wasteful incentives and identifying unused tax potential.[617] Options include reducing tax exemptions,[618] simplifying and unifying value-added tax rates,[619] environmental or carbon taxes, increasing tax rates on the income and assets of the wealthy,[620] increasing property taxes,[621] and increasing taxes on tobacco and alcohol.[622] Governments can also take measures to reduce transfer mispricing that enables multinational enterprises to shift taxable profits to subsidiaries in lower-tax jurisdictions.[623] In low-income countries and middle-income countries, such options have the potential to increase tax revenue by one to two per cent of GDP.[624]

Tax policies need to be well coordinated to avoid adding to the tax burden of the poor through regressive measures such as sales taxes.[625] Any regressive effects can be counterbalanced through transfers.[626] One option is to subsidize the social insurance contributions of those who cannot afford to pay them fully.[627]

In low-income countries, private investment can also be stimulated by improving governance and the business climate, enhancing domestic revenue mobilization, developing domestic financial markets, and improving economic and financial management.[628]

Science and technology – During the stabilization phase, innovations begin to saturate markets and achieve widespread dissemination and use, providing a ready-made 'template' that can be routinized and optimized with the support of complementary policy settings and

standardisation. Additional measures may be needed to encourage adoption by late majority and laggard segments of the population, who may only adopt an innovation after it has been tried and tested by the majority.[629] If social, economic or capacity barriers impede uptake for these groups, additional measures can encourage adoption. For example, many countries have announced dates to transition to bans on the sale of new fossil-fuelled road transport vehicles, most progressively by Norway by 2025.[630]

In this phase, entrepreneurs and established companies can help to scale up sustainable business offerings as well as to make key technologies, patents, and knowledge available to others for replication and dissemination.[631] This will help to phase out older and unsustainable technologies and practices and enable the spread of innovations and their adaptation to different contexts. Government interventions and responsible lobbying by sustainability pioneers together with established companies often play a large and decisive role in this phase, supporting a managed decline and phase-out of unsustainable approaches.[632]

Individual and collective action – Reforms are more likely to succeed if they have strong public support. For the Montreal Protocol, which stopped the use of chlorofluorocarbons, discoveries in science and technology were followed by individual and collective action organized through civil society campaigning and consumer pressure which forced some companies to remove chlorofluorocarbons (CFCs) even prior to government bans. Moreover, civil society was engaged assembling a group of engineers to develop a fridge that used a mix of natural hydrocarbons instead of CFCs – and subsequently founded a company to design and market these fridges, which ultimately revolutionized the domestic refrigeration sector, with more than a billion in use today.[633]

Capacity building – Institutionalization requires different forms of capacity building and relatively high levels of financial and human resources, for example to invest in legislative reforms and build new institutions to facilitate implementation, regulation, enforcement and monitoring. This often requires the allocation of sustainable, long-term financing and human resources. Capacities are also needed in building resilient and adaptive institutions and strategies, including strengthening institutions and networks through decentralisation, increasing diversity and redundancy, and monitoring and continuous learning.

All the phases and levers can be used more effectively by embracing scientific advances and technological innovation. How policy makers can work more closely with scientists is the subject of the next chapter.

Chapter 5: Transformations through science—and in science

The scientific method, based on observations and testing hypotheses, can reduce uncertainty, identify tipping points, accelerate the uptake of innovations and lay the foundations for the next frontier of ideas.[634] Science also provides the evidence to help dismantle negative pathways or paradigms that counter the rapid acceleration of new technologies and other solutions. While the internet has enabled instant sharing of information, and the prospect of open science, it has also opened the door for malicious actors—and the simply uninformed—to present false information as factual. In the age of multiple compounding global risks that lead to escalating social vulnerability, and increased inequality, the traditional process of production, validation and dissemination of scientific knowledge is not sufficient to result in meaningful processes of change. Transformations to sustainable pathways must be rooted in "socially robust" science. Today more than ever, scientists, policy makers and multiple social actors need to work closely together at the science-policy-society interface to build trust, establish the scientific base for progress towards the SDGs, deliver findings, and communicate these findings to society at large.

Socially robust science plays a central role in advancing human wellbeing across the three phases of the transformation S-curve.[635] Scientific evidence can reduce uncertainty and identify tipping points, leading to further knowledge to accelerate and complete each S-curve and provide the foundations for the next one.[636] While science does not directly provide general policy solutions, it does provide testable, fundamental knowledge and evidence on which policy should be based.

But how should science itself evolve to be able to respond to multiple challenges? The production of scientific knowledge has to be responsive to the context in which this knowledge is produced and used, which can help to "ensure that scientific knowledge is 'socially robust', and that its production is seen by society to be both transparent and participative."[637] Socially robust knowledge has three aspects.[638] First, robustness is tested "outside the laboratory, in a world in which social, economic, cultural and political factors shape the products and processes resulting from scientific and technological innovation." Second, social robustness often involves "an extended group of experts, of real or symbolic users and of real or 'imagined' lay persons." Thus "expertise spreads throughout society and becomes socially distributed expertise."[639] Third, society is not just a recipient of science but effectively an active partner participating in the production of social knowledge. Issue-driven science is common where "facts are uncertain, values in dispute, stakes high, and decisions urgent."[640] In such cases, the condition under which science is applied is not 'normal' and decisions must be made where scientific inputs are not 'hard' but 'soft.'[641] In this 'post-normal science, extended peer communities can play a role in maintaining the quality and verification of knowledge.[642]

The process of production and validation of scientific knowledge itself needs to evolve in order to produce socially robust knowledge. Broader engagement of society through all aspects of this process in a dynamic and iterative manner, i.e., a greater democratization of knowledge and movement towards a regime of pluralistic expertise, is key to science that is cognizant of, and responsive to, societal needs.

The importance of science has been asserted in a series of global conferences. In 1972, the United Nations Conference on the Human Environment in Stockholm, declared, "Science and technology, as part of their contribution to economic and social development, must be applied to the identification, avoidance and control of environmental risks and the solution of environmental problems and for the common good of mankind."[643] The report recognized the value of using science and evidence to address what came to be called 'wicked' problems – that have no clear formulations or definitive solutions.[644]

In 1992, the Earth Summit in Rio asserted that "One role of the sciences should be to provide information to better enable formulation and selection of environment and development policies in the decision-making process."[645] And in 2012 in the outcome document of the subsequent Rio Conference, "The Future We Want," governments again called for strengthening the science-policy interface.[646] Specifically, they mandated the production of a *Global Sustainable Development Report* (GSDR), of which this current report is the latest. In these reports science is defined broadly to include natural and social sciences, the humanities, and knowledge generated from local and indigenous communities (Box 5-1).

Box 5-1: Indigenous and local knowledge research infrastructure

Indigenous and local knowledge, acquired through lived experience about a region or environment goes beyond conventional scientific studies to incorporate a cultural element. The UN's Common Agenda recognizes the importance of meaningful participation in public affairs by groups traditionally marginalized,[647] but their full recognition and participation is not yet realized.

African indigenous scientific and technological innovations were routinely ignored during and after colonialism, as has been the contribution of technological innovations of enslaved Africans in America. Recent examples of fusion of technology with Indigenous and local knowledge in Africa demonstrate the creative, technological, and scientific intellectual agents emerging from the continent. African Science Technology and Innovation is emerging from a long process of multicultural knowledge production.[648]

Capturing and sharing information within and among indigenous groups is complex, but the Indigenous Knowledge Research Infrastructure (IKRI) is an example of success in this regard. The IKRI focuses on food systems, aiming to preserve indigenous knowledge, supporting input for policy makers, data creation and linkages with other data repositories. This should help protect and exchange indigenous knowledge and strengthen indigenous peoples' livelihoods globally.[649]

Local and indigenous knowledge in rural development and its contribution to food security can help in achieving SDGs. The Centre on Integrated Rural Development for Asia and the Pacific (CIRDAP) is a regional, intergovernmental organization aimed at galvanizing and organizing knowledge for rural development in general, and creating best practices for integrated rural development policies.[650]

Local and indigenous knowledge is fundamental to address climate change and loss of biodiversity. Indigenous communities depend on local biodiversity and ecosystems and are especially vulnerable to climate change impacts. Indeed, Indigenous communities are custodians of many of the world's most fragile and important ecosystems. They possess environmental knowledge that is crucial to developing effective adaptation plans. Across the world, indigenous peoples already manage many water-related risks in a changing climate with traditional knowledge and solutions. They also have a human right to be involved in the decision-making process for issues that affect them.[651] The World Intellectual Property Organization (WIPO) has therefore identified the need to engage Indigenous communities in the elaboration of climate action plans.[652] When engaging with local and indigenous knowledge, it is crucial to follow the principle of free, prior and informed consent (FPIC), which entails culturally appropriate consultation. Traditional knowledge which can be of archaeological and scientific value is the intellectual property of indigenous communities, who have the right

to negotiate the conditions of use of this information and withhold consent at any stage.[653] Enforcing a "permission to share" dialogue helps support indigenous self-governance and autonomy.

Over 100 countries have signed onto the UN sponsored commitment to FPIC but many jurisdictions are failing to implement it. As part of the FPIC process some countries do have programs and departments to support the protection and use of indigenous knowledge as intellectual property. These include Canada's Intellectual Property Strategy, Australia's Indigenous Knowledge IP Hub, and The Intellectual Property Office of the Philippines. However few countries have incorporated the protection of traditional knowledge into their laws.[654]

The 2019 GSDR asserted that "science lies at the heart of sustainable development", and offered recommendations for mobilizing knowledge communities, promoting access to science and data especially in low-income countries, investing in mission-oriented research, and scaling-up technology transfer.[655] This current chapter builds on that Report and explores new relationships and equilibriums – based on science that is multidisciplinary, equitably and inclusively produced, openly shared, widely trusted and embraced, and "socially robust"—relevant to society.

The science for the transformations needed to achieve the 2030 Agenda has been available for some time. The question now is how society – including scientists – can speak more convincingly to governments to inspire bold and often difficult decisions and to encourage behaviour change, in order to use the power of science and technology as an effective lever for starting, accelerating and stabilizing transformation.

