

S&T Major Group position paper for the 2021 HLPF

Sustainable and resilient recovery from the COVID-19 pandemic that promotes the economic, social and environmental dimensions of sustainable development: building an inclusive and effective path for the achievement of the 2030 Agenda in the context of the decade of action and delivery for sustainable development

First draft v. 20.04.2021

The launch of the Decade of Action and Delivery for Sustainable Development in 2020 recognises that the world has 10 years to meet the 17 sustainability goals. However, 2020 was also marked by the COVID-19 pandemic which has been called one of the ‘most challenging crisis humanity has faced since World War II’¹ by the UN Secretary-General Antonio Guterres. Besides generating massive adverse health and socio-economic impacts for societies around the globe, the COVID-19 pandemic has further exposed inequality in vulnerability to shocks among the poor and marginalized, feeding off existing inequalities and exacerbating them², undermining the aspiration of “leaving no-one behind”. Economic gains and opportunities continue to be unequally distributed, while costs and impacts associated with climate change and biodiversity destruction are increasing exponentially and affecting disproportionately the most vulnerable and poor particularly in low-income countries.

The COVID-19 pandemic has furthermore laid bare the integrated nature of human development, well-being and planetary health and the profound reliance of human societies on a healthy and resilient biosphere providing suitable living conditions³. The pandemic is merely a symptom of the devastating impacts of anthropogenic activities on natural ecosystems in a world characterised by complex interactions of globalized networks of travel and trade, densely populated urban areas, compounded by ecological habitat and land-use change, and climate change, resulting in increased human-wildlife interactions⁴. It comes as a timely warning to urgently transform human actions and relations, including with nature, to stabilize the Earth System currently threatened by further destruction of biodiversity, land, forests and oceans degradation, air and water pollution, destabilization of climate and general devastation of our natural capital⁵.

In line with the focus of the HLPF for 2021 on sustainable and resilient recovery, this position paper brings together the latest scientific evidence and thinking from the S&T community in order to set out ways to advance progress on the SDGs throughout the Decade of Action while living with and through the COVID-19 pandemic. The position paper seeks to reflect on how the current context, devastating as it has been for so many, also provides a window of opportunity – a leverage point – from where to steer radical system transformation and to highlight contributions of the scientific and technological community to support transitions towards desired outcomes.

¹ [UN Secretary-General at the launch of the Report on the Socio-Economic Impacts of COVID-19](#)

² Carl Folke et al. 2020. Our Future in the Anthropocene Biosphere: Global sustainability and resilient societies. Beijer Discussion Paper Series No. 272

³ Ibid.

⁴ Claude Henry, Johan Rockström, Nicholas Stern. 2020: Standing up for a Sustainable World. Cheltenham/Northampton: Edward Elgar Publishing.

⁵ Ibid.

Context

The impact of the COVID-19 crisis on the Sustainable Development Goals (SDGs)

The effects of the pandemic and the measures taken to mitigate its impact have generated the worst economic contraction since the Great Depression exposing structural flaws of the current growth-fixated economic system (and reliance on measures like GDP), which is creating the drivers for unsustainability, as well as the lack of preparedness and resilience of the increasingly globalised and interconnected economy. Despite the immense wealth accumulation and economic growth during the past decades, the current economic system has failed to address the health crisis appropriately, to protect the most vulnerable and to halt the rise of inequalities. Examples of economic impacts include the high risk for nearly half of the world's 3.3 billion global workforce to lose their livelihoods with millions of enterprises facing an existential threat⁶; decline of 14 percent in remittance flows to low and middle-income countries (LMICs) by 2021 compared to the pre-COVID-19 levels in 2019⁷. Solving the problems in the current economic and financial systems that were revealed by the COVID-19 pandemic requires systemic and profound changes and these challenges need to be addressed simultaneously with the health emergency.

