

Transformations within reach:
Pathways to a sustainable and resilient world

ENHANCING GOVERNANCE FOR SUSTAINABILITY





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Transformations within reach:

Pathways to a sustainable and resilient world

Enhancing Governance for Sustainability

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Executive Summary

The COVID-19 crisis has generated massive adverse health and socioeconomic impacts for populations around the globe. In spite of causing substantial set-backs, the crisis is nevertheless bringing to light some important leverage points for sustainability transformations going forward. One such leverage point concerns the enhancement of governance for sustainability.

This final report for the IIASA-ISC COVID-19 recovery pathways initiative brings together insights from the literature and from consultation with leading global experts on "governance for sustainability," drawing its first lessons from the governance of COVID-19 across different scales from the global to the national level. Using literature findings on what the COVID-19 crisis has revealed about governance for sustainable futures, together with a three-tier expert consultation process, we present options and recommendations for upgrading (risk) governance. Among a number of options, the following appear particularly promising and actionable to us.

Global governance: Reform in an ever-riskier world

We suggest enhancing global cooperation in mission-oriented ways to drive governance reform across the world by harnessing the leadership of sustainability champions. In the shorter-term, we identify opportunities for the global community—with support from science, policy, and civil society i) to move forward with implementing the ambitions agreed in the Paris Framework and the broader 2030 Agenda for Sustainable Development, and also ii) to cooperate in mission-oriented ways with recovery initiatives, such the newly created Green Recovery Alliance of the European Parliament and others such as those spearheaded by the Organisation for Economic Co-operation and Development (OECD) and its members. Other mission-oriented policy–science initiatives, such as the Knowledge–Action Network (KAN) on Emergent Risks and Extreme Events, the Resilience Alliance, or civil society networks, such as Alliance2015, the Zurich Flood Resilience Alliance, and the Conference of Non-Governmental Organizations in Consultative Relationship with the United Nations (CoNGO), also offer an opportunity to enable higher levels of change in international governance arrangements, in particular in terms of advocating for more reflexive and transformative governance and mainstreaming a holistic risk governance perspective.

Multilevel governance: Boosting awareness and understanding of compound and systemic risks across governance arrangements at all scales

A global resilience and risk dialogue could be launched to engage policymakers, civil society, the private sector, and the scientific community in mapping the risks and drivers of risks at different scales and in discussing the implications of these for risk governance, prevention, and preparedness. Such an engagement process would increase the understanding and communication of the compound, systemic nature of risks related to public health, climate change, and other socio-ecological stresses in particular contexts, and would identify risks, vulnerabilities and interdependencies, systems reverberations, and feedback loops. The process could be targeted to inform risk reduction planning as a fundamental component of decision making and investment in sustainable development. Such a dialogue and, more broadly, efforts to coordinate resilience could benefit from the creation of a Global Commission on

Resilience to Compound Risks. Such a commission could coordinate and build on the progress made with other initiatives, such as the Global Risks Perception Initiative of Future Earth, the Taskforce on Climate-related Financial Disclosures, and initiatives under the United Nations Office for Disaster Risk Reduction (UNDRR), the United Nations Framework Convention on Climate Change (UNFCCC), and other international organizations. It could also take into account insights generated by the Global Risks Perception Initiative of Future Earth, which provides a salient and deep overview of the global change science community's perceptions on global risks. All of this could inform efforts on devising an all-risk disclosure mechanism that through well-targeted and funded public and private investments addresses key socio-ecological risks (as associated with climate change, biodiversity, infectious disease and other stressors).

National systems governance: Moving systemic resilience to the center

As for global governance, Covid-19 and other concurrent crises have shown a need and opportunities for boosting accountability and transparency at national systems scale.

It would seem to be of fundamental importance to ensure that the often massively endowed Covid-19 recovery packages consider and integrate ongoing investments taken to achieve the Sustainable Development Goals (SDGs) and build SDG-wide resilience to maximize the potential to lead to longer-term transformations in terms of "building forward" rather than "building back." As a concrete option, we suggest devising and implementing a science-based tracking mechanism to assess the degree of alignment of these recovery packages with SDG ambitions and to focus on generating systemic resilience. Such an effort could build on ongoing Covid-19 response policy tracking exercises such as those promoted by the International Network for Government Science Advice (INGSA), OECD's COVID-19 policy tracker (OECD, 2020) or the Sustainable Development Report 2020 Dashboards (Europe Sustainable Development Index, 2020).

1 Introduction

The COVID-19 crisis is generating enormous adverse health and socioeconomic impacts for societies around the world. In addition to the substantial socioeconomic setbacks it has caused, COVID-19 is underscoring a need for identifying and working with important leverage points for ongoing sustainability transformations. Recognizing the massive challenges, opportunities and information needs created by Covid-19, the International Institute for Applied Systems Analysis (IIASA) and the International Science Council (ISC) have established a partnership, based on the strengths and expertise of the two organizations, to inform, define and design key sustainability pathways. Enhancing governance toward more sustainable development pathways is one of the four themes of the IIASA –ISC multi-stakeholder research and consultation.

