



The UN Global Assessment Report on Disaster Risk Reduction 2022 (GAR 2022)¹

Concept Note

Background

As presented in the UN Global Assessment Report on Disaster Risk Reduction 2019 (GAR 2019)², extreme changes in ecological and social systems are happening now, across multiple dimensions and scales more quickly and surprisingly than we ever thought possible. Non-linear, systemic change is a reality, and new risks and correlations are emerging in ways that we have not anticipated. Cost estimates of unmitigated climate change for instance, are now considered "potentially infinite"³. Four out of the nine planetary boundaries (climate change, loss of biosphere integrity, land-system change, altered biogeochemical cycles) have now been crossed,⁴ and the rate of change of the Earth's system is accelerating⁵. Systemic risks threaten to undermine, and potentially reverse efforts to achieve the 2030 Agenda for Sustainable Development (2030 Agenda). The Sendai Framework for Disaster Risk Reduction 2015 – 2030 (Sendai Framework) reflects the certainty that in an ever more populous, networked and globalizing society, the very nature and scale of risk has changed to such a degree that it surpasses established risk management institutions and approaches. GAR 2019 described how 'present systems of governance and organization of human knowledge are limited' and currently not adequate for understanding and managing systemic risks. Furthermore, many descriptions of globally connected systemic risk fail to adequately capture the role of human-environment interactions, creating biases towards solutions that ignore new realities⁶.

The Global Sustainable Development Report 2019 (GSDR)⁷ states that unless there is a fundamental—and urgent—change in the relationship between people and nature, and a significant reduction in inequalities between and inside countries, any progress of the last two decades risks being undone. "The present model of development has delivered prosperity to hundreds of millions. But it also has led to continuing poverty and other deprivations; unprecedented levels of inequality that undermine innovation, social cohesion and sustainable economic growth; and it has brought the world close to tipping points with the global climate system and biodiversity loss". Improving our understanding of the nature of social-ecological systems across the globe – that can be connected through global trade, international institutions, financialization and/or communication flows – incorporating aspects of environmental justice and inequality⁸, is imperative.

Precursor signals of such tipping points abound. The *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate⁹* cites "rapid changes to the ocean and the frozen parts of our planet which are forcing



¹ The UN Global Assessment Report on Disaster Risk Reduction (GAR) – published periodically by the UN Office for Disaster Risk Reduction (UNDRR) – is the authoritative, flagship report of the United Nations on worldwide efforts to reduce disaster risk.

² GAR 2019 (gar.unisdr.org)

³ "There is growing agreement between economists and scientists that the tail risks are material and the risk of catastrophic and irreversible disaster is rising, implying potentially infinite costs of unmitigated climate change, including, in the extreme, human extinction". IMF Working Paper WP/19/185, September 2019

⁴ Rockström et al. 2009

⁵ Nyström et al. 2019

⁶ Keys et al. 2019

⁷ https://www.un.org/development/desa/publications/global-sustainable-development-report-2019.html

⁸ Keys et al. 2019

⁹ https://www.ipcc.ch/srocc/home/



people from coastal cities to remote Arctic communities to fundamentally alter their ways of life" as warning signs of impending systemic failures. The ocean provides critical regulating and provisioning services that synergistically support most of the Sustainable Development Goals (SDGs). Stabilising the ocean can feed and provide livelihoods for people¹⁰ and, at the same time, maintain habitats, protect biodiversity and coastal areas, and regulate climate change through its role as a carbon sink.

The *IPCC Special Report on Climate Change and Land*, tells a similar story, "Land already in use could feed the world in a changing climate and provide biomass for renewable energy, but early, far-reaching action across several areas is required also for the conservation and restoration of ecosystems and biodiversity"¹¹. Such transformations will depend upon an overall commitment to sustainability and the development of locally appropriate policies and governance systems for sustainable and regenerative land management.

The gravity of biodiversity loss as described in the *IPBES Global Assessment Report on Biodiversity and Ecosystem Services* is striking. Many pollinating species have seen critical decline in numbers, putting the production of 75% of global food crops at risk¹². With 91% of the world's population breathing air in which pollutants exceed the World Health Organization (WHO) pollution guidelines¹³, air pollution presents one of the highest health risks globally, especially in fast-growing cities in developing countries.