The COVID-19 pandemic disrupted implementation towards many of the SDGs and, in some cases, reversed hard-won progress⁸. For example, global extreme poverty (SDG 1 no poverty) is expected to rise for the first time in 20 years leading to as many as 150 million being in this position by 2021⁹; with respect to SDG 2 (zero hunger) COVID-19 poses an additional threat to food systems, along with conflict and climate shocks, and is driving up acute hunger in countries already in food crisis¹⁰, creating new hunger hotspots across the globe¹¹; in terms of SDG 3 (good health and well-being), COVID-19 has led to the interruption of childhood immunization efforts worldwide¹² and reduced services for cancer screening, family planning, or non-COVID-19 infectious diseases¹³; with the pandemic hitting the most vulnerable hardest, and exerting more damaging impact on the poorest countries, means SDG 10 (reduced inequalities) has become even harder to achieve. Besides, as the attention of most governments turned to solving the health crisis and addressing the subsequent socio-economic impacts of the COVID-19 crisis, the risk of missing targets notably for goals aimed at environmental sustainability encompassed by SDGs 7-9 and 11-15 is particularly high. For example, ocean observation has been dramatically affected with almost all research vessels been called to their home ports and a number of arrays monitoring ocean state being at risk of failure (SDG14). In June 2020, this situation affected between 30–50% of the 300+ moorings. Some of them had already ceased to send data as batteries ran out¹⁴.

⁶ ILO, FAO, IFAD and WHO Joint statement. 2020. [Impact of COVID-19 on people's livelihoods, their health and our food systems](#)

⁷ The World Bank. Press release 2020. [COVID-19: Remittance Flows to Shrink 14% by 2021](#)

⁸ UN DESA Policy brief. 2020. [Impact of COVID-19 on SDG progress: a statistical perspective](#).

⁹ The World Bank. 2020. [COVID-19 to Add as Many as 150 Million Extreme Poor by 2021](#).

¹⁰ FAO. 2020. [COVID-19 impacts driving up acute hunger in countries already in food crisis](#).

¹¹ WFP and FAO. 2021. [Hunger Hotspots. FAO-WFP early warnings on acute food insecurity: March to July 2021 outlook](#). Rome.

¹² UN DESA. 2020. [The Sustainable Development Goals Report 2020](#). Page 30

¹³ The Lancet Editorial 2020. Will the COVID-19 pandemic threaten the SDGs? The Lancet Public Health. Volume 5, ISSUE 9, e460. DOI: [https://doi.org/10.1016/S2468-2667\(20\)30189-4](https://doi.org/10.1016/S2468-2667(20)30189-4)

¹⁴ OC-UNESCO. 2020. Global Ocean Science Report 2020—Charting Capacity for Ocean Sustainability. K. Isensee (ed.), Paris, UNESCO Publishing.

The effects of the pandemic emphasize the indivisible and systemic nature of the 2030 Agenda with all its 17 SDGs interacting with each other – in positive or negative ways¹⁵. The COVID-19 pandemic has confirmed some commonly known interactions such as the importance of providing good quality housing for improving mental and physical health as well as to reduce crowding and exposure to close-contact infectious diseases (SDGs 3 and 11). It has equally illustrated how the interaction between environmental and habitat changes induced by human agricultural activity can lead to ecosystems shifts, which in turn may intensify communicable disease transmission (SDG 3 and SDG 2)^{16,17}. Inversely, the crisis might impact the directionality of some SDG interlinkages¹⁸: without a ‘just transition’ approach a low-carbon recovery might entail job losses in some sectors, leading to unemployment and indirect health and social care costs (targets 13.2 and SDG 8, 9 and 10)¹⁹. Applying multidisciplinary systemic thinking and focusing on interlinkages while preparing recovery responses and measures is therefore necessary to balance the potential short-term divergences between economic, social and environmental priorities during the transition towards more sustainable future, and to maximise synergies and minimise trade-offs.

Negative impacts of the coronavirus pandemic on the progress of many of the SDGs are reinforcing the idea that efforts to recover from the current crisis and to implement the SDGs must go hand in hand in order to build a more resilient, healthy, equitable and sustainable future for all. The SDGs have become more relevant than ever as they offer a guiding and stable framework to shape a transformative recovery from COVID-19 that is centred on inclusion, equity and sustainability. Focusing recovery plans on sustainable development will enable societies to be better equipped to prevent, prepare for and tackle future crises, as it will contribute to strengthening health systems, reducing the number of people living in extreme poverty, supporting a healthier natural environment, and more resilient societies²⁰. In this context, the scientific and technological community calls for greater worldwide commitment to maintaining support for the poorest internationally and for the great wealth that still exists in the world, albeit highly concentrated, to be more evenly spread in order to reduce inequalities as per SDG 10. Indeed, COVID-19 responses represent a window of opportunity for sustainable and just transitions but swift action and global support, particularly from wealthy nations and industries is needed to take advantage to fully realise this potential.