It has been well recognized that sustainability transformations and the response to Covid-19 require concerted efforts by governments, the private sector, civil society, the international community, and other players. To this effect, the IIASA–ISC initiative and consultations went beyond only considering roles and responsibilities of national and subnational governments and adopted a broader definition of governance as "the totality of actors, rules, conventions, processes, and mechanisms concerned with how relevant...information is collected, analyzed and communicated, and how management decisions are taken" (IRGC, 2005 p. 22). Although the pandemic is still unfolding rapidly, the first relevant lessons for governance arrangements at different scales are already being drawn from how COVID-19 has been tackled through governance measures around the world. To deliver transformations toward the sustainable development pathways that are urgently required to mitigate climate change, it is vital to learn lessons from this evolving global crisis which, even as we write, is threatening well-being and hard-won development gains across the world daily. Such lessons offer insights into the opportunities and challenges presented by the governance changes needed if we are to shift from unsustainable to sustainable development pathways in a changing climate characterized by compounding risks. The existential challenges that humanity is facing, not only from COVID-19 and other infectious diseases, but also from climate change, biodiversity loss, and others, require effective governance structures that foster cooperation and collaboration as never before (WBGU, 2014).

COVID-19 is a single example in a string of health- and climate-related risks that, in the recent past and with increasing frequency and impact, have turned into disasters. As global warming continues, risks are projected to be exacerbated. Climate scientists warn of global tipping points (Lenton et al., 2019) and local climate adaptation limits (Mechler et al., 2020) as well as of "unknown unknowns" (Taleb, 2007); in such situations, affected societies need to adopt robust, nimble, yet evidence-based responses. Effective governance arrangements to address the new, compounding set of risks is key to preventing and responding to future extreme events. Many challenges are hampering success in achieving the goals of the 2030 Sustainable Development Agenda, and other international frameworks such as the Paris Agreement and the Sendai Framework.

This report for the IIASA–ISC COVID-19 recovery pathways initiative pulls together insights into leveraging “Governance for Sustainability” from leading global experts and literature, drawing first lessons from the governance of COVID-19 across governance scales, from global to national. We first discuss the methodological approach implemented (section 2), then present findings on what the COVID-19 crisis has revealed to us about governance for sustainable futures (section 3). Section 4, the main focus of this report, presents options and recommendations for upgrading (risk) governance. Section 5 closes with some conclusions.

2 Our approach: Literature review and expert consultation to identify options for enhanced governance for sustainable futures

The methodological approach we developed for this theme sought to pull together insights from emerging literature and from consultations with global experts and to use those as lessons for enhancing governance at different scales. It was clear from our research that governance needs to be more agile, responsive, empowering, coherent, transparent, and adaptable, and that governance measures must be more appropriate to the challenges of an ever riskier and more uncertain future, threatened by climate change and other stressors.

Thus, from the outset, the IIASA–ISC team identified three¹ guiding questions, which we addressed through a literature review and a consultation process:

- How has COVID-19 played out at different levels of governance (global, national, subnational)?
- How can governance take proper account of compound and systemic risk?
- How can COVID-19 serve as a springboard for rethinking governance for sustainable futures?

The literature review largely focused on the first two questions, while the third question was addressed mainly through our consultations and deliberations. Recommendations and options were then formulated. We built on the following research strands as entry points to governance analysis and debate:

- **Polycentric agency:** involving various actors (governments, private sector, civil society) across scales in complex decision problems like the climate and COVID-19 crises (see Ostrom, 2009);
- **Future-oriented perspective:** enhanced global governance in the design of transformational future development pathways toward climate-friendliness and strong sustainability (WBGU, 2014);
- **Systemic and compound risk:** risk governance as fundamental for achieving sustainability in the midst of multiple crises and uncertain events (IRGC, 2018; Jacobzone et al., 2020);
- **Cooperation and conflict:** taking different risk perspectives/discourses into account for co-generating "clumsy" solutions that address hard-to-resolve conflict (IRGC, 2005; Verweij and Thompson, 2006).

IIASA–ISC consulted with a broad set of leading experts working on global and national governance reform, disaster risk management, climate change, and public health from research institutions, international organizations, national governments, and nongovernmental organizations. In the first consultation, 46 experts joined (29 external and 17 IIASA–ISC) from Asia, Africa, Latin America, and Europe; another 25 experts from the private sector and civil society participated in the second consultation. The third consultation, which focused on co-designing and fine-tuning the set of options for enhancing risk governance, involved participation by 22 international and eight experts from IIASA and the ISC. The

¹ We also identified and referred to a fourth guiding question "What are views on a desired new normal post- COVID–19 in terms of governance?" We continued to address this during the consultations as a cross-cutting issue.

fine-tuning of options into a shortlist during the last consultation, including suggestions for action, was generated through a small future-oriented scenario exercise. Participants were first asked to rank their preferred option for action. They were then introduced to a prominent set of scenarios used in climate policy, asked to choose one scenario and to consider the feasibility of the recommended policy options, the enablers of action over a time horizon of 10 years—the SDG ambition period.