A multidisciplinary approach to multiple crises

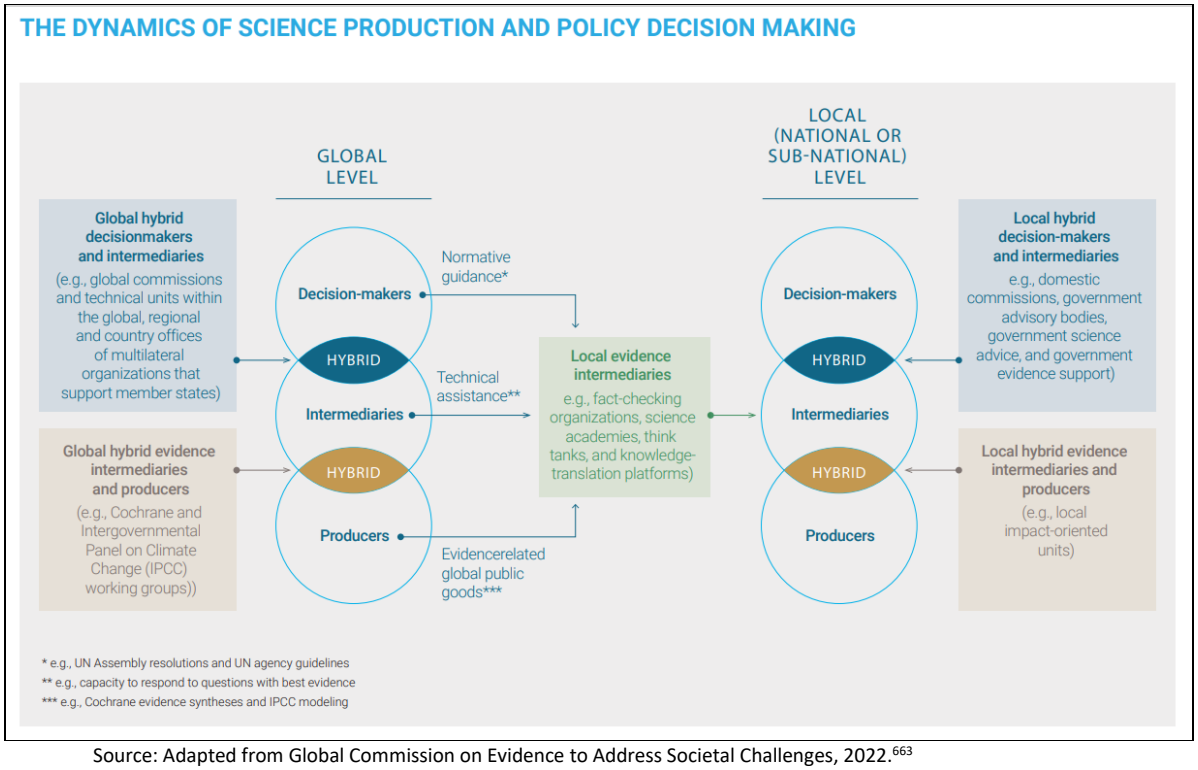
A few decades ago, the "science-policy interface," or points of interaction between scientific knowledge and the policy-making process, primarily involved experts in individual scientific disciplines – usually from high-income countries, who were predominantly white males in mid- to late-career. These individuals spoke to career policymakers, demographically similar people working in government, economics, and law. This interface was constructed as a four-stage policy formulation cycle: agenda-setting, policy formulation, implementation, and review. Within this largely linear sequence, policy makers expressed their priorities to the science community who responded with factual information and advice.[656] Eventually an "epistemic community", which is "a network of professionals with recognised expertise and competence in a particular domain and an authoritative claim to policy relevant knowledge within that domain or issue-area", is formed and drives action for problem-solving.[657] These communities include experts from various disciplines, from policy and public administration, and other relevant practitioners which jointly engage in problem-solving knowledge production.

For achieving sustainable development in the 21st Century, however, epistemic communities need to reflect the diversity of society, and their interactions will need to be far more multi-directional and multi-disciplinary, so they can effectively address complex and interlinked challenges and goals. Using the rate of change in Gross Domestic Product (GDP) to measure economic performance is an example of a product generated by a linear model of science-policy interface which isolates economic activity from its interlinkages with nature, culture, gender, power relations and the social fabric. Thus, meaningful measurements of progress on sustainable development are required to incorporate a wide range of issues and disciplines in a simple and integrated manner (see box 3-11).

Effective science advice mechanisms will be needed for evidence-based policymaking. Chief scientific advisors, have been appointed in some countries. These mechanisms can be effective, but need to be established in ways that work within specific cultures, while also questioning established institutional traditions so as to open new avenues for transformation. Most methodologies and strategies in the science advice community use cultural approaches closely related to their roots in English-speaking countries. The relationship between culture, language, on the delivery of effective, locally applicable scientific advice warrants further research.[658] To that end, the International Network of Governmental Science Advisors (INGSA) will aim to gather evidence on how culture and language should be taken into account to ensure the most effective delivery and uptake of scientific advice. An inclusive model of 'science-policy-society interface' is required (Figure 5-1).[659] The interface has to manage the challenges of transdisciplinarity in order to effectively include non-academic stakeholders in the process of knowledge production[660] for example in the Future Earth program.[661]

The international community has created platforms through which scientists, policymakers, and knowledge brokers can interact and capitalize on the latest information. These include the Montreal Protocol for the ozone layer (1987), the Intergovernmental Panel on Climate Change (IPCC) (1988), and the Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services (IPBES) (2012).[662]

Figure 5-1: Science production and decision-making



Source: Adapted from Global Commission on Evidence to Address Societal Challenges, 2022.[663]

These global platforms are complemented by a wide range of other knowledge intermediaries, including universities, think-tanks, and indigenous and local communities (Box 5-2). The International Network of Governmental Science Advisors (INGSA), with its African, Asian, Latin American and Caribbean chapters is a large and growing network of

government science advisers with a mission to strengthen science-policy interfaces at all levels of governance.[664] The network brings together policy practitioners, researchers, and other experts to promote the use of evidence in decision-making, to provide capacity building, and to generate knowledge for strengthening science-policy interfaces. The findings and recommendations of these platforms can be communicated to the broader public through knowledge brokers, knowledge translators, the media, science editors, and fact-checkers.[665]

As society faces complex and urgent challenges requiring the full involvement of all parts of society, it is clear that the current platforms and intermediaries are not sufficient. While children, young people, NGOs and CSOs are starting to be included in global processes and platforms, they are still often excluded from the actual decision making. Children and young women and men, those who have the biggest stake in the future, are particularly compelling messengers and leaders; these groups should be further empowered to participate in policy-making and decision-making to implement the SDGs. Civil society organizations (CSOs), non-governmental organizations (NGOs), think tanks and other institutions funded by public and/or private sources or philanthropy, that specialize in specific sectors, such as education, health, or climate change may be more effective at engaging the public; they can be powerful advocates for change.

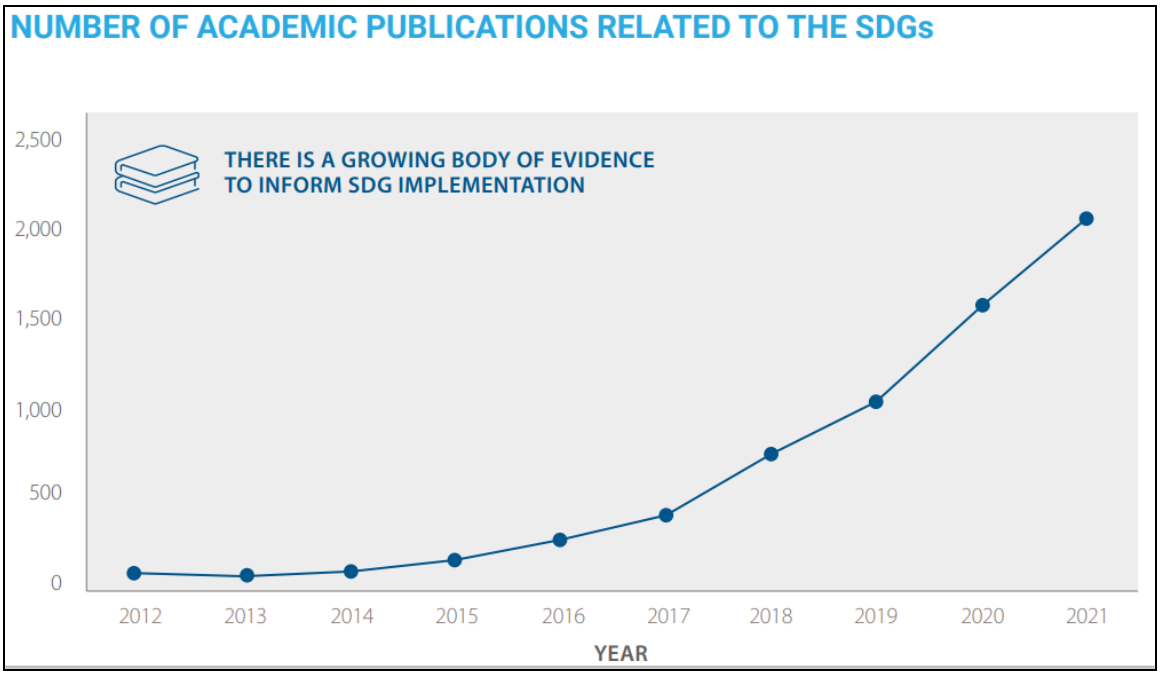
Box 5-2: The science-policy-society interface in Africa operates through an ecosystem of institutions

- *INASP* – An international development organization with 30 years' experience of working with a global network of partners in Africa, Latin America and Asia.[666]
- *Southern Voice* – An open platform for think-tanks focusing on SDGs and disseminating evidence-based policy analysis by researchers from the Global South.[667]
- *The African Population and Health Research Centre* – Which focuses on population and health.[668]
- *The African Centre for Evidence* – At the University of Johannesburg focuses on the SDGs.[669]
- *The Centre for Rapid Evidence Synthesis* (ACRES) – At the University of Makerere aims to support policy and decision-making with high quality, relevant and timely evidence.[670]
- *The African Institute for Development Policy* (AFIDEP) – A pan-African Institute with a mission to institutionalize the use of evidence among government decision-makers for sustainable development.[671]
- *AKADEMIYA2063* – Provides policy research and capacity strengthening support for the implementation of the Comprehensive Africa Agriculture Development Programme of the African Union.[672]
- *Code For Africa* – A citizen-based initiative focused on civic technology and data journalism.[673]

Shining a brighter spotlight on the SDGs

The 2030 Agenda and its 17 SDGs approach sustainable development in a holistic, integrated manner. An integrated approach is the only way to stem the compounding risks of climate change, disaster, pollution, biodiversity loss and degraded ecosystems as well as their socioeconomic impacts. Those compounding risks have amplified social systemic risks, war, security, inequality, financial instability and erosion of democracy. The synchronicity of risks can and has motivated researchers, funders and academic institutions to increasingly frame their research, teaching and societal outreach strategies around the SDGs; they prioritize transdisciplinary research, co-creation, and mission-oriented science, as with initiatives by the Sustainable Development Solutions Network, the International Science Council, and UNESCO.[674] This is also reflected by many more publications which mention the SDGs (Figure 5-2), a trend which continues an upwards trajectory.

Figure 5-2: Number of academic publications including "SDG"



Source: as reported in Scopus 2012-2021.

This work has also generated science-based SDG tools – such as evidence databases, data and monitoring frameworks, methods for assessing SDG interlinkages, and models and scenarios for developing transformation pathways. In addition, there are curated knowledge repositories on interventions to achieve the SDGs (Box 5-3), as well as academic and professional training courses.[675] As shown in Chapter Two, attaining the SDGs requires working across the 2030 Agenda to maximize positive interlinkages and committing to partnerships across all sectors, including academic partnerships and engagement with students, women, children and youth.

As knowledge of and interest in the SDGs has grown, so has the availability of tools and methods for integrated SDG analysis and decision support. Box 5-3 gives examples of such tools and their applications. These tools should be accessible and relevant to policy makers and other practitioners so they can systematically identify and evaluate positive and negative interlinkages among SDGs, and strategically inform their decision-making process.