Common drivers of unsustainability and pandemics

Anthropogenic activities are driving ecological disruption and leading to climate change and biodiversity loss, and are also driving increased pandemic risk²¹. COVID-19 has underscored the wider tension between human production and consumption patterns and ecological balances. Our agriculture and food systems represent one of the most important interfaces between human

¹⁵ International Council for Science (ICSU). 2017. A Guide to SDG Interactions: from Science to Implementation [D.J. Griggs, M. Nilsson, A. Stevance, D. McCollum (eds)]. International Council for Science, Paris

¹⁶ OECD. 2020. [Building a coherent response for a sustainable post-COVID-19 recovery](#).

¹⁷ International Council for Science (ICSU). 2017. A Guide to SDG Interactions: from Science to Implementation [D.J. Griggs, M. Nilsson, A. Stevance, D. McCollum (eds)]. International Council for Science, Paris

¹⁸ Shulla, K., Voigt, BF., Cibian, S. et al. Effects of COVID-19 on the Sustainable Development Goals (SDGs). *Discov Sustain* 2, 15 (2021). <https://doi.org/10.1007/s43621-021-00026-x>

¹⁹ OECD. 2020. [Building a coherent response for a sustainable post-COVID-19 recovery](#).

²⁰ Shulla, K., Voigt, BF., Cibian, S. et al. Effects of COVID-19 on the Sustainable Development Goals (SDGs). *Discov Sustain* 2, 15 (2021). <https://doi.org/10.1007/s43621-021-00026-x>

²¹ IPBES. 2020. Workshop Report on Biodiversity and Pandemics of the Intergovernmental Platform on Biodiversity and Ecosystem Services. Daszak, P., das Neves, C. et al. IPBES secretariat, Bonn, Germany, DOI:10.5281/zenodo.4147317

activities and the environment²². Agricultural expansion and intensification to meet the needs of a growing global population is one of the biggest threats to biodiversity globally due to land-use change and habitat fragmentation and loss. Land-use change, including deforestation, human settlement in primarily wildlife habitat, the growth of crop and livestock production, and urbanization, contributing to increased wildlife-livestock-human contact interface, caused the emergence of more than 30% of new diseases reported since 1960²³.

The recent exponential rise in consumption and trade, driven by demand in developed countries and emerging economies, as well as by demographic pressure, has led to an increase of emerging diseases. Emerging infectious diseases tend to originate in rural communities in biodiverse developing countries often lacking resources for early detection of outbreaks, and to combat spillover and spread. Increased population, uncontrolled urbanization, domestic trade networks, globalized trade and international travel patterns contribute to the spread of infectious diseases and the emergence of pandemics. Developed countries are more exposed to, and very often quickly affected by, infectious diseases emerging from biodiverse developing countries considering their dependence on globalized trade and travel. In this context, reducing anthropogenic impacts particularly in countries that are under highest risk of disease emergence and characterised by high biodiversity, as well as undertaking efforts to understand the complex and sometimes obscure interactions amongst drivers, could reduce pandemic risk²⁴. In addition, increased surveillance, early warnings and preparedness for identifying, preventing and responding to transboundary health risks represent essential conditions to avoid future pandemics like COVID-19.

Climate change and biodiversity loss will continue driving the emergence of infectious diseases and pandemics, if rapid action is not taken to reduce human caused global environmental change and to tackle these global challenges. Climate change has already been associated with disease emergence (e.g. tick-borne encephalitis in Scandinavia) and is expected to lead to an increase of pandemic risk by driving movement of people and animals which are likely to allow microbes to make contact with new hosts²⁵. In addition, decline in biodiversity associated with changes to natural landscapes leading to increased contact between human wildlife and livestock can contribute to increased emerging disease risk. For instance, human expansion into undeveloped areas increases the pool of pathogens that can move from animals to humans²⁶. Reducing anthropogenic global environmental change by promoting responsible and sustainable consumption and production, as well as reducing unsustainable exploitation and encroachment of humans and livestock into biodiverse habitats can help prevent the spread of novel pathogens²⁷.

²² Sperling, F., et al. 2020. IIASA–ISC Consultative Science Platform: Resilient Food Systems. Thematic Report of the International Institute for Applied Systems Analysis (IIASA), Laxenburg, and the International Science Council (ISC), Paris.

²³ IPBES. 2020. Workshop Report on Biodiversity and Pandemics of the Intergovernmental Platform on Biodiversity and Ecosystem Services. Daszak, P., das Neves, C. et al. IPBES secretariat, Bonn, Germany, DOI:10.5281/zenodo.4147317

²⁴ Ibid.