3 What did the COVID-19 crisis reveal to us in terms of leveraging governance for sustainable futures?

We examined how COVID-19, as an exemplary crisis of sorts, continues to reveal governance achievements and challenges at global and also national scales, in particular, in terms of systemic risk governance (for further questions, see background paper).²

3.1 How has COVID-19 played out at different levels of governance (global and national systems)?

Global and regional governance insight

The literature review revealed that, while global governance hinges on multilateralism and cooperation, international cooperation during Covid-19 has, in large part, remained uncoordinated, ad hoc, and often experimental (in good and bad ways). Globally and regionally, COVID-19 has resulted in widening geo-political divides, for example, between China and the United States (Woods, 2020); it has also resulted in specific uncoordinated national approaches, even in the more integrated areas of the world such as the European Union. Infectious diseases, however, do not recognize organizational boundaries, and this makes the introduction of effective coordination and decision-making arrangements at different governance scales essential to ensure development pathways are sustainable and that we stay on them. Covid-19 thus illustrates the classic commons coordination problem for dealing with a global world crisis. As crisis mode took precedence over cooperation and the democratic process, some speculated that the COVID-19 pandemic might bring rampant and unbridled globalization to an abrupt end; others, however, stressed that although it has shown the adverse consequences of nations deciding to go it alone in a disaster, it will not put a stop to globalization in the long run.

Overall, a consensus emerged among participants that COVID-19 has highlighted the need for polycentric, inclusive, and holistic governance that builds systemic resilience (i.e., through an integrated approach across health, social, and economic systems). It was also observed that the COVID-19 crisis is increasingly calling into question existing governance arrangements and rules of globalization, as these do not sufficiently account for, and manage, current and emerging social and environmental challenges and externalities. Noted, too, was that the risks are not yet being sufficiently factored into governance arrangements, while neoliberal tenets favoring optimization and resource efficiency above human and ecosystems health and wellbeing often are. The ongoing COVID-19 crisis is thus both a chance to upgrade to risk-informed, resilience-based governance modes and build back better toward and through relevant transformations. In the absence of universal cures for the ongoing epidemiological and climate crises, particularly where the most vulnerable are under threat, integrating a socioeconomic and ecological

² <http://pure.iiasa.ac.at/id/eprint/16550>

resilience approach into governance arrangements would appear to be essential for building back *at all* and for enabling the necessary sustainability transformations.

Our consultations thus identified the need to revamp and adapt our current global governance system, conceived in the aftermath of World War II, to better meet today's and future challenges around sustainability transitions (gradual, policy-led change) and transformations (radical change throughout). The "revamping" process has already gone into effect. The current COVID-19 crisis has become a springboard for harnessing the potential of earlier reform initiatives. Cognitive concepts around transformation are slowly becoming mainstream, and power shifts toward sustainability are gaining speed: the number of "green" actors is growing, and new actor constellations are being created (see Nakicenovic et al., 2020). International conventions, such as the 1994 United Nations Framework Convention on Climate Change (UNFCCC) were the starting point. These led to, for example, the adoption of the Paris Agreement in 2015 (UN, 2015), which at its core has a strong focus on transforming climate governance toward supporting the implementation of climate mitigation and adaptation measures. Our review and consultations also identified good synergies between dialogues on "greening" and resilience in terms of opportunities for stepping beyond concepts of climate and resource efficiency to considering redundancy, resourcefulness, and inclusion. Exemplary initiatives such as discourses on the "Green Economy" and "Building Back Better" (UNDRR, 2019) are providing useful entry points to alignment and support for implementation around *green*, *inclusive*, and *resilient* attributes. Overall, progress on implementation remains (too) slow, as recognized by analysts, and will need to gather pace in the future (van Zanten et al., 2020).

Insights into national-systems governance

The COVID-19 crisis provides encouraging and also challenging lessons for national governance arrangements and for potentially leveraging those lessons to facilitate sustainable development pathways. In countries, such as Singapore and South Korea, evidence-based, swift national leadership coupled with clear crisis communication has proved useful for containing the spread of (the first wave of) COVID-19 and bringing with it necessary recovery initiatives (Choi et al, 2020). In other countries, crisis arrangements have been characterized by governance challenges, such as crisis plans with layers of shared responsibility being ignored in favor of "management by panic" approaches (APA, 2020). These have been witnessed once again in several countries currently facing second waves of Covid-19.