Box 5-3: Research evidence for the SDGs

The scientific community provides platforms, tools and methods for integrated analysis of the SDGs. Many are specifically designed to support decision-making. Examples include:

Social Systems Evidence – Developed by McMaster University Forum+ and Monash Sustainable Development Institute. This is a comprehensive and continuously updated repository of syntheses of research evidence on each SDG. For example, policy makers can find syntheses of studies of effects of training programmes on African smallholder farmers' economic outcomes and food security (SDG 2) or the effects of payment for environmental services (PES) schemes on deforestation and poverty in LMICs.[676]

SDG Synergies – This is a free online tool to facilitate strategic decision-making based on systems analysis. It can be used to align different policy strategies The tool is centred around a participatory scoring process, where interlinkages between pairs of SDGs are assessed and guided by the question: If progress is made on

SDG X, how does this influence progress on SDG Y? SDG Synergies has been used to support integrated SDG implementation in Mongolia, Sri Lanka, and the European Union.[677]

Enabling SDGs – A free online tool for mapping, visualizing, and analysing how SDG targets influence each other in specific contexts. The output is a cross-impact matrix, presenting the interlinkages of interest and highlighting key synergies and critical trade-offs.[678]

SDG Interlinkages Analysis & Visualization Tool – A free online tool available since 2015. The user may select countries, goals, and targets of interest and thereafter visualize the main interlinkages. The visualization of interlinkages is based on scientific literature and available indicator data. The user may edit the interlinkages and explore and download data.[679]

The iSDG model – The Integrated Sustainable Development Goals (iSDG) model is designed to support strategic planning and analyse the impacts of policy interventions. The model accounts for the dynamic interactions between all SDGs and shows the best pathways for implementation. The iSDG model has been used to support decision-making in several countries, including Nigeria, Australia, and Senegal.[680]

SDG Climate Action Nexus – A free online tool for policy makers across departments and at different levels of government. Specifically, it provides an understanding of trade-offs and synergies between climate action and SDG targets. Examples of use include analysis of the links between NDCs and SDGs in Macedonia, Lebanon, and Georgia.[681]

NDC-SDG Connections – Presents knowledge and illustrates connections between the SDGs and Paris Agreement. The tool is free to use and allows the user to make global and regional comparisons. it was developed to identify entry points for coherent climate and development policies.[682]

More tools and methods for coherent implementation of the SDGs are available on the UNDP integration platform.[683]

The science-policy-society interface must be inclusive

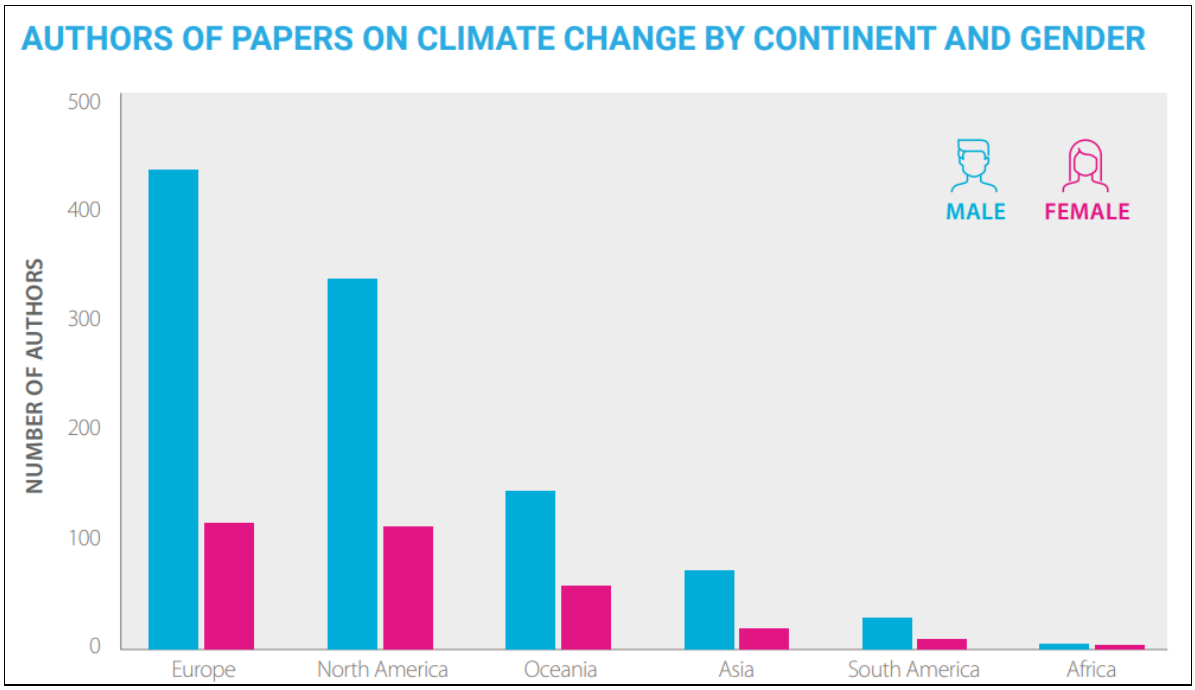
The SDGs require a transdisciplinary approach incorporating the humanities, general social sciences, natural sciences, indigenous knowledge, and the arts. Research questions and initiatives related to the SDGs should be co-created with a range of actors, including children, young people, local communities, civil society, and academics from across various disciplines. Importantly, scientists and policy makers themselves must be diverse, in terms of gender, age, demographic group and ethnic and geographical diversity, for meaningful change. Philanthropies, often the generous sponsors of targeted interventions—in health, or education, or environmental protection, for instance—could expand their portfolios to support holistic and transdisciplinary research. As noted above, academic institutions can also support this by rewarding practitioner-scholars.

A particular concern is gender disparities in science and research. Although in middle- and high-income countries girls outperform boys in science in secondary school in all subjects, only one-third of the world's scientific researchers are women —though the pattern varies between global regions.[684] Women are notably underrepresented in engineering, manufacturing, construction, and information and communication technology programmes; in over two-thirds of countries, the percentage of females studying engineering, manufacturing and construction or ICT is below 25 per cent.[685] These disparities play out in the degree to which science addresses areas of concern for women—for example, investment in research on women's health issues lags significantly behind spending on men's health concerns.[686]

In 2021, the website Carbon Brief analysed the gender and affiliation country of the authors of 100 highly cited climate-science papers from the previous five years (Figure 5-3).[687] In addition to confirming gaps in publication productivity between the high-income countries and the low- and middle-income countries, this study highlighted wide gender disparities. Less than one-quarter of the authors were female, and only 12 of the 100 papers had women listed as the first author.[688] Similar gender disparities have been observed in other disciplines, reflecting the obstacles that women continue to face in establishing the networks and affiliations needed to lead research projects.[689]

Addressing the gender imbalance in scholarship and scientific research, and increasing inclusive research more broadly, could bring new perspectives and insights into science.[690] Scaling up co-created research, especially, could ensure that the findings and messages of this research resonate across society in more meaningful and durable ways, which could help to inspire commitment to the kinds of transformations we need.

Figure 5-3: Authors of papers on climate change by continent and gender



Note: The number of male (purple) and female (orange) authors in the Top 100 most-cited climate science papers during 2016-20.
Source: Carbon Brief, 2021

Global imbalance in research and development

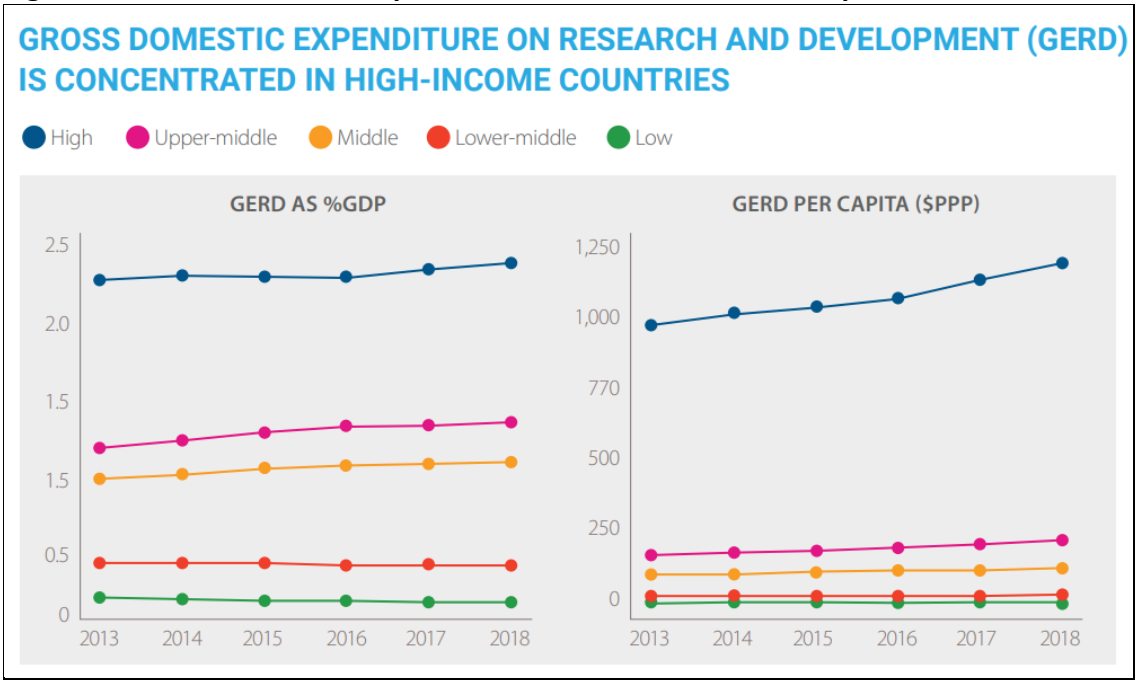
Between 2013 and 2018, the average gross domestic expenditure on research and development (GERD) as a percentage of the GDP was twice as high in high-income countries than in upper-middle- and middle-income countries, and six times higher than in lower middle- and low-income countries (figure 5-4).[691] On a per capita basis, GERD in high-income countries was seven times that of upper-middle- and middle-income countries, and sixty-five times that of lower middle- and low-income countries. Ten countries account for 80 per cent of spending.[692] Over the period from 2013 to 2018, GERD as a percentage of GDP decreased in low and lower-middle income countries.[693] As a result, more than 70 per cent of the world's population are served by relatively small research and development

(R&D) systems.[694] This has implications for developing solutions that can advance context-specific SDG implementation in low- and middle-income countries. This also means that countries in the Global South may lack the capacity to absorb or adapt technological advances developed elsewhere. Consider the pay-off for earning a PhD and then setting up research facilities in a low-income country vis a vis research facilities and access to funding in high-income countries; investments and opportunities for research and capacity-building are generally fewer than in high-income countries.

This imbalance severely curtails the capacity of many low- and middle-income countries to embrace the required transformations that are essential to attaining the SDGs through (a) participating in the international platforms which bring together scientists, policymakers and knowledge brokers to solve wicked problems, and (b) using the science and technology lever effectively in the various stages of the transformation process towards sustainability to generate context-specific solutions in their region and their national territories.

In addition, the largest research funding share comes from the private sector. In 2020, in the United States, for example, $517.4 billion in research investment came from the private sector, $142.8 from the public sector, $22.6 billion from higher education, and $25.1 billion from non-profit organizations.[695]

Figure 5-4: Gross domestic expenditure on research and development



Source: UNESCO Institute of Statistics 2023b

An unbalanced global science system does not serve the needs and interests of the whole planet. For some subjects, scientists fail to take local conditions into account and miss some important subjects. For COVID-19, for instance, most of the research has taken place in a limited number of countries, so there remain many unknowns about the virus, including the reasons for the lower-than expected mortality rates due to COVID-19 in parts of Africa.

There have been severe inequalities around vaccine production and distribution, such that high-income countries had the first access to vaccines and were administering boosters

before residents of other countries had received first or second doses.[696] In addition, COVID-19 has exacerbated inequities in R&D funding. Donors have used some overseas development assistance R&D funds for work on COVID-19 while other research activities have slipped.[697] In a global pandemic, the large public research funders of the world would be expected to direct resources towards strengthening R&D capacities in low-income countries, too, and not leave this to development cooperation where resources are already stretched.

In some cases, research and knowledge production is not happening due to a lack of capacity or other structural inequalities. In other cases, there is actually a thriving knowledge ecosystem, whether in a Global South country or among people in vulnerable situations. Local and Indigenous communities can be deep wells of sustainable development expertise which policy makers need to incorporate into decision-making. In addition, even in areas where the Global North dominates in terms of technological innovation and research, countries in the Global South may be at the forefront in applying this technology—such as in renewable energy technologies, battery production and electric vehicles.[698] SDG implementation across the world will benefit from capacity building in the Global South through knowledge-sharing between South and North, as well as South-South collaborations, based on equity and mutual respect.[699]

Sharing knowledge openly and equitably

While making the production of science more inclusive and geographically diverse, it is also crucial to ensure that once science is produced, it is widely accessible. The open science movement maintains that public interest groups, policymakers, industry and teachers should have access to all underlying scientific research including publications, data and software (Box 5-4).[700] Research outputs, including metadata, should be freely accessible with no borders – geographical, temporal, social or cultural. This would serve to augment and expand the utilization of science towards the attainment of the SDGs.[701] This is especially important for SDG issues, and for scientific research that has been publicly funded and which should be treated as a public good.