²⁵ Ibid.

²⁶ Tollefson, J. 2020. Why deforestation and extinctions make pandemics more likely. *Nature* 584, 175-176. doi: <https://doi.org/10.1038/d41586-020-02341-1>

²⁷ IPBES. 2020. Workshop Report on Biodiversity and Pandemics of the Intergovernmental Platform on Biodiversity and Ecosystem Services. Daszak, P., das Neves, C. et al. IPBES secretariat, Bonn, Germany, DOI:10.5281/zenodo.4147317

Risks

Recovery plans should not contribute to the aggravation of ongoing environmental crises

A truly transformative recovery from COVID-19 will be the one that is aligned with the principles of the SDGs which will allow Governments to combine economic recovery plans with a transformative sustainability agenda that leaves no person and no place behind. COVID-19 must not become the excuse for insufficient efforts towards the SDGs. The trillions of dollars in stimulus packages announced by Governments worldwide represent a unique opportunity to making decisive steps towards sustainability through channelling investments towards new sustainable growth opportunities and decent jobs while achieving the SDGs at the scale and speed necessary. However, recent analysis done by the Global Recovery Observatory exposed that only 18% of recovery spending is likely to reduce greenhouse gas (GHG) emissions, while only 3% of recovery spending is deemed positive for natural capital and up to 17% may have negative effects on natural capital²⁸. Failure to mobilize a green and resilient recovery, would have the opposite effects leading to further exacerbating long-term social and ongoing environmental crises. Aligning recovery packages and the SDGs will make their attainment feasible considering that annual investment requirements across all sectors to achieve the global goals have been estimated at around \$5 to \$7 trillion²⁹.

COVID-19 response and recovery plans should particularly focus on addressing the climate and biodiversity emergencies, which are threatening the stability of the Earth system and undermining society's chances of achieving the SDGs. These are challenges creating vulnerabilities of a similar magnitude and urgency, and are fundamentally interlaced, with climate change projected to become an increasingly important driver of biodiversity loss³⁰. Environmental changes are projected to increase and accelerate in the coming decades due to further expansion of human activities, which will lead to an intensified exploitation and further degradation of our natural systems. These are expected to exacerbate poverty (SDG 1) particularly in developing countries and to slow down efforts to reduce inequalities within and among countries (SDG 10) and to promote sustained, inclusive and sustainable economic growth and decent work for all (SDG 8), as well as the promotion of peaceful and inclusive societies (SDG 16). If current trends continue, achieving food security and improved nutrition and promoting sustainable agriculture (SDG 2) will not be feasible³¹.

Our global biodiversity is declining at alarming and unprecedented rates, while world leaders conclude that none of the 20 Aichi Targets in the Strategic Plan on Biodiversity 2011–2020 have been fully met³². The recent Global Assessment of IPBES³³ has shown that most indicators of the state of nature related to the extent and integrity of ecosystems, distinctness of local ecological communities, abundance and number of wild species, and the number of local domesticated

²⁸ United Nations Environment Programme, 2021. [Are we building back better? Evidence from 2020 and Pathways o Inclusive Green Recovery Spending.](#)

²⁹ Fajans-Turner, V. 2020. [Filling the finance gap.](#)

³⁰ Secretariat of the Convention on Biological Diversity (2020) Global Biodiversity Outlook 5. Montreal. <https://www.cbd.int/gbo/gbo5/publication/gbo-5-en.pdf>

³¹ United Nations Environment Programme (2021). Making Peace with Nature: A scientific blueprint to tackle the climate, biodiversity and pollution emergencies. Nairobi. <https://www.unep.org/resources/making-peace-nature>

³² Secretariat of the Convention on Biological Diversity (2020) Global Biodiversity Outlook 5. Montreal. <https://www.cbd.int/gbo/gbo5/publication/gbo-5-en.pdf>

³³ IPBES (2019): Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany.

varieties, are declining³⁴. This has led to the decline in nature's capacity to provide vital benefits to people indispensable for humanity's well-being and prosperity, including nature's capacity to regulate environmental processes such as modulating air and water quality, sequestering carbon, building healthy soils and pollinating crops³⁵. In addition, recent data reveals the extent of human activities' impact on living nature: at least 70% of land surface is altered; 1 million species of animals and plants are threatened with extinction; and forests span only 68% of their preindustrial size³⁶. Investing in biodiversity as part of the COVID-19 policy response can help minimise the risks that its decline poses to human well-being, while also reducing the risk of future crises and improving the resilience, health and long-term viability of businesses and the economy.