The GSDR 2019 stresses the need to transform key areas of human activity, which could otherwise lead to systems failure – including in respect of food, energy, consumption and production, and cities – and increase resilience to economic shocks and disasters caused by natural and man-made hazards, through active implementation of the Sendai Framework. The goal of the transformation is the decoupling of economic activity from environmental degradation, in other words, shifting from an unsustainable development model to a risk-informed one that restores and regenerates natural systems to ensure that 'no ecosystem is left behind'. The resilience and stability of natural ecosystems, their restoration and regeneration are of paramount importance for systemic risks to be managed effectively. Breaching the limits of those systems presents risks that incur severe (even existential) social, economic and political consequences.

The GSDR 2019 identifies food and energy systems as particularly important areas for change since these systems are critical risk and opportunity nexus areas for human and ecosystems health and well-being. The food system must undergo urgent widespread changes to infrastructure, cultural and societal norms, and policies that support the current, unsustainable status quo¹⁴. The GSDR further states that the energy system must transform by transitioning to net-zero CO₂ emissions by mid-century, whilst simultaneously closing the energy access gap¹⁵. GAR 2022 will build on the enquiry presented in the GAR Special Report on Drought – which seeks to deepen our understanding of the complex pathways of drought impacts on food and energy systems – modernising knowledge and through detailed case studies examine solutions.

¹⁵ Close to 1 billion people are without access to electricity, predominantly in Sub-Saharan Africa, and more than 3 billion people rely on polluting solid fuels for cooking, causing an estimated 3.8 million premature deaths each year.



¹⁰ The ocean supports the livelihoods of 40 million fishers, that are threatened by overfishing and ocean acidification.

¹¹ https://www.ipcc.ch/2019/08/08/land-is-a-critical-resource_srccl/

¹² <u>https://www.ipbes.net/global-assessment-report-biodiversity-ecosystem-services</u>

¹³ https://www.who.int/health-topics/air-pollution

¹⁴ 2019 – c. 2 billion people suffer from food insecurity & 820 million people are undernourished. The proportion of populations that are overweight is growing in almost all regions of the world = 2 billion adults / 40 million children under-5 are overweight.





The Sendai Framework stipulates that the global community must come to terms with a new understanding of the dynamic nature of systemic risks, new structures to govern risk in complex, adaptive systems and develop new tools for risk-informed decision-making that allows human societies to live in and with uncertainty. As a result, we must now choose to learn to live with uncertainty and complexity and start to address risk from a systems perspective. This compels new conceptual and analytical approaches to improve understanding and management of risk dynamics and risk drivers at a range of spatial and temporal scales. It requires emphasis on the interaction among *social, ecological, political, economic and technological systems* resulting from the activities of humans in nature.

GAR 2022 will extrapolate and enrich the narrative presented in GAR 2019 to assess how worsening social inequalities and potentially irreversible damage to ecosystems created by the current unsustainable development model are increasing systemic risks. It will address how to assess systemic risks – with a focus on aspects of vulnerability and exposure within and between systems – as well as the systems-based approaches that are being put in place to prevent their creation, limit their propagation or mitigate consequences when realised. GAR 2022 will explore how risk perception drives decision-making and how to deal or live more comfortably with uncertainty. GAR 2022 will examine emerging systemic risk management solutions. This, to assist governments and non-state actors better understand and manage trade-offs in realising risk-informed sustainable development in a changing climate and enable increasing coherence and integration across the aligned intergovernmental agendas.

As first GAR main report being produced after the UN call for a 'Decade of Action' to deliver the Global Goals, the report will take stock of the progress made by governments and other stakeholders in achieving the outcome, goals and targets of the Sendai Framework and the 2030 Agenda, **GAR 2022 will explore** systems-based approaches to managing risk within efforts pursuing sustainable development, and the health and well-being of humans and ecosystems.

The GAR 2022 will be composed of the following Parts:

- I. An update on global progress in implementing the outcome, goal, targets and priorities of the Sendai Framework and disaster-related Sustainable Development Goals (SDGs) and targets. Enhanced analysis of Sendai Framework data, national loss accounting data and non-Sendai Framework variables (e.g. health, water, education, inequality), examining trade-offs, transitions and interactions with systemic risks and resilience.
- II. An investigation and examination of exposure, as well as vulnerabilities including of socialecological systems – and its dynamic characteristics. The Part will include exploration of our evolving understanding of their relationship to risk, including systemic risks.
- III. Part III will examine behavioural aspects of understanding and managing risk and uncertainty. It will explore how risk perception drives behaviour and decision-making, and how this could be considered in effectively communicating risk and designing disaster risk reduction interventions.
- IV. An exploration of effective, emergent systems-based approaches to systemic risk assessment, management and governance for sustainable and resilient societies and ecosystems. Through known and vetted practices and case studies, this Part will examine the solution space, highlighting successes in fomenting societal transitions and exploring overarching principles that can guide such systems-level transformations, navigating trade-offs, providing examples of effective approaches to bring forward portfolios of solutions.