Despite such struggles, some forward-looking lessons on transformation and resilience have already started to find their way into governance arrangements. For example, in Slovakia efforts to realize complete nationwide testing are currently under way, while several other countries across the EU are preparing for new lockdowns, more closely coordinated this time by several rounds of crisis summits (Dempsey, 2020). The summits have also served as a forum for designing the EU's Covid-19 recovery programs, in which investments in sustainability are playing a major part; yet these programs' implementation will also need to strongly focus on supporting relevant transformations (such as decarbonization) with the necessary governance arrangements (Colli, 2020). Illustrating the positive impacts that future-oriented and risk-informed governance arrangements will have on driving sustainability transitions, the European Commissioner for Climate Action and EU environment ministers have also

committed to upholding the *European Green Deal* during COVID-19 recovery efforts (against pressure from 40 MEPs to put the Green Deal on ice) (Wellbeing Economy Alliance n.d.). Similarly, Japan's Covid-19 recovery plan, "Economy 5.0," explicitly considers the SDGs, appropriately integrating a human (capital) perspective (Tashiro and Shaw, 2020). In an economy that is transforming, this approach may well support building people-centered system resilience.

Multilevel governance insights

COVID-19 has made evident how much more scientific knowledge is needed to be able to understand related issues and identify solutions (see also the report on the [Science theme](#)). Our literature review and consultations suggested that ad hoc advisory boards at the global level would be a good way of eliciting expert insights. As we found, further focus was also needed on global processes able to drill down into the value orientations in society (changes in norms/beliefs) and into local knowledge to encourage leadership toward transformation across scales (Shaw et al., 2020). As some countries and actors may lead and others may follow later, our group overall suggested building on the notion of concentric circles of governance (Zielonka, 2006).

Above all, however, it was shown that other factors such as accountability and trust in public institutions, social cohesion, reliable data and information, and effective and transparent communication play a key role in ensuring a productive science–policy–society interface that works for the public good. Discussions also led us to ask how science can support or even act as an agent of transformation through improvements in science communication and also collaboration with activists. Our consultations exhibited that individual behavior matters when collective issues of governance are tackled. As well, we identified that shared understanding and experience of risk from both the individual and community level are needed to drive collective action at all scales.

3.2 Taking a compound and systemic risk approach to governance?

Around the world, analysts have been warning for some time that a pandemic like COVID-19 could materialize at some point and that COVID-19 was more of a "gray rhino," that is, a predictable extreme event that it was possible to prepare for (Taleb, 2007; Wucker, 2020; see box 1). In recent years several novel epidemic- and pandemic-prone diseases, such as Ebola, Zika, SARS, and MERS, have emerged, and more are on the horizon, as climate change and globalization proceed. Given the increasing occurrence of pandemics, adopting a risk perspective on global and national governance offers learning opportunities for policy and practice. COVID-19 has shown that current socioeconomic trends have brought us to a world that is not only increasingly risky but also has increased inequalities and shortcomings in sustainability terms. According to our consultations with leading experts, advisors, and policymakers, in order to achieve sustainable development, risk-informed governance arrangements appear in need to be urgently advanced with a view to building whole-of-society resilience.

Covid-19 revealed undeniably that current governance arrangements are inadequate in terms of protecting the global and local commons, stimulating necessary transformations of our human systems, and addressing the complex and systemic nature of risk in a world that will see more and more shocks and stressors. Hyperconnectivity, environmental degradation, accelerating climate change, rapid technological

change, and rising inequalities require new types of governance arrangements. In the face of multiple and compounding stressors and risks, addressing vulnerability and building resilience can, and ought to, create multiple dividends (Surminski and Tanner, 2015). Failure to take a risk and resilience perspective on governance may reduce our collective capacity, across countries and across generations, to thrive and cope with crises and move toward sustainable futures.

Box 1. COVID-19 -a manifestation of systemic and compound risk

COVID-19 is an event that can be explained as a manifestation of compound and systemic risk (these concepts imply also attention to concepts of uncertainty, complexity, and surprise; see IRGC 2005, 2018; Taleb, 2007).

Compound risks are associated with multiple, otherwise unrelated hazards that interact with each other. Compound risks/events can either be sequential (i.e, the first event triggering the second (third, fourth etc.) or coincidental but collocated in space and time (Raymond et al., 2020). Both manifestations of compound events lead to a compounding of impacts that may breach the coping capacities of communities or even national governments.

Systemic risk refers to dependent risks that can lead to cascading impacts and system collapse. Covid-19 has shown how quickly contagion can spread from one region (within countries and across countries, even continents) to another via globalized movements of people, goods, and capital and lead to potential system-wide collapse (Hochrainer-Stigler et al., 2018).

4 What is needed for the future? Options for leveraging governance toward sustainable futures

Our third and fundamental question for this report was: “How can COVID-19 serve as a springboard for rethinking governance for sustainable futures?” According to our review and consultations, Covid-19 has (again) exhibited that governance arrangements—institutions, rules and norms, constellations of actors, finance and data and measures—need to be realigned toward achieving the SDGs, to fully embrace the fundamental interdependencies between human agency and nature, and to reduce risks through systemic interventions in order to enable a shift toward sustainable (and regenerative) development pathways. The consultative meetings with experts, policy, and practice around the “Governance for sustainability” theme concluded that priority should be given to the options and recommendations set out in Figure 1. We distinguished between multilevel, global governance, and national system governance and marked key options in bold that appear to be actionable in the shorter term.