The world is failing to meet its commitments to limit environmental damage and is set to miss the Paris Agreement targets to keep warming well below 2°C and to stabilize global warming at 1.5°C³⁷. The substantial drops in greenhouse gas (GHG) emissions during lockdowns are unlikely to have any significant long-term impact on global emission trajectories³⁸. Recovery must not entail reinstating historical development pathways, and should instead focus on new investments to lock humanity into more sustainable pathways. To do otherwise risks global average temperature increases well beyond 2°C. Global warming beyond 2°C and higher would lead to sea level rise, threatening the infrastructure, livelihood and safety of many coastal cities and millions of people around the world; and damage to coastal ecosystems. Impacts on marine ecosystems, including coral reefs, are already experiencing the combined effects of warming, changing currents and ocean acidification. This warming would also be accompanied by observed increases in intensity and frequency of extreme weather and climate events including heatwaves on land and in the oceans (marine heatwaves); extreme bushfire weather; and heavy rainfall. All of these have significant impacts on the health and wellbeing of our communities and ecosystems as well as infrastructure and economies³⁹. As well as supporting recovery from the pandemic, stimulus packages must also be aimed at restricting global warming to 1.5°C, including reducing the risk of some irreversible impact and addressing the loss and damages that have been incurred. To do otherwise would be a false economy, providing short term fixes which would exacerbate long term impacts.

Recovery packages should support and invest in integrated and consistent approaches in dealing with these interrelated challenges to facilitate positive and synergistic impacts, to help ensure multiple objectives are achieved, and to avoid unintended negative impacts. For instance, focusing recovery plans on promoting and investing in nature-based solutions could act as catalysts for achieving the SDGs, while addressing the climate and biodiversity crises. Nature-based solutions are actions that protect, sustainably manage, and restore ecosystems in ways that address societal challenges to provide both human well-being and biodiversity benefit⁴⁰. Recent research has shown their potential to provide around one third of the net reductions in greenhouse gas emissions required to keep climate change below 1.5°C, while enhancing a wide range of ecosystem services, including water filtration, flood and coastal protection and soil health, healthy diets and food security, as well as contributing to the conservation and sustainable use of biodiversity⁴¹. In addition,

³⁴ Diaz S. et al. 2019. Pervasive human-driven decline of life on Earth points to the need for transformative change. *Science*, Vol. 366, Issue 6471, DOI: 10.1126/science.aax3100

³⁵ Ibid.

³⁶ Ibid. and IPCC

³⁷ United Nations Environment Programme (2021). [Making Peace with Nature: A scientific blueprint to tackle the climate, biodiversity and pollution emergencies](#). Nairobi.

³⁸ Future Earth, The Earth League, WCRP (2021). [10 New Insights in Climate Science 2020](#). Stockholm

³⁹ IPCC 1.5 and SROCC Special Reports; WMO United in Science and Annual Climate Statement reports.

⁴⁰ IUCN. Nature-based solutions: <http://www.iucn.org/theme/nature-based-solutions/about>

⁴¹ Secretariat of the Convention on Biological Diversity (2020) Global Biodiversity Outlook 5. Montreal. <https://www.cbd.int/gbo/gbo5/publication/gbo-5-en.pdf>

recent economic analysis indicates that industry actions that have a positive impact on nature could generate as much as \$10.1 trillion in new opportunities for business, 395 million new jobs by 2030.⁴²

Responses

COVID-19 and the environmental urgency call for governance arrangements that advance systemic and social resilience and just transitions

The COVID-19 pandemic has increased awareness of the deficiencies and vulnerabilities of current global governance arrangements⁴³, and of the need to build effective governance structures that would enable the world to respond collectively to shared global risks posed not only by COVID-19 and other infectious diseases, but also by ongoing environmental degradation, accelerating climate change, rapid technological change, and rising inequalities⁴⁴. Current events offer important opportunities to rethink the very foundations of our societies and to move away from existing economic and social systems that produce and reinforce vulnerabilities, social inequality, and systemic risks⁴⁵. COVID-19 has furthermore revealed the need for governance arrangements at all levels, from norms and regulations, to finances, partnerships, and decision-making processes, to be realigned toward achieving the SDGs. To achieve sustainable development it is imperative to advance risk-informed (anticipatory) governance arrangements with a view to building whole-of-society resilience. COVID-19 recovery packages must integrate sustained investments into SDGs and SDG-wide resilience to maximize the potential to lead to longer-term transformations.