A shift to open science can change how research is done, who is involved, and how it is valued.[702] This should be understood as part of a broader relationship between science and society – mobilizing knowledge to influence public policy, the education system and public understanding.[703]

Open science can boost global research collaboration.[704] It enables scientists and others to use resources more effectively, and boost rigour and reliability by sharing data and code and by using open tools.[705] And, by enabling contributions from many fields, it can open new questions and areas of inquiry. It can also broaden research participation, for example, by offering opportunities to citizen scientists.

In some cases, private sector companies are embracing so-called “open innovation,” in which industry teams collaborate with outside researchers and communities to address common, well-articulated problems. Though of course this new openness is balanced with the interest in protecting intellectual property and revenues, it nonetheless represents a promising trend for inclusive knowledge production that could benefit SDG implementation.[706]

Crucial to open science are publicly accessible databases. In the humanities, for example, the digitization of historical documents across continents has allowed students and citizens to gain first-hand understanding of key moments in history that can be instructive for current challenges.[707]In the physical sciences, open data and collaboration in astrophysics are being used to explore the origins of our universe. And the development of drugs and vaccines have been sped up by public genomics repositories such as GenBank – though it should be noted that less than two per cent of the human genomes analysed so far have been from Africa, even though that continent has the greatest genetic diversity.[708]

While open access publishing is on the rise,[709] only a minority of publications offer open access, and some charge authors an article processing fee, both of which limit opportunities for many youth and lower-income groups. Even on the internet, much essential information is behind paywalls in academic journals that require subscriptions. A survey by the scientific publisher Springer Nature found that approximately 40 per cent of readers of its websites were non-academic, but around half of all surveyed users said they were unable to access the full text of subscription content.[710] The same survey looking at documents related to at least one SDG were four times more likely to be downloaded if they were published under an open licence and thus available to anyone.[711]

UNESCO has developed a framework for open science that can help to guide further action in this direction (Box 5-4).

Box 5-4: UNESCO framework for open science

In November 2021, UNESCO made seven recommendations for action on open science.[712]

1. A common understanding of open science.
2. Developing an enabling policy environment for open science.
3. Investing in relevant open science infrastructure and services.
4. Investing in human resources, training, digital literacy and capacity building for open science.
5. Fostering a culture for open science and aligning incentives to the practice.
6. Promoting innovative approaches for open science at different stages of the scientific process.
7. Promoting international and multi-stakeholder cooperation in the context of open science, with a view to reducing digital, technological and knowledge gaps

Member States are requested to: 1) develop appropriate monitoring frameworks; 2) share examples of good practices; and 3) develop long-term strategies for efficient open science. This will serve to strengthen the nexus between science, policy and society and increase transparency and accountability for inclusive and equitable solutions.

Founded in 2017 in Australia, the Curtin Open Knowledge Initiative collaborates with national and international partners to create fresh insights into open and global knowledge practices and measure the global status and impact of scholarly communication, open access, diversity and inclusion.[713] It shows the number and percentage of accessible outputs by region, subregion, number of publications, and open access levels. Although the initiative itself eschews rankings, it is noticeable that the top 27 countries for openness in access are low- and middle-income countries – until the appearance of Greenland in 28th position.[714]

Trust and Integrity

As the global community pushes for greater access to knowledge, it also has a responsibility to ensure that information is broadcast with integrity and responsibility. To this effect, the UN Secretary General, in his report '*Our Common Agenda*' suggests that "States, media outlets and regulatory bodies should explore a global code of conduct that promotes integrity in public information, facilitated by the United Nations".[715] He further urges that it is time to better manage and regulate the digital commons as a global public good.

A major hurdle for science is the speed of publication, especially relative to other sources of knowledge including journalism and social media. Producing unbiased, peer-reviewed information absorbs time and money, giving alternative outlets or false facts time to get a head start. To help scientific health evidence keep pace with fake news for COVID-19 for instance, WHO developed a social listening tool called Early AI-supported Response with Social Listening (EARS). It offers real time information about how people are talking online about the pandemic.[716] WHO also released a series of tips to identify mis- and dis-information and is working with digital companies and social media platforms to ensure that when people search for COVID-19 related information, the first results to appear are science-based resources from official sources.[717]

Academic journals can also contribute to the science-policy-society interface by communicating scientific findings in a manner that is accessible and engaging to policy makers and the broader public. Frontiers Policy Labs, for example, is a publication that stresses the importance of science being open, trusted, and accessible. The initiative has launched a series of conversations to engage experts with policy leaders[718] and has produced a number of science communication training programmes.[719]

The world has responded to the proliferation of fake news with comprehensive countermeasures. In June 2022, Duke University's Reporter's Lab estimated that 400 teams of journalists and researchers in 105 countries were working on tackling political lies, hoaxes and other forms of misinformation:[720]

- *Africa* – "Africa Check" is an independent, non-partisan organisation with teams in South Africa, Kenya, Nigeria and Senegal, which assesses claims made in the public arena using journalistic skills as well as sources drawn from online tools, public sources, and experts. Another network is "Africa Facts" specifically targeting Covid-19 with its #KeepTheFactsGoing programme.[721]

- *United States* – The Poynter Institute is home to the International Fact-Checking Network, which promotes excellence in fact-checking with more than 100 organizations worldwide through advocacy, training and global events.[722]

- *Canada* – The 'Check then Share' campaign reminds people to fact-check information before sharing it on social media, while providing shareable images and videos.[723]

- *Latin America* – The Comprova consortium, led by the Brazilian Association of Investigative Journalism; a neutral and non-profit fact checking organization, Chequeado, in Argentina; Verificado Uruguay consisting of 137 entities,

and the Verificado consortium in Mexico, with more than 90 partners, are all working to ensure truth in journalism.[724]

These fact-checking initiatives face an uphill battle. The speed and ease with which information travels has helped the democratization of knowledge, and amplified voices and perspectives that may have been ignored in the past. However, is also introduces new risks. Social media has made the delivery of information extremely fragmented and complex, now that anyone can produce and transmit news.[725] Influencers and propagandists, with little or no expertise in the issue at hand, can create seemingly compelling stories with catchy headlines that appear factual and elicit a strong emotional response.

The algorithms that structure an individual's social media experience ensure that people rarely see posts that contradict their expressed biases and preferences. Almost any post that appears to have a scientific basis can go viral, soliciting the trust of millions of people, especially if it aligns with their existing views. Moreover, the sources of disinformation are often obscured, which can trick search engines into presenting them as credible news sites.

This "echo chamber" effect created by social media is having a profound impact on the political landscape in many countries, with increased polarization and partisanship and a lower level of trust in governments.[726] It can also stoke distrust in science. Scientists have always relied on peer-reviewed journals and other publications to check the veracity of data and information. Information without a scientific basis may be distorted or fake – either malicious or mendacious -- designed to confuse or mislead. A recent survey of 140,000 people in more than 140 countries found that only 54 per cent of people had a 'medium' level of trust in scientists, and only 18 per cent had a high level. More than one-third of people in southern Africa and Latin America said science helps 'very few' people in their country.[727]

Two vital issues today illustrate the extent of distrust of science: climate change and Covid-19 vaccinations. In both cases, the science is clear and compelling, yet sizable minorities of people express doubt. In climate change, the degree of trust varies widely from region to region, with nearly 75 per cent of respondents in South Asia reporting that they trusted climate scientists 'a great deal' or 'a lot', while in Western Europe, East Asia, Eastern Europe, and North America the proportion was around 50 per cent.[728] On the COVID-19 vaccine, an overabundance of often inaccurate information stoked mistrust in the government and science, [729] and resulted in public resistance or hesitancy about vaccines and other health measures. A recent study of 23,000 people across 23 countries found that nearly 25 per cent of respondents reported 'vaccine hesitancy'.[730]

Socially robust science can bridge the gap between policy commitment and policy implementation

Ensuring a strong and effective science-policy-society interface does not automatically ensure transformation towards the SDGs. There is inevitably a time lag between the publication of scientific evidence, public policy decisions, and full implementation. Sometimes, the gap between policy articulation and action is created by political inertia resulting from a lack of political will or lobbying and disinformation by vested economic interest groups. For example, the damage to health from adding lead to fuel was identified by science in the 1920s but the practice only stopped completely in 2021. Similarly, though

science has long established a clear link between smoking and cancer, policy guidance against smoking has taken a long time.[731]

Government pronouncements on the SDGs are generally sincere, but progress is limited by a lack of capacity, data limitations, existing trade-offs between goals and policies, incomplete understanding of economic or ecological processes, or by worry that a given action may be unsuccessful. Progress may also be limited by the relatively short political cycles of governments, with long-term sustainable development solutions taking a 'back-seat' to short-term and less ambitious measures that are more popular with the electorate. For example, investments in early childhood care and development (ECCD) reap multiple benefits for societies but their effects are often not seen for many years. The financial investment in ECCD may not be considered an important "election issue" as a result.[732] In some cases, the problems are so complex that even the formal scientific method based on testing hypotheses does not always capture the reality of the problem; increments in knowledge do not necessarily reduce uncertainty.[733]

For many countries, action for the SDGs can be impossible because of political unrest and conflict and/or natural disasters. The scientific evidence may be clear, but the way that it informs policy is influenced by political and economic interests, and even stages in the election cycles. Even when the weight of scientific evidence may be overwhelming, the necessary actions are fraught with political and technical complexities—as is the case when a well-developed global process such as IPCC has not resulted in full-scale transformation. Despite the overwhelming scientific evidence that demonstrates the immense risks of maintaining the current status quo, we have not fully addressed the global carbon footprint. We are not on track to stay "Below 1.5 C".

In order to be meaningful, science needs to be "socially robust," or relevant to society. This means that science must be transparent, inclusive, and transdisciplinary – produced in diverse contexts by a heterogeneous and multidisciplinary groups engaging all possible actors including youth. The nature of achieving the SDGs embodies a broader engagement of society with all aspects of science and a greater democratization of knowledge so that people will be ready and willing to commit to the transformations we all need.

Chapter 6: Calls to action for transformation

Against the backdrop of the changes and shocks of the last few years, the 2030 Agenda for Sustainable Development remains a strong and valid agenda for a desirable future – for people, planet, prosperity, peace, and partnership. This report points to the science-driven transformations urgently needed to enable progress toward the SDGs.

At the halfway point of the 2030 Agenda, marked by major setbacks experienced by humanity and the planet, all countries must renew their efforts to enable transformations towards the SDGs. This means identifying key interventions that have systemic effects across the SDGs, scaling up investment, mobilising the knowledge of scientists, practitioners and communities at all levels, and building the capacity needed in all countries and institutions, all while enhancing policy learning and accountability and closely monitoring the impacts of interventions.

There is evidence that goals and targets matter in themselves. But experience in the last eight years has also shown that implementation and compliance are still weak. Today, halfway to 2030, collective action towards sustainable development becomes one of the most important levers, if not the most important, to actively embrace and meaningfully engage with transformations. Using this lever effectively requires ambitious public policies to establish adequate incentives for change, consultation with a wide range of stakeholders and coalition building.

Equally important for the 2030 Agenda is to step up international cooperation for the poorest and most vulnerable countries – to help them recover from the pandemic, as well as from ongoing conflicts, inflation and the cost-of-living crisis and to build resilience to future shocks and climate risks. In the 21st Century, global solidarity and international cooperation are instrumental to human security and to building an inclusive, equitable and peaceful world.

Fully achieving all SDGs and targets in the remaining seven years will be difficult, but every inch of progress matters. And this must be achieved globally – leaving no country, society or person behind.

Incremental and fragmented change is not sufficient and will not achieve the transformations that are required. The only way forward is to transform how we think, live, produce and consume in order to achieve a new equilibrium that balances resilience, security and well-being, and does so in harmony with nature. There are efforts to develop measurements of progress on sustainable development that complement Gross Domestic Product, but they should be further enhanced on the basis of socially robust science.

As indicated in the 2019 *Global Sustainable Development Report*, the SDGs and their targets can be approached through six entry-points: (i) human well-being and capabilities, (ii) sustainable and just economies, (iii) food systems and nutrition patterns, (iv) energy decarbonization with universal access, (v) urban and peri-urban development, and (vi) the global environmental commons. These entry points offer opportunities for social and technological innovation and changes in human behaviour that lead to transformative pathways.