STRUCTURE

PART I – Stay on Target

(Realising the outcome, goal and targets of the Sendai Framework, the 2030 Agenda and risk-informed sustainable development)

Part I assesses global progress towards achieving the goals and targets of the Sendai Framework and the 2030 Agenda (and where possible the Paris Agreement) seven years after their adoption. By showcasing practices that have been successful in positively influencing trends in preventing, reducing and managing risk and losses, the Part presents preliminary analysis of the degree to which countries have advanced in realising the outcome of the Sendai Framework, namely:

The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries.

This Part will present the current state of play, looking at global, regional and national disaster loss and impact trends. To assess if countries and communities are on the right track in reaching the outcome, goal and global targets of the Sendai Framework and the 2030 Agenda, GAR 2022: a) represents a more complete picture of losses and impact, consistent with the expanded scope of the Sendai Framework, and b) showcases efforts in quantifying long-term, indirect impacts of disasters.

Progress in achieving the global targets of the Sendai Framework and disaster-related SDGs will be undertaken using data and information provided through the Sendai Framework Monitor and the SDG reporting mechanism, and where relevant metrics and data pertaining to the Paris Agreement. This Part will explore efforts undertaken by countries to fulfil monitoring and reporting commitments to the global targets, as well as developing and retro-fitting national loss accounting systems and developing disasterrelated statistics. Preliminary analysis of the evolution of disaster losses as compared with baseline data from the HFA decade 2005-2015 will be presented.

Qualitative analysis of progress in achieving targets included in national disaster risk reduction (DRR) strategies as reported using custom indicators will also be presented, and where available, analysis of subnational reporting on progress will provide a local perspective on global efforts to achieve the outcomes, goals and targets set in 2015.



Part I will also focus on risk-informed development pathways. In order to achieve the Targets of the Sendai Framework, State and non-state actors at national and local level should prioritize action which both accelerates sustainable development and creates or builds resilience, but at minima does not create additional risk. However, global action to meet the SDGs is not advancing at the speed nor scale required to deliver the goals by 2030. This prompted the UN Secretary-General to mark 2020 as the beginning of the 'Decade of Action' that 'calls for accelerating sustainable solutions to all the world's biggest challenges - ranging from poverty and gender to climate change, inequality and closing the finance gap'¹⁶.

¹⁶ https://www.un.org/sustainabledevelopment/decade-of-action/



G∀R

To fully implement – as well as monitor progress in realising – the SDGs, decision makers everywhere need data and statistics that are accurate, timely, sufficiently disaggregated, relevant, accessible and easy to use. The Open SDG Data Hub promotes the exploration, analysis, and use of authoritative SDG data sources for evidence-based decision-making and advocacy. Its goal is to enable data providers, managers and users to discover, understand, and communicate patterns and interrelationships in the wealth of SDG data and statistics that are now available. Recognising that existing and emerging vulnerabilities and exposures amplify the impact of disasters, GAR 2022 is set to explore correlations in data and information pertaining to disaster risk reduction and sustainable development and the implementation of the Sendai Framework and the 2030 Agenda, to present evidence of how progress towards one goal or target – or the lack of it – may impact risk and resilience, or vice versa. GAR 2022 will make recommendations both as to how trade-offs and delays can be minimised, as well as suggestions for accelerated implementation, promoting the wellbeing of humans and ecological systems

The application of a risk lens to the SDGs has been identified as clear current gap by the GAR Advisory Board stating that government counterparts struggle with divided SDG, disaster risk and climate change agendas at country level, a division that hampers implementation despite the urgency of the climate crisis. GAR 2022 offers the opportunity to investigate such relationships and advocate for scaled-up riskinformed development in the decade remaining for the achievement of the SDGs.

The Part will collaborate with partners such as UN DESA, UN SDSN, Open SDG Data Hub and others conducting statistical and other analyses of SDGs implementation, identifying and collecting data and developing and running analytics correlating SDG and Sendai Framework data, and risk information. It will also draw from enquiry being developed by the IPCC into climate-resilient development pathways, incorporating aspects of comprehensive risk management.