The IIASA–ISC Consultative Science Platform⁴⁶ put forward a series of recommendations for enhancing governance arrangements at all levels to enable the necessary shift towards sustainability and resilience in view of increasing compound and systemic risk. At the global level, the Platform recommends building processes allowing international organizations to be more cooperative and proactive in identifying and redressing key drivers of risk before they even manifest themselves. A series of concrete actions have been identified including establishing regular exchange and coordination platforms among institutions with similar or connected mandates and objectives; strengthening global science–policy–society interfaces to enable evidence-based, participatory decision-making; and upgrading accountability and transparency provisions allowing more integrated approaches. It also underscores, in view of the deep connectedness of our world, the need to boost awareness and understanding of compound and systemic risks across governance arrangements at all levels, which could be achieved through a global socio-ecological resilience and risk dialogue engaging a wide range of stakeholders. In addition, the report emphasizes the need to elevate resilience as a core government priority within nation states in the process of working towards systemic transformations towards sustainability⁴⁷.

⁴² WEF (World Economic Forum) 2020b. The Future of Nature and Business Policy Companion: Recommendations for policy-makers to reset towards a new nature economy. In Collaboration with SYSTEMIQ. July.

⁴³ Future Earth, The Earth League, WCRP (2021). [10 New Insights in Climate Science 2020](#). Stockholm

⁴⁴ IIASA-ISC Enhancing governance for sustainability. 2020. <https://council.science/wp-content/uploads/2020/06/IIASA-ISC-Reports-Governance.pdf>

⁴⁵ Future Earth, The Earth League, WCRP (2021). [10 New Insights in Climate Science 2020](#). Stockholm

⁴⁶ Mechler, R. et al. 2020. IIASA–ISC Consultative Science Platform: [Enhancing governance for sustainability](#). Thematic Report of the International Institute for Applied Systems Analysis (IIASA), Laxenburg, and the International Science Council (ISC), Paris.

⁴⁷ Ibid.

The COVID-19 crisis provides an opportunity to drive just transitions towards climate-neutral and sustainable economies, which can ensure environmental sustainability as well as decent work, social inclusion and poverty eradication⁴⁸. The transition to environmentally sustainable economies and societies presents both major opportunities and challenges for countries, however there is growing consensus that the positive impacts of a green economy can prevail over negative consequences⁴⁹ if managed properly and fairly with the full engagement of governments, workers and employers' organizations in a broad social dialogue⁵⁰. Such transition could offer some major opportunities including net gains in total employment by creating additional decent jobs through investments in environmentally sustainable production and consumption and the management of natural resources; improving job quality and incomes on a large scale; and enabling social inclusion through improved access to affordable, environmentally sustainable clean energy with health benefits for all⁵¹.

COVID-19 has revealed the symbiotic nature of the human and planetary health relationship, therefore providing an opportunity to use planetary health as a new guiding development narrative⁵². The degradation of Earth's natural systems and changes to the environment including climatic change, ecosystem degradation, water scarcity, overexploitation of fisheries, and biodiversity loss pose serious risks to human civilisation and health and are likely to become increasingly dominant in the Anthropocene⁵³. The global developments and environmental changes, which have created the conditions for the COVID-19 to emerge, have revealed health as a common denominator across all sectors and disciplines, suitable for an integrative approach towards multiple interlinked SDGs. Hence policymakers need to design and promote recovery packages, measures and interventions building on the deep linkages between human health, societal wellbeing and environmental health to maximize co-benefits and achieve multiple objectives at the same time. Adopting such an 'I, we, planet' approach requires the appropriate valuing of care, care for ourselves, each other and non-human nature.

Science indicates the need for radical system change

Transitions toward sustainability which encompass mitigating climate change, restoring biodiversity and reversal of recent declines, as well as solving other environmental challenges, are only possible with urgent, and fundamentally transformative, change^{54,55}. A global transformation rewiring all sectors of society, from food production to energy supply, transport, consumption and

⁴⁸ Just Transition. A Report for the OECD. May 2017

⁴⁹ Hepburn, C., O'Callaghan, B., Stern, N., Stiglitz, J., and Zenghelis, D. (2020), 'Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change?', Smith School Working Paper 20-02.

⁵⁰ ILO. 2013. Sustainable Development, Decent Work and Green Jobs. International Labour Conference, 102nd Session, Report V. Geneva, International Labour Organization.