The previous GSDR also identified four main levers that need to be deployed in these entry-points – governance, economy and finance, individual and collective action, and science and technology. This report adds a fifth lever – capacity building – since all countries need the knowledge and skills to understand, enable and navigate context-specific transformative change. Supporting the transformation process entails enhancing capacity in all countries for strategic direction and foresight; innovation and the generation of new alternatives; orchestration, engagement and negotiation; identifying and overcoming impediments; and in learning and resilience.

While these entry points are valuable globally, applying them locally will require contextualized strategies and actions. Countries and local governments will need to develop their own strategies and implementation plans in line with domestic priorities and practices. To do so they need to understand how SDGs are interlinked, how progress in one SDG supports progress in others, and how to address trade-offs and maximize synergies, whilst promoting social cohesion, equality, and participation, at local, sub-national, national, regional, and international levels.

These systemic changes need to increase harmony with nature. Human livelihoods, culture and well-being depend on biodiversity, and the health of landscapes, ecosystems, and oceans. SDG achievements will be short-lived if they are accompanied by overuse and degradation of the natural environment.

To guide policymakers as they engage with SDGs, this chapter presents a series of calls for action. First, that the United Nations Member States establish a shared SDG Transformation Framework, to support transformation processes globally and locally across all the stages of transformation. Second, it provides recommendations on how to build the capacity of state and non-state stakeholders. Third, for each of the six entry-points there are game-changing interventions that will tap into synergies and help manage trade-offs. Fourth, given the changing contexts identified in chapters 1 and 2, there are proposed measures for improving the fundamental conditions for implementation. Finally, there are recommendations on how science, policy and society can work together for a future where people and nature can thrive as one.

Establish an SDG Transformation Framework for Accelerated Action by 2024

Business-as-usual approaches will not achieve the SDGs by 2030 or even 2050. To achieve progress locally, nationally and globally to reach the SDGs will mean truly transformative action with radically new efforts and approaches. This Report recommends therefore that at HLPF 2024 Member States agree on a Transformation Framework for Accelerated Action that brings together local action with international cooperation and thus reflects local contexts, needs, aspirations and capabilities.

Six essential steps and elements for this Transformation Framework would be needed to actively embrace transformative change:

(1) Develop **National Plans for Transformative Accelerated Action** that are underpinned by strong scientific evidence within a context of local and indigenous knowledge and meaningful public engagement. Plans should pursue action where SDG indicators

show stagnant or negative trends, and should use appropriate levers to implement synergistic interventions that are truly transformative in pushing progress across interlinked SDGs. Negative transboundary spillovers should be targeted and reduced. Plans of action should clearly identify impediments in each entry-point and at each phase of transformation and take action to address these. Individual and collective action levers should be employed for inclusive, bottom-up decision-making that engages all sectors, all segments of the population and subnational entities so that no one is left behind. National plans should also include action for international cooperation and, wherever possible, link SDG action with the implementation of global commitments under the Paris Agreement, the Kunming-Montreal Global Biodiversity Framework and the Sendai Framework. Developing national targets, as mentioned in paragraph 55 of the 2030 agenda, is strongly recommended in this regard.

(2) **Local governments, business and industry associations, and institutional investors should be encouraged to develop similar plans**, and feed into national plans. Many actors in these sectors are innovating and experimenting with SDG action, and there is a need to better share learning, jointly evaluate and recognize successful steps.

(3) Employ **national and international economic and financial levers** to accelerate transformations towards just and sustainable economies and infrastructures, including incentives for behaviour change of individuals and of corporate decision-making. Efforts should strengthen the Addis Ababa Action Agenda framework for aligning domestic and international resource flows towards SDG implementation, and for increasing fiscal space, i.e. through increasing tax revenue and official development assistance, combating illicit financial flows, achieving debt relief and restructuring, so that no country is left behind. Reforming financial, tax, and budgetary operations systems, and moving from silo-specific to interlinked, issue-based systems will be crucial. Environmental, social, and governance (ESG) investments should be linked to the SDGs using a corresponding index. At the multilateral level, progress is also needed in reforming the international financial architecture.

(4) Invest in **data, science-based tools and policy learning** to improve policy planning and implementation. This would include a focus on improving the quality of data and developing a funded and credible plan for closing the SDG data gap globally by 2030. Increasing investments for R&D in low- and middle-income countries is also needed. Development of a broader range of economic and non-economic metrics is also needed that reflect the value of human life and nature for monitoring progress in improving human well-being, economic performance and the provision of public goods.

(5) Establish a new partnership for **enhancing the science-policy-society interface** to increase the use of science and scientific evidence and strengthen trust in science and public information. Necessary action includes stronger scientific advisory systems for government departments, open science and cross-border partnerships aligned with specific SDGs and entry-points, South-South partnerships and capacity development in research, knowledge translation, and evidence use.

(6) Invest in **improving accountability** of governments and other stakeholders on implementing the SDGs at international, regional, national, and sub-national levels. Government action should be supervised by parliaments. Civil society organisations should hold governments accountable while also making inputs into national and local policy learning. Global implementation of the Transformation Framework should be monitored by the High-level Political Forum. Monitoring and reporting should also include action at sub-national levels and by the corporate sector.

Build capacity for transformation

Strategic transformations for the SDGs rely on a wide range of capacities and skills at individual, institutional and network levels. Therefore, national acceleration plans should invest in the capacities to strategize, innovate, manage conflicts, identify and overcome impediments and cope with crises and risks. For this purpose, governments may need to reorganise policymaking and public administration to improve horizontal coordination, between departments, and vertical coordination, across levels of government. They will also need to integrate policies from multiple fields and goals – for example, between agriculture, environment, water, social and labour policies, in line with the interlinked nature of the SDGs. Such coordination will allow for regulation and setting incentives that transform decision-making and behaviour patterns in households and in the private sector in a way that is coherent with the SDGs, and takes advantage of synergies and minimises trade-offs.

Specific measures for capacity building include:

- *Management for transformation* – Develop capacity of key stakeholders (policy makers, academics, CEOs, civil society organisations) for driving and managing sustainability transitions in a strategic and systematic manner, including inter-ministerial collaborations with shared vision for long-term goals.
- *Foresight capacity* – International organisations and governments should strengthen foresight capacity to develop visions for long-term sustainable development to 2050 and beyond, and to better understand and respond to external shocks and new opportunities for transformation.
- *Effective public engagement* – Engage citizen groups, youth, women's groups, indigenous communities, marginalised groups, philanthropists and other groups in the quest for transformative change towards sustainability. Safe spaces for youth, people with disabilities, and marginalised groups may be needed for effective engagement.
- *Suitable knowledge production* – Strengthen the process of producing, validating and disseminating socially-robust scientific knowledge for the SDGs and inclusion of indigenous knowledge into scientific processes.
- *Strengthening the science-policy-society interface* – Establish platforms for interaction between academia, think tanks, policymakers, practitioners and the public, focussed on key interventions. Reinforce public trust in science by promoting learning models throughout the education system that teach students and the general public how to filter materials and recognize misinformation.

- *Negotiation and conflict resolution skills* – Countries should build the capacities needed for negotiations to navigate the acceleration phase, conflict resolution, mediation across scales, designing effective policy mixes, overcoming system lock-ins, encouraging horizontal and vertical coordination, and orchestrating various actors.
- *Incorporate the SDGs in codes of conduct and business strategies* – Multinational and large-scale companies should use their influence within their supply chains to make their processes and financial goals compatible with the SDGs. Equally, consumers should exert their individual and collective voice to demand that the quality of the goods they buy is closely aligned with multiple SDGs prioritising the interlinkages across goals.

Push transformation by activating synergies in the six entry-points

Putting the SDG Transformation Framework to work requires locally relevant, synergistic and integrated implementation that breaks down the silos of public service and policymaking. Drawing on global scenario studies and other evidence, we recommend key interventions with systemic effects for each entry-point and across them.

Entry-point 1: Human well-being and capabilities

- *Universal social protection and universal health coverage* – To reduce inequalities within and between societies, eradicate poverty and build resilience to shocks, governments should establish national systems for universal social protection and accelerate the implementation of universal health coverage as established in the 2030 Agenda. Universal social protection needs to be adaptive, to reach those left behind, including those affected by emergencies and crises. With universal social protection as a floor, governments should consider further measures, to tackle rising inequalities, such as progressive taxation, citizen funds or universal basic incomes. Universal health coverage should go hand-in-hand with empowering communities to build healthy environments that promote physical, mental and social well-being and the implementation of the SDGs.
- *Education* – Education builds engaged and informed societies and capabilities for addressing the world's biggest challenges. It is crucial to keep the promise of a minimum of 12 years of quality schooling for every girl and boy in the world. Education systems need to be transformed to ensure that everyone is equipped with the knowledge and skills that enable innovation, resilience, and creativity. The promotion of STEM education, particularly for women and girls, will be valuable for advancing sustainability.
- *Co-benefits* – Policymakers should promote human well-being as a co-benefit of other policies, and this co-benefit reasoning should be formally and systematically included in cost-benefit analyses and impact assessments, in line with the linter-linkag ethos of the SDGs. Better insulation of houses, for example, can benefit health, and reduce CO_2 emissions. Targeted interventions to secure universal safe and efficient water and sanitation services have benefits for human health, reduction of poverty and inequality, improve girls' and women's safety as well as

environmental health. Utilising domestic capital and recovering the costs of operations and maintenance from tariffs, with due attention to equity, has positive economic effects and empowers regulatory authorities.

Entry-point 2: Sustainable and just economies

- *Economic policies* – Key interventions should focus on reducing structural inequalities, and promoting pro-poor growth, gender equity, and decent work as part of whole-of-economy decarbonisation and progressive redistribution, funded through tax reforms for increased revenue and the introduction of global carbon pricing. Policies for resource efficiency, circular and sharing economies are crucial.
- *Renewable energy* – International cooperation and proactive public policies should encourage market forces to scale up renewable energy capacity, development and deployment of energy storage technologies, and rapid expansion of electric vehicles. Linkages with SDGs 1 (poverty eradication) and SDG 10 (reducing inequalities) should be used to harvest and amplify positive spillovers and minimize negative social effects.
- *Climate adaptation* – Governments and the private sector need to invest in adaptation to climate change, for example, by climate-proofing public infrastructure and systems of production and distribution, and by promoting climate-smart agriculture.
- *Implement just transition* – Governments should ensure just transitions by investing in a healthy economy, a clean environment and fairness for those negatively impacted. Unintended negative effects need to be anticipated as early as possible. Measures can include compensation, redundancy payments, early-retirement benefits and social safety nets, as well as helping with skills upgrading, retraining, alternative employment, and regional innovation or development policies. Governments can also provide incentives for existing industries and organisations that are willing to innovate and adopt new sustainable alternatives.

Entry-point 3: Sustainable food systems and nutrition patterns

- *Food security and nutrition* – Address key food systems, including fisheries and aquaculture, and their challenges, such as eliminating hunger and malnutrition, which are especially prevalent in the Global South, and ensure food security.
- *Multifunctional agriculture and agro-ecology* – Shift to regenerative, ecological and multifunctional agriculture systems that protect soil fertility and biodiversity, including more efficient use of water and fertilisers, reducing emissions and increasing the absorption of greenhouse gases and adapting to the impacts of climate change. Increase water-use efficiency in agriculture through safe wastewater reuse and reducing food loss and waste. Scale up agro-ecological practices, improve the quality of connection to consumer markets, strengthen agri-food processing by local entrepreneurs, establish more open and inclusive governance, and build the capacity of food systems actors.
- *Reform food production, promote healthier diets* – Develop the infrastructure and systems for producing sufficient nutrient-rich and affordable staple foods, reducing

losses in processing, storage and transport. Promote diverse and healthier diets, discourage overconsumption of animal-based foods and sugars, starting early in life at schools. Sustainable food systems should crowd out products that have low or no nutritional value. Reform public food procurement along the chain of agricultural production, processing, transport and consumption, making supply chains more resilient, farming more productive and sustainable, and diets healthier.