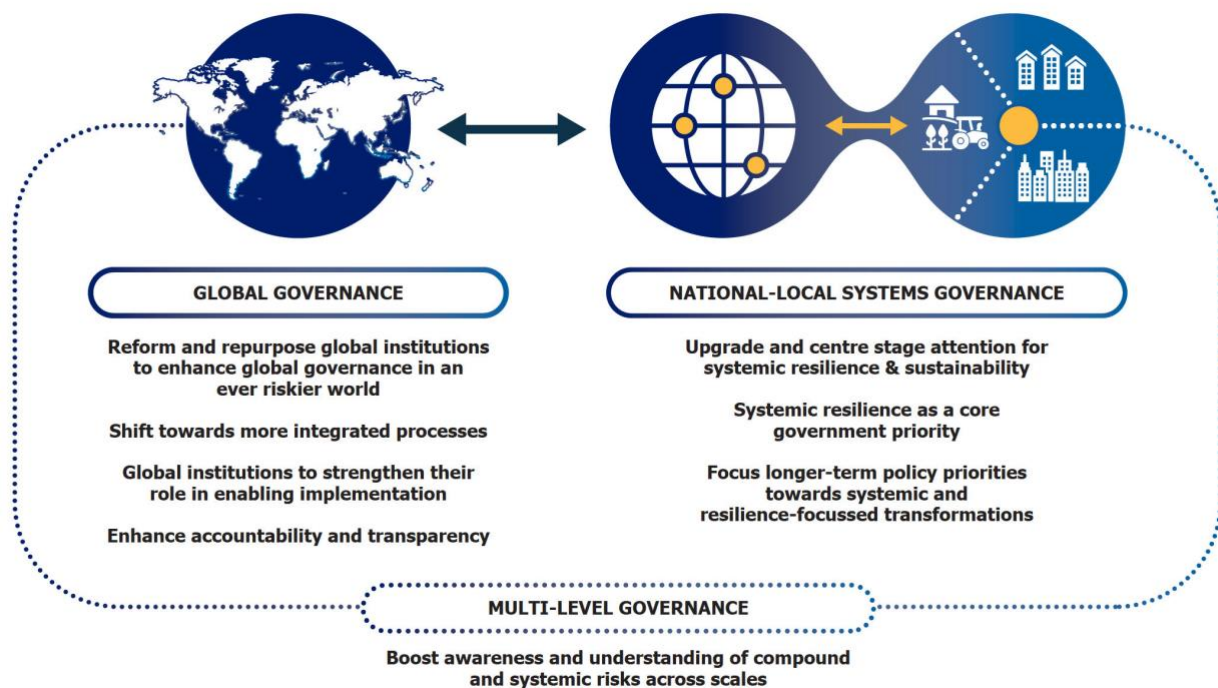


Figure 1. Options for enhancing governance for sustainability

4.1 Reforming global institutions to enhance global governance for sustainability in an ever-riskier world

The COVID-19 pandemic vividly illustrated that today’s challenges are not happening in isolation but are closely interconnected and that much of our global economy and many of our critical infrastructures are interdependent. The global pandemic is thus a warning of the challenges to come in an ever-riskier world driven by spiraling climate change, ecosystem collapse, and dwindling resources. The pandemic also

sharply illustrated the need for rethinking the usual paradigms and structures of international cooperation toward one in which the global community engages in multidirectional and more integrated learning, problem identification, and decision-making, thereby enabling the necessary shift toward more sustainable and equitable development in an ever-riskier world. The international governance system, based on specialized agencies and devised in the aftermath of World War II under a Western-driven development paradigm, appears to become increasingly unfit to respond to today's interconnected and interdependent challenges. As we found, this holds true for the COVID-19 pandemic, as well as for long-standing challenges like climate change and patterns of inequality. The IIASA–ISC Consultative Science Platform thus recommends considering a profound reform of global institutions to enhance global governance for sustainability. To realize this objective, the IIASA–ISC Consultative Science Platform suggests acting upon the following options.

The world must start to adopt integrated processes rather than address global issues in isolation

To enable a shift toward more sustainable futures, it is crucial—if not indispensable—to move the current global governance arrangements toward a system based on more cooperative and proactive international organizations that are able to identify and redress the key drivers of risk before they even manifest themselves. This means initiating a more systemic and evidence-based approach to key global issues, such as security. We must move beyond state security to address human needs and health—to address both human and ecosystems health—through a unifying framework such as the "One Health" approach (see, e.g., Amuasi et al., 2020).