⁵¹ UNFCCC Technical Paper. 2020. [Just Transition of the Workforce, and the Creation of Decent Work and Quality Jobs](#)

⁵² De Paula, N. and Willetts, E. 2021. [COVID-19 and Planetary Health: How a Pandemic Could Pave the Way for a Green Recovery](#). IISD Earth Negotiations Bulletin.

⁵³ Whitmee, S., Haines, A., Beyrer, C. et al. 2015. Safeguarding human health in the Anthropocene epoch. The Rockefeller Foundation–Lancet Commission on planetary health. Volume 386, ISSUE 10007, P1973-2028. [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(15\)60901-1/fulltext#bib32](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)60901-1/fulltext#bib32)

⁵⁴ Diaz S. et al. 2019. Pervasive human-driven decline of life on Earth points to the need for transformative change. Science, Vol. 366, Issue 6471, DOI: 10.1126/science.aax3100

⁵⁵ Claude Henry, Johan Rockström, Nicholas Stern. 2020: Standing up for a Sustainable World. Cheltenham/Northampton: Edward Elgar Publishing.

production patterns, and health systems, is required. It implies simultaneously and holistically reshaping these systems and the interactions between them. To build sustainable futures, the dominant narrative about the causes of inequality, environmental urgencies and pandemic must be challenged and revised. Reconstructing the dominant narrative will allow to develop policies that address the underlying causes of the challenges we face. Transformative changes therefore need to be supported by fair and participatory governance systems and processes bringing together the voices of all relevant stakeholders.

Recent scientific reports and assessments have identified and put forward transformations' frameworks underscoring key systemic areas of intervention, as well as levers of change, that would yield and drive large-scale changes towards sustainability. The 2019 UN Global Sustainable Development Report (UN GSDR) highlights six entry points for transformations: human well-being and capabilities; sustainable and just economies; energy decarbonization and access; food systems and nutrition patterns; urban and peri-urban development; and global environmental commons, and four levers of change: governance, economy and finance, individual and collective action, and science and technology. The TWI2050 report and Sachs et al. (2019) provide similar actionable transformation frameworks⁵⁶. The 2019 IPBES Global Assessment underscores five main 'levers': incentives and capacity-building; cross-sectoral cooperation; pre-emptive action; decision-making in the context of resilience and uncertainty; and environmental law and implementation, and eight leverage points: visions of a good life; total consumption and waste; values and action; inequalities; justice and inclusion in conservation; externalities and telecouplings; technology, innovation and investment; and education and knowledge generation and sharing⁵⁷. There is an urgent need to act on scientific evidence and move from plans to action. Identifying barriers to change as well as leveraging points is a crucial step in the transformation to sustainability process.

Any transformation framework must take into account the dynamic, interdependent and multi-level nature of social and environmental systems, not least the close relationship between sustainability and equity, and questions of power and politics. Operationalizing such frameworks such as those offered in the GSDR 2019, TWI 2050 report and the 2019 IPBES Global Assessment will require transformative alliances between researchers, governments business, civil society, and other actors, to ensure that chosen pathways enable those who typically have less power to be meaningful actors in the visioning and process of change. Creating enduring transformative change will require, simultaneously, concerted top-down strategies, such as changes in the rules that govern the global economy and redistributive measures such as labour and market regulations, progressive tax regimes, universal health and education access, as well as bottom-up experiments and collective actions including community-based management of land, forests, fisheries or waste, which are needed to achieve and sustain impact⁵⁸. Furthermore, different combinations of state-led, market-led, technology-led and citizen-led strategies towards sustainability transformations will need to be adapted to national and regional settings to reflect the diverse nature of economies, societies and political systems⁵⁹.

⁵⁶ Sachs, J.D., Schmidt-Traub, G., Mazzucato, M. et al. 2019. Six Transformations to achieve the Sustainable Development Goals. *Nature Sustainability*, Vol. 2, pp. 805–814. <https://doi.org/10.1038/s41893-019-0352-9>

⁵⁷ IPBES (2019): Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. S. Díaz, J. Settele, E. S. Brondízio E.S. et al. (eds.). IPBES secretariat, Bonn, Germany. 56 pages.