Entry-point 4: Energy decarbonization with universal access

- *Accelerate decarbonization* – Phase-out fossil fuels in a manner that is globally and domestically just, while strengthening the transition to renewables by increasing energy efficiency and encouraging behavioural change. High-income countries should lead international cooperation in eliminating fossil fuel subsidies and promoting carbon pricing and limiting new exploration and exploitation of reserves. Governments can design pathways for a just transition based on evidence and scenarios and equipped with necessary funding.
- *Universal access to clean energy* – Provide universal and secure access to clean energy within and between countries and support communities most impacted by climate change. This includes access to electricity as well as access to clean cooking fuels and technologies, which are particularly essential for the health, wellbeing and economic opportunities of women and girls.
- *Transitions in African countries* – Energy inequality is especially large on the African continent, where governments, regional organisations and development partners should enable locally tailored energy transitions to meet long-term development objectives. This includes increasing the use of renewables, decreasing fossil fuels, using indigenous and local knowledge, and skills and institutions that can enable African policymakers, the private sector, NGOs, CSOs and scientists to work together for energy decarbonization with universal access. Similar initiatives should be made for other countries and regions strongly affected by energy poverty.
- *Climate justice* – Greenhouse gas emissions should be monitored for both production and consumption and take into account each country's level of development and emissions by income group. In an effective global climate regime, historically high emitters must take the lead in reaching net zero, while transferring the necessary technologies to low- and middle-income countries and building their capabilities. The least developed countries, for example, will need significant emissions headroom but all countries should work towards zero carbon transformations for multiple wins.

Entry-point 5: Urban and peri-urban development

- *Green infrastructure for transformation* – Renew infrastructure to favour collective transport and people's mobility, energy conservation in buildings, circularity in the waste cycle, protecting and expanding green areas and taking advantage of digital technologies.
- *Integrated planning* – Cities should lead the way in integrated planning for SDG implementation across all entry-points, and in disaster risk reduction given the

multiple risks – including climate change, pandemics, and displacement - acknowledging the interlinkages across SDGs and the role of living spaces to contribute towards the goal of healthier societies.

- *International solidarity* – Violent conflicts, climate change impacts and governance deficiencies in rural areas and regions are closely related and call for greater solidarity from the international community including, but not limited to, support to within-country and international migrants.

Entry-point 6: Global environmental commons

- *Protected areas* – Expand protected areas to at least 30 per cent of terrestrial and inland water areas, and of marine and coastal areas, especially those of particular importance for biodiversity and ecosystem functions and services, and restore at least 30 per cent of degraded terrestrial, inland water, and marine and coastal ecosystems. This should be done by respecting the rights of indigenous peoples and local communities, regulating land use, adopting landscape-level conservation planning, and promoting a progressive shift in societal preferences and lifestyles. Recognise the linkages between human and animal health, and the environment.
- *Cooperating for biodiversity protection* – Governments and organisations should urgently implement the Kunming-Montreal Global Biodiversity Framework (GBF) and enable participation at all levels of government to cooperate at transboundary, regional, and international levels. Civil society organisations and non-governmental organisations can make important contributions and should be supported. Reversing biodiversity loss will require action-oriented planning and resource mobilisation.
- *United Nations* – The UN General Assembly should acknowledge the GBF and take it into account when monitoring progress towards the SDGs and to cooperate with other conventions and international organisations for ensuring harmony with nature, on land and in oceans.
- *Better indicators* – Governments, science and statistical offices should jointly start using indicators that better measure the capacity of economies and societies to protect and promote human well-being in key decision-making processes, while addressing planetary well-being – to reflect the dimensions of social equality, and the economic, social, cultural, and ecological functions of ecosystems and biodiversity.

Improve critical underlying conditions for SDG implementation

Healthier and resilient societies are essential for long-term sustainability. The past three years have shown how vulnerable societies are to sudden shocks from pandemics, conflicts, inflation and rising costs of living when they lack provisions for solidarity and equity.

In addition to acute shocks, this Report assesses five trends that have their own slow and persistent dynamics and can lead to disruptions: climate change, rising inequality, biodiversity loss, demographic change, and digitalization. These trends need to be countered and shaped – by governments, multilateral institutions, regional organisations, civil society organisations, and development actors. Specific actions include:

- *Prevent and avoid violent conflict* – Engage in conflict resolution and support the reform of institutions and governance to allow for active, inclusive and fair participation in decision-making.
- *Ensure the necessary fiscal space* – Provide debt relief from all major lenders to developing countries and strengthen their capacities for taxation and fiscal policy. Developed and developing countries should reform international financial institutions, as well as national and multilateral development banks, to focus more strongly on the SDGs and the provision of global public goods.
- *Focus on marginalised groups* – Prioritise the perspectives of communities and people experiencing marginalisation including women and girls, LGBTIQIA, persons with disabilities, children, youth, older persons, migrants, refugees, internally displaced persons, and indigenous peoples, to ensure meaningful inclusion and strengthen their capacity to engage in formal decision-making.
- *Take advantage of the digital transformation* – Maximise its potential for financial inclusion, close the digital divide, and minimise any damaging outcomes. Ensure open, free and secure digital spaces while reducing disinformation and fake news and contributing to a global code of conduct for the integrity of public information.
- *Ensure gender equality* – Focus on achieving equality in four areas:
    - *Legislation* – Eliminate unequal practices leading to gender-pay gaps, the under-representation of women and girls in positions of leadership, and the under-valuing of women's domestic and care work. Regional blocks should strengthen commitments to gender equality and review progress in implementation.
    - *Elimination of harmful practices* – Strengthen national and local leadership to implement laws banning harmful practices such as female genital mutilation, child marriages, rape, and other forms of gender-based violence and discrimination.
    - *Education* – Commit financial resources to provide 12 years of compulsory and free education for every child; strengthen programmes that encourage girls and women in science and technology and research leadership roles.
    - *Reproductive health* – Provide comprehensive information and improve access to affordable sexual and reproductive health services.

Transforming Science for Sustainable Development

Sustainable development pathways benefit most from science that is multidisciplinary, equitable and inclusively produced, openly shared, widely trusted and embraced, and socially relevant and robust. Science and technology can produce socially robust insights and innovation in an atmosphere of diversity, ensuring participation of women and girls, and all groups of society, as both creators and users. Policymakers, public interest groups, industry and teachers should have open access to the body of scientific knowledge, including publications, data and software, drawing the full benefits of science as a public good.

- *Performance indicators* – Governments should encourage scientific institutions to adopt key performance indicators that reward impact-oriented work and inter- and

trans-disciplinary research on concepts, approaches, tools, methods, and empirical processes of implementation of the SDGs.

- *Empirical research* – Funders and development partners should invest in empirical research on SDG implementation including interlinkages and spillovers, as well as in empirically measuring success, including gender disaggregated impacts, to provide evidence for improved implementation.
- *Support for low-income countries* – Strengthen their capacities and institutions for research and academic training and increase access to knowledge, fostering South-to-South collaborations. Increased funding for research systems should strive for equitable partnerships as a key driver for SDGs.
- *Open science* – Develop an enabling policy environment as well as infrastructure and services that promote open science, global collaboration and open access to publications, data, software and research outputs for implementing the SDGs.
- *The Global Sustainable Development Report* – Increase human and financial resources for the GSDR, to review and synthesise the science required for successful implementation of the SDGs and help local governments and communities to respond to global problems.
- *Mechanisms for knowledge sharing* – Establish strong mechanisms for knowledge sharing to address global challenges and ensure access to science-based solutions. Strengthen cooperation on access to science, technology and innovation including through the Technology Facilitation Mechanism.

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Appendix 1: Literature on SDG interlinkages and summary of findings

The 2019 GSDR presented an analysis of SDG interlinkages. The authors conducted a review of 112 scientific articles and 65 global assessments with explicit reference to the SDGs. The interlinkages between the SDGs were subsequently assessed using the seven-point scale developed by the International Science Council (https://council.science/wp-content/uploads/2017/05/SDGs-Guide-to-Interactions.pdf). Since 2019, the literature on SDG interlinkages has grown rapidly. The 2023 GSDR presents a synthesis of the literature published between 2019-2022. The analysis is based on a review of i) global and non-context-specific assessments, and ii) assessments of SDG interlinkages for different country-, income-, and population groups. Only publications that analyze interlinkages between all 17 SDGs were included in the review. In total, 4997 publications were screened for eligibility. The final sample consists of 52 publications. Many of these publications establish that there are interlinkages between the SDGs without providing further information about the nature of these connections. However, the 2023 GSDR synthesis focuses specifically on the sub-set of publications that clearly identify trade-offs and synergies between the SDGs. The following table provides an overview of the publications providing supporting evidence for SDG trade-offs and synergies.

Publications providing supporting evidence for SDG trade-offs and synergies

	Trade-offs identified in the following publications	**Synergies identified in the following publications**
SDG 1	Kroll et al., 2019	Kroll et al., 2019 Dawes, 2020, 2022 Pham-Truffert et al., 2020 Anderson et al., 2021 Hegre et al., 2020 Warchold et al., 2021 Wu, 2022 Barbier & Burgess, 2019 Cernev & Fenner, 2020
SDG 2	Pham-Truffert et al., 2020 Miola et al., 2019 Boar et al., 2022 Warchold et al., 2021	Dawes, 2020, 2022 Hegre et al., 2020 Cernev & Fenner, 2020 Barbier & Burgess, 2019 Pham-Truffert et al., 2020

SDG 3	Pham-Truffert et al., 2020 Warchold et al., 2021 Kroll et al., 2019	Kroll et al., 2019 Dawes, 2020, 2022 Miola et al., 2019 Anderson et al., 2021 Hegre et al., 2020 Warchold et al., 2021 Wu, 2022 Asadikia et al., 2021 Barbier & Burgess, 2019 Kunčič, 2019 Cernev & Fenner, 2020 Pham-Truffert et al., 2020
SDG 4	Anderson et al., 2021 Pham-Truffert et al., 2020	Pham-Truffert et al., 2020 Boar et al., 2022 Hegre et al., 2020 Warchold et al., 2021 Wu, 2022 Asadikia et al., 2021 Cernev & Fenner, 2020 Barbier & Burgess, 2019
SDG 5	Warchold et al., 2021 Pham-Truffert et al., 2020	Miola et al., 2019 Anderson et al., 2021 Hegre et al., 2020 Warchold et al., 2021 Wu, 2022 Barbier & Burgess, 2019 Pham-Truffert et al., 2020
SDG 6	Pham-Truffert et al., 2020	Pham-Truffert et al., 2020 Anderson et al., 2021 Hegre et al., 2020 Warchold et al., 2021 Wu, 2022 Barbier & Burgess, 2019
SDG 7	Pham-Truffert et al., 2020 Warchold et al., 2021 Kroll et al., 2019	Kroll et al., 2019 Boar et al., 2022 Anderson et al., 2021 Hegre et al., 2020 Warchold et al., 2021 Wu, 2022 Asadikia et al., 2021 Barbier & Burgess, 2019 Dawes, 2022 Pham-Truffert et al., 2020