To kick-start the reform process, we suggest the establishment of regular exchange and coordination platforms among organizations and agencies with similar or connected mandates and objectives. The goal is to bridge the divide between them and eliminate the competition that may emerge between some organizations at times. Such integrated processes need to reflect the systemic nature of the pressing human security issues facing the global community today, informed by the precautionary principle of reducing risks before a crisis happens. This is especially so, as we are witnessing increasingly negative trends across social and environmental indicators. In particular, special crisis provisions should be established for activation if urgent action is needed, as the move toward more integrated processes rolls out.

We also propose to strengthen science–policy–society interfaces to enable evidence-based, participatory decision-making at global levels. Effective decision-making within reformed global governance arrangements hinges on reliable evidence being swiftly made available when it is needed, as well as on sufficient stakeholder buy-in. We should put into the decision-making process that is already in place evidence-sharing arrangements, such as specialized advisory bodies with regular and on-demand consultation arrangements or participatory platforms for integrating diverse stakeholder perspectives. This will give us the opportunity to enhance decision-making in global governance arrangements so as to better account for the increasingly interconnected and interdependent, wicked challenges faced by the global community today.

Enhancing cooperation in mission-oriented ways to drive global governance reform

Reforming global institutions and governance arrangements is a complex project that requires political buy-in at several levels. This is not the first time that such a suggestion has been put on the table. The experience of the COVID-19 pandemic, however, adds new dynamics to reform initiatives. Nevertheless, positions between countries are entrenched and shaped by different interests and priorities. Enabling the successful reform of global institutions and governance arrangements depends on there being sufficient political buy-in across the global community.

In the shorter-term, opportunities for enhanced teamwork may include further cooperation between the United Nations Framework Convention on Climate Change (UNFCCC) and the EU's newly created Green Recovery Alliance or other recovery initiatives such as those spearheaded by the OECD and its members. Other mission-oriented policy–science initiatives also offer an opportunity for enabling higher levels of change in international governance arrangements, in particular with a view to mainstreaming a risk perspective and advocating for more reflexive, transformative governance: these initiatives include the Knowledge-Action Network (KAN) on Emergent Risks and Extreme Events or the Resilience Alliance; and civil society networks such as Alliance2015, the Zurich Flood Resilience Alliance, and the Conference of Non-Governmental Organizations in Consultative Relationship with the United Nations (CoNGO). For this to work, strong alliances must be built in support of implementing larger, more profound reform processes down the road: this offers an opportunity for incorporating the dynamics unleashed by COVID-19 into actual global governance reform. Initiatives, such as the IIASA–ISC Consultative Science Platform “Bouncing Forward Sustainably: Pathways to a post-COVID World” can play an important role in identifying pathways toward such global governance reform.

Upgrade accountability and transparency provisions for more integrated governance

Boosting accountability and transparency as part of initiatives to reform global governance arrangements is critical if successful reforms are to be ensured in the long run. Options for enhancing accountability and transparency include: i) boosting stakeholder participation and access to monitoring and evaluation processes such as used for assessing progress on the Sustainable Development Goals; and ii) establishing safeguard mechanisms for sharing data and information, especially at times of crisis. Emergent good country practice such as initiatives taken to develop integrated Covid-19 and SDG data infrastructures offer inspiration for establishing similar provisions at global level.

4.2 Boosting awareness and understanding of compound and systemic risks across governance arrangements at all scales

We identified a fundamental need to align governance arrangements, from norms and regulations, through finances, partnerships, and decision-making processes, to 21st century risks and transformation imperatives. Human and natural systems are deeply intertwined. This connectedness through time and space requires a multilevel, multi-temporal approach to problem solving, given that local events can cascade into global crises—as we have seen with COVID-19—and given also that global processes impact economies, societies, and ecosystems in many different ways at global to local scales; the international food trade, for instance, drives distant groundwater depletion (Keys 2019). The interplay of dynamic

processes occurring over different time frames is also becoming more and more evident: slow-onset processes like climate change are colliding with events such as wildfires; availability and access to capital is uneven, for example, the cost of raising capital in Kenya is 64 times greater than in the USA. This is all bringing us closer to reaching the tipping points or leading to disasters that are overturning years and even decades of development gains. This calls for the adoption of holistic approaches to planning and decision-making processes in all sectors that address the dynamic nature of changes in socio-ecological systems. Concrete options that we identified are:

Launching a global resilience and risk dialogue

The COVID-19 pandemic is putting into sharp focus the need for a better understanding of i) the systemic nature of risk to inform systems-based approaches that address risks in relation to a wide spectrum of hazards, and ii) the socioeconomic factors that affect vulnerability and exposure of people and assets within the context of rapid change. The pandemic is also providing a window of opportunity for structural changes to address deep drivers of risk, without which resilient and sustainable futures will be unattainable. Developing a deeper appreciation of how individual and collective choices and perceptions contribute to the creation and realization of such risks is imperative (see also Garschagen et al., 2020). Enhanced understanding, developed through innovative and inclusive collaboratives, involving decision makers and those affected by such decisions, can contribute to necessary future transformations in a way that addresses inequalities and vulnerabilities, builds engagement and possibilities for self-determination, and can make a major contribution to building societal and ecosystems resilience.