⁵⁸ Leach M. et al. 2018. Equity and sustainability in the Anthropocene: a social–ecological systems perspective on their intertwined futures. *Global Sustainability*, Vol. 1, e13, pp. 1–13. Doi: 10.1017/sus.2018.12

⁵⁹ Scoones, I., Leach M. and P. Newell (eds). 2015. *The Politics of Green Transformations*. London: Routledge

A key element of sustainable pathways is the shift of the global economic and financial system to a model that can sustainably increase well-being through decoupling economic activities from the negative effects of resource use and recoupling humanity's existence with natural ecosystems. Incorporating the multiple values of ecosystem functions and of non-human nature's contributions to people into economic incentives has, in the economy, proved to enable better ecological, economic and social outcomes⁶⁰. Current social, economic and financial systems fail to account for the value of nature's contributions to human well-being and hence fail to provide incentives to manage ecosystems and natural capital in a sustainable manner and maintain their value. Science has shown that it is possible to do things differently, for instance, aligning private incentives with social and environmental objectives could be the first step in this regard. Such a shift could be enabled through taxes on environmentally harmful activities, abolition of subsidies that have negative effects on the environment and that damage global commons, as well as payments for ecosystem services or tax breaks for environmentally friendly economic activities⁶¹.

To create and steer true systems changes, strategic collaborations must identify and act on opportunities to affect the whole system. D. Meadows has identified twelve leverage points - places in complex systems where relatively small changes can lead to potentially transformative systemic changes – requiring collaborative efforts: the power to transcend paradigms; the mindset or paradigm out of which the system — its goals, structure, rules, delays, parameters — arises; the goals of the system; the power to add, change, evolve, or self-organize system structure; the rules of the system (such as incentives, punishments, constraints); the structure of information flows (who does and does not have access to information); the gain around driving positive feedback loops; the strength of negative feedback loops, relative to the impacts they are trying to correct against; the lengths of delays, relative to the rate of system change; the structure of material stocks and flows (such as transport networks, population age structures); the sizes of buffers and other stabilizing stocks, relative to their flows; and constants, parameters, numbers (such as subsidies, taxes, standards)⁶².

Progress can no longer be defined in terms of economic growth and should instead serve the broader objective of well-being. Gross domestic product (GDP) and its associated economic model simultaneously overvalues and over-rewards production (financial) capital while undervaluing and under-rewarding human capital and natural capital. Redefining current measures of economic performance to become more holistic and therefore powerful levers to achieve a just and prosperous society⁶³ require deep changes in power dynamics and status quo, as well as in values, norms, practices, and institutions, which have been actively resisted so far.

⁶⁰ IPBES. 2019. Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. S. Díaz, J. Settele, E. S. Brondízio E.S. et al. (eds.). IPBES secretariat, Bonn, Germany. 56 pages.

⁶¹ Ibid.

⁶² Meadows, Donella H. Thinking In Systems : a Primer. London ; Sterling, VA :Earthscan, 2009.

⁶³ Potočník, J., Dixon-Declève, S. and Stuchtey, M. R. 2020. A System Change Compass: Implementing the European Green Deal in a Time of Recovery. SYSTEMIQ and the Club of Rome.

The Science & Technological Community Major Group recognizes the critical importance of changing the mindsets, collective leadership and systems thinking to craft efficient, effective and sustainable solutions. We stand ready to work with other stakeholders and devise feasible and implementable science-informed solutions to help decision-makers and societies recover from COVID-19 and build more equitable, resilient and sustainable futures.

- Self-critical response related to the dominant science system which provides too little incentives for inter- and transdisciplinary work, and too little effort in science-society dialogue engaging all of society. Science as a global public good (ISC).
- Education and capacity development in relation to SGDs is critical across the entirety of science and society for any of the other responses to move forward and be successful.
- The pandemic revealed that despite decades of economic growth globally and enormous scientific strides, both science organizations as well as science preparedness, to support solutions to complex challenges through integrated policies and actions, need urgent strengthening.
- Supporting the ability of Governments to leverage the power of science in support of a better COVID-19 socio-economic recovery and a more equitable, healthy and sustainable future will be crucial.
- Access to high-quality, robust and relevant scientific knowledge from the full range of disciplines including health sciences, natural and social sciences, economics and the humanities, is essential in these pressing times when creative, rapid and critical decisions need to be made.
- A truly transformative and successful COVID-19 recovery that will shift the world onto a sustainable path must be based on scientific knowledge and solutions that are co-designed and co-developed with various stakeholders from business, policy-makers, civil society, indigenous people etc.
- To enable science to achieve its full potential and to generate new knowledge on which system-change transformations can be grounded, COVID-19 recovery packages should support research and development activities in this direction, as well as seek to transform and strengthen science and science systems to be more inclusive, accessible, and reliable.