SDG 8	Pham-Truffert et al., 2020 Boar et al., 2022 Cernev & Fenner, 2020	Kroll et al., 2019 Hegre et al., 2020 Wu, 2022 Cernev & Fenner, 2020 Pham-Truffert et al., 2020
SDG 9	Kroll et al., 2019 Pham-Truffert et al., 2020	Kroll et al., 2019 Miola et al., 2019 Wu, 2022 Pham-Truffert et al., 2020
SDG 10	Pham-Truffert et al., 2020 Anderson et al., 2021 Hegre et al., 2020 Lusseau & Mancini, 2019	Barbier & Burgess, 2019 Pham-Truffert et al., 2020
SDG 11	Kroll et al., 2019 Anderson et al., 2021 Barbier & Burgess, 2019 Pham-Truffert et al., 2020	Hegre et al., 2020 Pham-Truffert et al., 2020
SDG 12	Boar et al., 2022 Anderson et al., 2021 Warchold et al., 2021 Wu, 2022 Kunčič, 2019 Lusseau & Mancini, 2019 Pham-Truffert et al., 2020	Dawes, 2022 Pham-Truffert et al., 2020 Cernev & Fenner, 2020
SDG 13	Kroll et al., 2019 Wu, 2022 Barbier & Burgess, 2019 Lusseau & Mancini, 2019 Randers et al., 2019 Pham-Truffert et al., 2020	Cernev & Fenner, 2020 Pham-Truffert et al., 2020
SDG 14	Kroll et al., 2019 Dawes, 2020, 2022 Pham-Truffert et al., 2020 Wu, 2022 Barbier & Burgess, 2019 Randers et al., 2019	Pham-Truffert et al., 2020 Cernev & Fenner, 2020
SDG 15	Dawes, 2020, 2022 Pham-Truffert et al., 2020 Wu, 2022	Pham-Truffert et al., 2020 Cernev & Fenner, 2020

	Barbier & Burgess, 2019 Randers et al., 2019	
SDG 16	Kroll et al., 2019 Anderson et al., 2021 Pham-Truffert et al., 2020	Pham-Truffert et al., 2020 Wu, 2022 Cernev & Fenner, 2020
SDG 17	Kroll et al., 2019 Warchold et al., 2021 Wu, 2022 Pham-Truffert et al., 2020	Dawes, 2022 Pham-Truffert et al., 2020 Anderson et al., 2021 Hegre et al., 2020 Cernev & Fenner, 2020 Barbier & Burgess, 2019 Warchold et al., 2021

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5758 **ANNEX 1: Independent Group of Scientists**

 Ms. Imme Scholz, Germany (Co-Chair)	 Mr. J. Jaime Miranda, Peru (Co-Chair)	 Mr. John Agard, Trinidad and Tobago (Co-Chair, *2020-2021)*	 Mr. Ambuj Sagar, India	 Ms. Kaltham Al - Ghanim, Qatar
 Mr. Sergey N. Bobylev, Russia	 Ms. Opha Pauline Dube, Botswana	 Ms. Shirin Malekpour, Australia	 Mr. Jaime C. Montoya, Philippines	 Mr. Jiahua Pan, China
 Ms. Åsa Persson, Sweden	 Ms. Nancy Shackell, Canada	 Mr. Ibrahima Hathie, Senegal	 Mr. Norichika Kanie, Japan	 Ms. Nyovani Janet Madise, Malawi

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ANNEX 2: Regional Consultations to inform the GSDR

Together with partners, the United Nations Department of Economic and Social Affairs, Division for Sustainable Development Goals (DESA/DSDG) organized a series of regional consultations to inform the 2023 GSDR. These consultations brought together experts from academia, civil society, government officials participating in their individual capacity, the private sector, and other stakeholders to share experiences and perspectives. Additional consultations were held in virtual and hybrid form in China, Japan and Australia. Some examples and case studies from these consultations have been incorporated in the current draft.

Locations of regional consultations:

Latin America and the Caribbean, Lima, Peru (7-9 November 2022)

Africa, Dakar, Senegal (14-16 November 2022)

Asia and the Pacific, Manila, Philippines (28-30 November 2022)

Africa, Lilongwe, Malawi (30 November – 2 December 2022)

Western Asia, Doha, Qatar (24-25 January 2023)

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Additional partners:

African Institute for Development Policy

Chinese Academy of Social Sciences

Initiative Prospective Agricole et Rurale

Ministry of Science and Technology of the Philippines

Social and Economic Survey Research Institute, Qatar University

Universidad Peruana Cayetano Heredia

ANNEX 3: Scientific review of the draft of the 2023 GSDR

The scientific review of the draft 2023 Global Sustainable Development Report was led by the International Science Council (ISC) at the invitation of the Department of Economic and Social Affairs of the United Nations (UNDESA). The review took place between 09 September and 02 October 2022 based on the embargoed first-order draft of the GSDR shared by UN DESA with the ISC on 07 September 2022. Comments from 104 reviewers were received during the review period. The ISC set up a multidisciplinary working group composed of 16 experts. The working group's role was to support the ISC secretariat by advising on the review process, reviewing the full draft GSDR report, and synthesizing the review comments from the large pool of reviewers. The review led to the production of two outputs: a table compiling all the comments received from the large pool of reviewers and a synthesis report by the working group structuring and summarizing the main findings from the review process, intended for the Independent Group of Scientists, UN DESA and any other institution or individual supporting the development of the 2023 GSDR.

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ANNEX 4: Ministerial declaration of the 2016 high-level political forum on sustainable development, convened under the auspices of the Economic and Social Council, on the theme "Ensuring that no one is left behind"

(E/HLS/2016/1)

We, the Ministers and high representatives, having met at United Nations Headquarters in New York,

1. Pledge that no one will be left behind in implementing the 2030 Agenda for Sustainable Development. In this first high-level political forum for sustainable development to be convened following its historic adoption, we underscore the need for its 17 Sustainable Development Goals and 169 targets to be met for all nations and peoples and for all segments of society. We stress that the 2030 Agenda is people-centred, universal and transformative and that its Goals and targets are integrated and indivisible and balance the three dimensions of sustainable development — economic, social and environmental. It is a plan of action for people, planet and prosperity that also seeks to strengthen universal peace in larger freedom, to be implemented by all countries and stakeholders, acting in collaborative partnership. We reaffirm all the principles recognized in the Agenda, and that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development;

2. Emphasize that the high-level political forum is called to provide political leadership, guidance and recommendations for the implementation of sustainable development commitments, and that it has a central role in overseeing a network of follow-up and review processes of the 2030 Agenda at the global level, working coherently with the General Assembly, the Economic and Social Council and other relevant organs and forums, in line with existing mandates. It will, inter alia, facilitate the sharing of experiences and best practices and promote system-wide coherence and coordination of sustainable development policies, considering that the 2030 Agenda is applicable to all, taking into account different national realities, capacities and levels of development and respecting each country's policy space, and to be implemented consistent with the sovereign rights and obligations of States under international law and with the Charter of the United Nations;

3. Welcome early efforts in implementing the 2030 Agenda at all levels, building on the achievements of the Millennium Development Goals and seeking to address their unfinished business. We are encouraged by these efforts and, in this first year of its implementation, look forward to further progress in, inter alia, revitalizing and enhancing the Global Partnership for Sustainable Development, aligning existing policies with the new global plan of action, increasing policy and system-wide coherence and integration for achieving the Sustainable Development Goals and targets, addressing existing and emerging challenges, enhancing national capacities for evidence-based and data-driven decision-making, and favouring participatory, cooperative and enabling environments at all levels. We take note with appreciation of the Secretary-General's first annual progress report on the Sustainable Development Goals;

4. Have considered the theme of the 2016 high-level political forum, "Ensuring that no one is left behind", and highlight in this regard that the dignity of the human person

is fundamental, and that we endeavour to reach the furthest behind and the most vulnerable first. To ensure that no one is left behind, we are working to eradicate poverty and hunger and achieve sustainable development in its three dimensions, inter alia, by promoting inclusive economic growth, protecting the environment and promoting social inclusion in an integrated manner. We will ensure gender equality and women's and girls' empowerment. We will also promote peaceful and inclusive societies, respect and promote all human rights, and promote an equitable global economic system in which no country, people or person is left behind, enabling decent work and productive livelihoods for all, while preserving the planet for our children and future generations. We strive for a world of peace, free of fear and violence and free from terrorism. We pledge to make such a world a reality;

5. Commit, in our endeavour to ensure that no one is left behind, to focusing our efforts where the challenges are greatest, including by ensuring the inclusion and participation of those who are furthest behind. We deem it of critical importance, in this regard, to protect and empower people who are vulnerable. We recall that those whose needs are reflected in the 2030 Agenda include all children, adolescents, youth, persons with disabilities, people living with HIV/AIDS, older persons, indigenous peoples, refugees and internally displaced persons, migrants and peoples living in areas affected by complex humanitarian emergencies, and peoples in areas affected by terrorism and conflict;

6. Emphasize that, to ensure that no one is left behind, we are committed to making real a world free of poverty, hunger, disease, want and environmental degradation, where all life can thrive; a world with universal literacy and with equitable and universal access to quality education at all levels and to health care and social protection, where physical, mental and social well-being are assured, where we reaffirm our commitments regarding the human right to safe drinking water and sanitation and where there is improved hygiene, and where food is sufficient, safe, affordable and nutritious;

7. Recognize that sustainable development cannot be realized without peace and security, and that peace and security will be at risk without sustainable development. The 2030 Agenda recognizes the need to build peaceful, just and inclusive societies that provide equal access to justice and that are based on respect for human rights, including the right to development, on effective rule of law and good governance at all levels and on transparent, effective and accountable institutions. Factors which give rise to violence, insecurity and injustice, such as inequality, corruption, poor governance and illicit financial and arms flows, are addressed in the Agenda. We must redouble our efforts to resolve or prevent conflict and to support post-conflict countries, including by ensuring that women have a role in peacebuilding and State-building. We call for further effective measures and actions to be taken, in conformity with international law, to remove the obstacles to the full realization of the right of self-determination of peoples living under colonial and foreign occupation, which continue to adversely affect their economic and social development as well as their environment;

8. Emphasize that universal respect for human rights and human dignity, peace, justice, equality and non-discrimination is central to our commitment to leaving no one behind. Our commitment also includes respect for race, ethnicity and cultural diversity, and equal opportunity, permitting the full realization of human potential and contributing to

shared prosperity. We are committed to a world that invests in its children and youth and in which every child grows up free from all forms of violence and exploitation. We envision a world in which every woman and girl enjoys full gender equality and all legal, social and economic barriers to their empowerment have been removed. We will strive for a world where young women and young men are key agents of change, supported by a culture of innovation, sustainability and inclusiveness, to enable a better future for themselves and their communities; a just, equitable, tolerant, open, creative and socially inclusive world in which the needs of the most vulnerable are met;

9. Also emphasize our commitment to making real a world in which every country enjoys sustained, inclusive and sustainable economic growth and decent work for all, in which consumption and production patterns and the use of all natural resources are sustainable; a world in which development is climate-sensitive and respects biodiversity, where we restore and conserve and sustainably use all ecosystems and strengthen our cooperation to prevent environmental degradation and promote resilience and disaster risk reduction; a world where human settlements and the application of technology are inclusive, safe, resilient and sustainable and where there is universal access to safe, affordable, reliable and sustainable transport and energy systems; a world in which humanity lives in harmony with nature and in which wildlife and other living species are protected;

10. Stress that realizing gender equality and the empowerment of all women and girls will make a crucial contribution to progress across all the Goals and targets. Women and girls should enjoy equal access to quality education at all levels, health-care services, economic and natural resources and civil and political participation as well as equal opportunities with men and boys for employment, leadership and decision-making at all levels. We will work for a significant increase in investments to close the gender gap and strengthen support for institutions in relation to gender equality and the empowerment of all women and girls at the global, regional and national levels. We strive for a world where all forms of discrimination and violence against women and girls will be eliminated, including through the engagement of men and boys. The systematic mainstreaming of a gender perspective into the implementation of the 2030 Agenda is crucial;

11. Welcome the numerous contributions made by the United Nations and other relevant intergovernmental bodies and forums to the implementation of the 2030 Agenda, including the General Assembly and the Economic and Social Council, the United Nations development system and the United Nations specialized agencies. In the context of the high-level segment of the Economic and Social Council, we welcome its annual work, including that of its functional and regional commissions and segments, which has been guided by the theme “Implementing the post-2015 development agenda: moving from commitments to results”. The Council is key in supporting our efforts to ensure that no one is left behind by, inter alia, addressing existing and emerging challenges, facilitating multi-stakeholder participation and promoting system-wide coherence and coordination. We highlight the important contributions made by its forums on youth, on partnerships and on development cooperation; its segments on operational activities, on integration and on humanitarian affairs; its special meetings on inequality, on the El Niño phenomenon and on the Zika virus; and its dialogue on the longer-term positioning of the United Nations development system in the context of the 2030 Agenda, called to inform the upcoming

quadrennial comprehensive policy review, among other activities related to the implementation of the 2030 Agenda. We look forward to the contributions of the Council and other relevant intergovernmental forums and bodies in the coming years, including on the thematic reviews of the 2030 Agenda;