As a concrete option, a global socio-ecological resilience and risk dialogue could be launched engaging policymakers, civil society, the private sector, and the scientific community in mapping risks and their drivers at different scales and discussing their implications for risk governance, prevention, and preparedness. Such an engagement process would increase the understanding and communication of the compound, systemic nature of risks driven by infectious diseases, climate change, and other socio-ecological stresses in particular contexts as well as possible system reverberations and feedbacks. It should inform risk reduction planning as a fundamental component of decision making and investment in sustainable development. Dramatically greater investments are required to enhance global risk assessment (building on the wealth of scientific assessments available such as through the UNDRR Global Assessment Report and Global Risk Assessment Framework, the reports of the IPCC and of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and others, in partnership with stakeholders. Such an assessment could further inform the development of a global risk register and risk reduction strategies to better anticipate and prepare for large-scale events (including for low-probability, high-impact events) and provide an input to the necessary profound reform of global institutions.

However, risk assessments will be wasted efforts unless there are major investments made in: i) strengthening institutional capacity, ii) building purpose-driven partnerships, iii) establishing a strong science–policy–public interface, and iv) robust monitoring, evaluation, and accountability mechanisms. Weak governance is, indeed, a driver of risk and unsustainable practices.

Co-generating a joint resilience vision of the post-pandemic economy and setting up an international platform to coordinate investments

COVID-19 has sparked a global conversation on the need to reset or transform our economies and our relationship with nature, as countries seek to mobilize massive funding to cope with the socioeconomic impacts of the crisis. This is an opportunity to accelerate the structural transformations needed to make the desired outcomes already agreed upon in the world to protect nature and enhance human development for all through various frameworks and agreements (Sustainable Development Goals, the Paris Agreement, the Sendai Framework for Disaster Risk Reduction, universal health coverage, Aichi targets, and post-2020 framework, etc.). There is a very real need to provide vision and leadership in directing risk-informed investments toward sustainability and resilience building and, equally, in removing support and incentives for interventions that work against those objectives. Governments in collaboration with relevant stakeholders should build a plan to mobilize money to identify the kinds of investments needed and to coordinate action across sectors to ensure coherence and ambition.

This requires investments to be directed toward building a resilient, just, and sustainable world with multiple dividends needing to be sought to harness opportunities for synergies and co-benefits, and to provide incentives for investments for the global public good. Conversely, there is also a well acknowledged need to address existing mechanisms that prevent sustainable investments through costing risks, ending harmful subsidies, reforming tax systems (e.g., reducing tax on labor and putting tax on carbon in Sweden), and internalizing social and environmental externalities (see also option set 2 under 4.3).

In addition, measures to strengthen accountability at all levels need to be put in place. These could take the form, for example, of building on the progress made with the Taskforce on Climate-related Financial Disclosures and the insights generated by the global change science community through the Global Risks Perception Initiative of Future Earth (2020). *This could inform the establishment of an all-risk disclosure mechanism that addresses key socio-ecological risks (e.g., pertaining to climate change, biodiversity, infectious disease) for public and private investments.* In national budgets, initiatives to assess the extent to which public funding contributes to or hinders progress to achieve the SDGs and contributes to risk reduction should be mainstreamed. Such measures require robust data, data analytics, and capacity to integrate data across diverse sources and share data on all aspects of sustainable development and resilience building following open data standards.

4.3 Moving systemic resilience to the center of local–national systems governance

Our lessons learned and insights generated from our research indicate that there is a strong demand and need to upgrade attention to systemic resilience in national systems. A focus on national systems suggests that multiple actors from national and subnational governments, the private sector, research bodies, and civil society, including community-based organizations, play differential but complementary roles in attending to risks and building resilience. Two basic sets of policy options and recommendations that would help upgrade the role of resilience emerged from our background work and consultations with experts, policy, and practice.

(Systemic) resilience as a core government priority in the center of government

Risk assessment has increasingly become central to such systems and to public management and finance. A focus on managing risk through policies and interventions based on systemic resilience should be enhanced. Among other things, this would include systemic and equitable investments in health, physical, and social infrastructure resilience. A set of policy actions might look as follows.