12. Stress, in regard to the thematic discussion of the Council's high-level segment on "Infrastructure for sustainable development for all", the attention given by the 2030 Agenda to building resilient infrastructure and its particular connection with the promotion of inclusive and sustainable industrialization and the fostering of innovation. We are committed to addressing infrastructure gaps by, inter alia, improving investments and further building capacities within a coherent policy framework, and consider this key for reducing inequalities within and among countries. We also stress that infrastructure should be safe, accessible and people-centred, and promote economic integration and connectivity, to ensure that no one is left behind;

13. Recognize that the scale and ambition of the 2030 Agenda require a revitalized and enhanced Global Partnership for Sustainable Development to ensure its implementation, working in a spirit of global solidarity, in particular with the poorest and with people who are vulnerable. We are fully committed to this, and to moving from all commitments to results, working with all stakeholders. The provision of means of implementation, particularly as outlined under Goal 17 and under each Sustainable Development Goal, supported by the concrete policies and actions outlined in the Addis Ababa Action Agenda of the Third International Conference on Financing for Development, which is an integral part of the 2030 Agenda, is critical for achieving our ambitious goals and ensuring that no one is left behind;

14. Welcome in this regard, inter alia, the holding of the inaugural forum on financing for development, take note of its intergovernmentally agreed conclusions and recommendations, and look forward to further advancement in the follow-up process. We also welcome the work of the United Nations Inter-Agency Task Force. We further welcome the progress made in operationalizing the three components of the Technology Facilitation Mechanism and the holding of the inaugural multi-stakeholder forum on science, technology and innovation for the Sustainable Development Goals, which is important, inter alia, to help facilitate the development, transfer and dissemination of relevant technologies for the Sustainable Development Goals. We look forward to the establishment of the online platform as part of the Mechanism. We also welcome the progress made in operationalizing the technology bank for the least developed countries;

15. Highlight the importance of participatory and inclusive implementation, follow-up and review of the 2030 Agenda at all levels. We acknowledge the primary responsibilities of Governments in this regard. We also acknowledge the contribution of parliaments, subnational governments and all other relevant stakeholders, including the private sector, civil society, academia and philanthropic organizations. Their participation supports accountability to our citizens and enhances the effectiveness of our action, fostering synergies, multi-stakeholder partnerships and international cooperation, and the exchange of best practices and mutual learning. We welcome the participation and contributions of major groups and other relevant stakeholders in the high-level political forum and encourage their continued engagement in ensuring that no one is left behind;

16. Stress that the availability and use of accessible, timely, reliable and high-quality disaggregated data underpins our efforts to leave no one behind by, inter alia, identifying inequalities. Such data should measure poverty in all its forms and dimensions as well as progress on sustainable development, to reveal inequalities, gaps, progress and recurrent challenges, identify innovative solutions and inform the implementation of the 2030 Agenda at all levels. We are committed to developing broader measures of progress to complement gross domestic product. We urge Governments and international organizations, including the United Nations system, international financial institutions and other relevant stakeholders, to assist developing countries in further building and strengthening capacities for data collection, disaggregation, dissemination and analysis at all levels, taking into account that the global review of the 2030 Agenda will be based primarily on national official data sources. We welcome the decision of the Statistical Commission on the global indicator framework for the Sustainable Development Goals and targets prepared by the Inter-Agency and Expert Group on Sustainable Development Goal Indicators, which is a practical starting point, and look forward to its implementation and continual improvement in an inclusive and transparent manner;

17. Commend the 22 countries[1] that presented voluntary national reviews at the 2016 high-level political forum, and highlight the commitment and leadership shown by these countries in their early steps to implement the 2030 Agenda, including by integrating it into their national development and sustainable development strategies. Country-led reviews at the national level should be the foundation for voluntary reviews at the regional and global levels, as appropriate. Consistent with the 2030 Agenda, such reviews can promote the inclusive participation of all relevant stakeholders in its implementation, fostering national and subnational ownership and thus enhancing our efforts to ensure that no one is left behind. We stress the importance of building national capacities for follow-up and review, and the usefulness of making assistance available for preparing for the national voluntary reviews at the high-level political forum, including through voluntary guidance and methodologies to address issues such as the interlinkages among the Sustainable Development Goals. We encourage countries to take into consideration experience gained and lessons learned from these 22 State-led voluntary reviews, and to volunteer in the coming years;

18. Recognize the important role that regional and subregional forums can have in supporting the implementation of the 2030 Agenda, including its follow-up and review process, by, inter alia, promoting peer learning and cooperation, including South-South and triangular cooperation as appropriate, and helping to link the national and global levels of implementation. In this regard, we welcome the identification, development and convening of appropriate regional and subregional forums on sustainable development;

19. Stress that reducing vulnerability to climate change is a global challenge faced by all, in particular those living in poverty. We recognize the synergies of the Paris Agreement with the 2030 Agenda for Sustainable Development. We welcome the Paris Agreement, under which all parties will take urgent action to address climate change, and in that regard look forward to its prompt ratification, acceptance, approval or accession and its early entry into force and implementation. We also look forward to the mobilization of

resources to assist its implementation. We recognize the specific needs and special circumstances of developing countries, especially those that are particularly vulnerable to the adverse effects of climate change;[2]

20. Reiterate that each country faces specific challenges in its pursuit of sustainable development. The most vulnerable countries and, in particular, African countries, least developed countries, landlocked developing countries and small island developing States deserve special attention, as do countries in conflict and post-conflict situations. There are also serious challenges within many middle-income countries. In this regard, we welcome the progress made to date and reaffirm support for the Istanbul Programme of Action for the Least Developed Countries for the Decade 2011-2020, the SIDS Accelerated Modalities of Action (SAMOA Pathway) and the Vienna Programme of Action for Landlocked Developing Countries for the Decade 2014-2024, and reaffirm the importance of supporting the African Union's Agenda 2063 and the programme of the New Partnership for Africa's Development, to ensure that no one is left behind. We also take note of the principles set out in the New Deal for Engagement in Fragile States by the Group of Seven Plus, countries that are, or have been, affected by conflict;

21. Look forward to all ongoing and upcoming intergovernmental processes which will contribute to the implementation of the 2030 Agenda, including, inter alia, the United Nations Conference on Housing and Sustainable Urban Development (Habitat III), to be held in Quito in October 2016; the United Nations high-level plenary meeting on addressing large movements of refugees and migrants, to be held in New York in September 2016; the thirteenth meeting of the Conference of the Parties of the Convention on Biological Diversity, to be held in Cancun, Mexico, in December 2016; and the Group of 20 Summit to be held in Hangzhou, China, in September 2016. We recommend that these processes and other efforts, including, inter alia, the Sendai Framework for Disaster Risk Reduction 2015-2030 and the 10-year Framework of Programmes on Sustainable Consumption and Production Patterns, should focus on ensuring that no one is left behind. We stress the importance of system-wide strategic planning, implementation and reporting in order to ensure coherent and integrated support for the effective implementation of the 2030 Agenda by the United Nations development system, taking into account its integrated and indivisible nature;

22. Endorse the outcome of the process of consultation on the scope, methodology and frequency of the Global Sustainable Development Report as well as its relationship with the Sustainable Development Goals progress report, as laid out in the annex to the present declaration;

23. Are encouraged, despite varied new challenges emerging after the adoption of the 2030 Agenda, by the enthusiasm, innovation and dedication of the wide array of actors already engaged, in collaborative partnerships, in its implementation, showing that this is an Agenda of the peoples, by the peoples and for the peoples. In this regard, we look

forward to its continued inclusive implementation and urge that every effort be made to reach the furthest behind first and to ensure that no one is left behind.

ANNEX on Global Sustainable Development Report: scope, frequency, methodology and relationship with the Sustainable Development Goals progress report

We, the Ministers and high representatives, having met at United Nations Headquarters in New York,

Scope

Recalling paragraph 83 of the 2030 Agenda for Sustainable Development,

1. Stress that the Global Sustainable Development Report is one important component of the follow-up and review process for the 2030 Agenda for Sustainable Development;

2. Also stress that the Global Sustainable Development Report will inform the high-level political forum, and shall strengthen the science-policy interface and provide a strong evidence-based instrument to support policymakers in promoting poverty eradication and sustainable development. It will be available for a wide range of stakeholders, including business and civil society as well as the wider public;

3. Resolve that the Report should incorporate scientific evidence in a multidisciplinary manner, considering all three dimensions of sustainable development, in order to reflect the universal, indivisible and integrated nature of the 2030 Agenda. With its universal scope, the Report should also consider the regional dimension, as well as countries in special situations. The Report will provide guidance on the state of global sustainable development from a scientific perspective, which will help address the implementation of the 2030 Agenda, provide lessons learned, while focusing on challenges, address new and emerging issues, and highlight emerging trends and actions. The Report should also focus on an integrated approach and examine policy options with a view to sustaining the balance between the three dimensions of sustainable development. These policy options should be in line with the 2030 Agenda to inform its implementation;

Frequency

4. Resolve that a comprehensive, in-depth Report will be produced every four years to inform the high-level political forum convened under the auspices of the General Assembly;

5. Also resolve that each year, in order to strengthen the science-policy interface at the high-level political forum convened under the auspices of the Economic and Social Council, scientists who work on the Report should be invited to provide scientific input into the discussion, including on the theme of the forum;

Methodology

6. Stress that the main principles guiding the methodology of the Report should be objectivity, independence, transparency, inclusiveness, diversity, scientific excellence and integrity, and policy relevance. The Report represents the result of an ongoing dialogue among scientists in all relevant fields on sustainable development worldwide, ensuring geographically balanced participation and assessing existing assessments, including the relevant reports on sustainable development from a variety of sources, including the United Nations system, as well as bringing together dispersed information;

7. Request, therefore, the creation of an independent group of scientists to draft the quadrennial Global Sustainable Development Report. The independent group of scientists is to comprise 15 experts representing a variety of backgrounds, scientific disciplines and institutions, ensuring geographical and gender balance. The group will be appointed for each Global Sustainable Development Report by the Secretary-General in open, transparent and inclusive consultations with Member States, including the possibility of taking nominations from Member States. The group will commence its work by the end of 2016. It will be supported by a task team, co-chaired by one representative each of the United Nations Secretariat, the United Nations Educational, Scientific and Cultural Organization, the United Nations Environment Programme, the United Nations Development Programme, the United Nations Conference on Trade and Development and the World Bank, with the logistical support of the United Nations Secretariat. The task team will coordinate inputs from a network of existing networks, representing the United Nations, the private sector, civil society and academia. Inputs can also be posted onto the high-level political forum online platform annually;

Relationship with the Sustainable Development Goals progress report

8. Acknowledge the distinct but complementary nature of the Sustainable Development Goals progress report and the Global Sustainable Development Report, both contributing to the high-level political forum from different perspectives. The high-level political forum will be informed by the annual Sustainable Development Goals progress report, which is to be prepared by the Secretary-General in cooperation with the United Nations system, on the basis of the global indicator framework, data produced by national statistical systems and information collected at the regional level. The Global Sustainable Development Report will be more scientific and analytical, focused on the science-policy interface, and will also inform the high-level political forum.

ANNEX 5: Acknowledgments

(**THIS SECTION WILL BE UPDATED AND EXPANDED IN ADVANCE OF FINAL PUBLICATION**)

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United Nations Task Team (**to be completed**)

Independent Group of Scientists' member institutions (**to be completed**)

Additional expert contributors (**to be completed**)

Participants in the regional consultations (**to be completed**)

Contributors to the Call for Inputs (**to be completed**)

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