- Effective coordination and systemic decision processes across levels of government. This might involve placing such an office strategically close to the highest decision-making levels (such as the cabinet office).
- Defining clear roles and recognition for civil society and private sector as relevant transformation agents. In many countries these parts of society have shaped responses to Covid-19 and before this crisis had already taken charge of fostering transitions and transformations. Further recognition for these achievements is desirable and necessary.
- Strong focus on and accountability for ensuring solidarity with the most vulnerable. While societies during Covid-19 have shown enormous solidarity for those most vulnerable to the pandemic (i.e., the older segments of society), those most vulnerable to the response measures (such as migrant workers) have not been adequately taken care of. Further attention and accounting mechanisms will need to be developed with this in mind.
- Efforts to further establish and upgrade health, education, and social protection systems to create a web of systemic security for all and enhance human development and resilience. As the crisis shows, the importance of the public sector in providing basic services and public goods is key, and institutional capacity needs to be built and maintained in this regard.
- Ongoing support should be extended across ministries, agencies, and other groups of actors for informing and implementing systemic investments, both in terms of decision-making and accountability, by mobilizing science communities and science advisors. This could further involve roundtables across ministries and agencies, civil society, communities, private sector, and lead to policy advisory bodies at arm's length from government.
- It is fundamentally important to ensure that the often massively endowed Covid-19 recovery packages integrate sustained investments in the SDGs and SDG-wide resilience that have the potential to lead to longer-term transformations to "build forward" rather than "build back." As a concrete option, we suggest to: *devise and implement a science-based tracking mechanism to assess the degree of alignment of these recovery packages with SDG ambitions and focus on generating systemic resilience.* This could build on ongoing Covid-19 response policy-tracking efforts such as by the International Network for Government Science Advice (INGSA, 2020) and efforts being made around updating the SDG dashboard system of the Sustainable Development Solutions Network (SDSN) for impacts exerted by Covid-19.

Longer-term policy priority setting toward systemic and resilience-focused transformations through financial measures and new methods for measuring social progress

- *It appears extremely opportune to push ahead with the implementation of progressive environmental and carbon taxation (see e.g., Hepburn, 2020) also to redirect investments into human capital and*

nature-based solutions. Our discussions on risk governance and resilience indicated that this would not only contribute to moving away from short-term efficiency that leads to unaccounted-for externalities, but also help to counteract risk creation through degradation of national and global commons (ecosystems, climate) through creating longer-term development benefits.

- Developing new measures and new ways of measuring social progress, building on "beyond GDP" concepts to better capture interactions between the economic, social, and environmental dimensions of development, and dynamics (and spillovers) across geographical scales and time scales. Covid-19 has shown that the social fabric is fragile, and that the idea of systems-relevance is not well captured by measures of GDP. The "beyond GDP" debate that has been proceeding over at least two decades has generated much valuable information and suggestions. As Covid-19 provided additional insights, more investment in robust data collection, sharing, and analysis is key to further making and measuring progress.

5 Conclusions

The COVID-19 crisis has generated massive adverse health and socioeconomic impacts for populations around the globe. In spite of causing substantial setbacks, the crisis is nevertheless bringing to light some important leverage points for sustainability transformations going forward. One such leverage point concerns the enhancement of governance for sustainability.

This final report for the IIASA-ISC COVID-19 recovery pathways initiative presented insights from the literature and from three consultations with leading global experts on the theme of "enhancing governance for sustainability," drawing its first lessons from the governance of COVID-19 across different scales from the global to the national level. Using literature findings on what the COVID-19 crisis revealed about governance for sustainable futures, together with the three-tier expert consultation process, led us to identifying options and recommendations for upgrading (risk) governance.

We hope that these lessons and options may inform further action on SDG-relevant transformations with regard to governance. There are negative lessons to report, such as the widespread global fragmentation initially observed with respect to uncoordinated and sometimes competing responses to Covid-19. We also clearly identified that systemic risk is currently not well governed. However, our consultation also brought to the fore several positive findings issues, such as a pronounced will for better cooperation across regions and in national systems as the crisis proceeded. Science in particular has tried to lead the way and has made clear the need for robust evidence-based insights to inform policy and other decisions. Much remains to be done on this topic. What we have learned, and still need to further learn during and after the Covid-19 crisis, may provide leverage points for working toward true transformational change on climate and other global change problems.

This report summarizes results of the first phase of the IIASA-ISC Covid-19 initiative with the aim of supporting policy and decision-making in the public and private sector and in the civil society sphere. A second phase of the initiative may further proceed with knowledge and option co-creation with current and additional partners. As the Covid-19 crisis and key SDG transformations, including those related to governance, are as yet unresolved, we look forward to further supporting and informing the solution space with evidence-based and co-created research insight.

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ABOUT THE IIASA-ISC CONSULTATIVE SCIENCE PLATFORM:

Transformations within reach: Pathways to a sustainable and resilient world

Starting in May 2020, a partnership between the International Institute for Applied Systems Analysis (IIASA) and the International Science Council (ISC) has drawn on the combined strengths and expertise of the two organizations to define and design sustainability pathways that will enable building-back a more sustainable post COVID-19 world. The platform has engaged a unique set of transdisciplinary global thought leaders on four themes:

- Governance for sustainability
- Strengthening science systems
- Resilient food systems
- Sustainable energy

The series of publications, Transformations within reach: Pathways to a sustainable and resilient world, presents the results and recommendations of the platform on the design of sustainable pathways and policy choices during the COVID-19 recovery period.

The platform is informed and supported by an advisory board under the patronage of the former Secretary-General of the United Nations H.E. Ban Ki-moon.

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