Potential contributors: UNDRR, UN DESA, Open SDG Data Hub, World Bank, UN Economic Commissions, national Sendai Framework focal points, the Secretariats of the United Nations Framework Convention on Climate Change, the Convention on Biological Diversity and the United Nations Convention to Combat Desertification, UN Habitat, UN Water, World Health Organization, Food and Agriculture Organization, GRAF Working Groups, GEO Community, private sector.







PART II – Unpacking and revealing characteristics of vulnerability, exposure and managing systemic risks

Understanding the systemic nature of risk must drive innovation and systems-based solutions across all societies if we are to cope with a 1.5°C (let alone a 2.5 or 3°C) global warming. Instability as a result of anthropogenic climate change is changing our understanding of hazard intensities and frequencies, of vulnerability and fragility estimates, so that currently our ability to anticipate these in a world beyond a 2°C increase is limited.

Much of Part I of the GAR 2019 on risk trends focused on presenting the hazard landscape – introducing additional biological, environmental and technological hazards and risks. Part II of GAR 2022 proposes to assess trends and distributions in vulnerability and exposure, including an examination of underlying drivers and triggers, and emerging approaches to assessing systemic risks.

As spelled out in GAR 2019, risk, impact and capacity to cope evolve throughout an individual's life. Vulnerabilities may emerge and change, compound and persist – leading to disparities in income, inequalities based on gender roles, ethnicity, household and social status. This can contribute to the intergenerational transmission of vulnerability and widening inequalities. Location, age, gender, income group, disability, and access to or benefit from social protection schemes and safety nets greatly affect the options people have to anticipate, prevent and mitigate risks.

GAR 2019 discussed some of the different dimensions of exposure beyond merely structural exposure in the built environment, elements that will need to be understood in the new paradigm that the Sendai Framework represents, and that our shared reality requires.

This is in line with the message of the GSDR 2019 that clearly considers disaster <u>risk</u> management as a basic social service, alongside health, education, water, sanitation, energy, information and communication technology, adequate housing and social protection, that should be available to everyone. This Part will explore why this remains persistently not the case.

Applying a systemic risk lens in analysis, potential thematic areas for detailed examination include the relationships between human and environmental health conditions, employment and economic shifts, ecosystem services, physical and social infrastructure and education services.

Potential areas of focus: energy, food, water, livelihoods, built infrastructure, or environmental infrastructure.

Part II proposes to assess changes in vulnerability. This involves integrated risk assessment and harnessing disaggregated data across different global frameworks and indicators that can be used to compare



Measuring disaster as experienced by individuals requires consideration of how resources are shared among communities, cities or nations, but also among members of the same household. However, traditional measures have not been able to capture such variations because they stop at the national or subnational level. National averages, even city averages, often mask wide disparities among population groups and households.



outcomes and changes over time – among and within countries and households. This can examine dynamic vulnerability through case studies on for example climate change impacts on security, migration, agricultural production to human health and biodiversity etc. This Part may also look at examples of tail risks, and the interplay of climate change and financial risks, and how poverty and inequality affect vulnerability to disasters¹⁷.

Beyond the Sendai Framework Monitoring data, GAR 2022 proposes to interrogate other sources of disaggregated data (e.g. by sex, age, disability, ethnicity, income or geographic location) – which can reveal the differential impacts and experiences of people in specific contexts. This will identify gaps and more comprehensively reflect the conditions in which risk accumulates and is realized, as well as support the identification of systemic changes to risk and resilience, thereby informing policy interventions that prioritize prospective and corrective risk management ex ante, above compensatory risk management ex post.

This Part also proposes to investigate how to build on prevailing approaches to vulnerability assessment (to date predominantly developed around economic and structural vulnerabilities), for instance to explore social vulnerabilities (health, education, access to services etc.) or ecological vulnerabilities.

Potential contributors: Statistical divisions of UN DESA and the Regional Economic Commissions, UNDP, CODATA, SDSN, ISC, selected universities (e.g. OPHI, Oxford University), World Bank / MDBs, Future Earth, GEM, The CEFID Directory, IcebreakerOne, OECD, Stockholm Environment Institute (SEI), Potsdam Institute for Climate Impact Research (PIK), Stockholm Resilience Centre (SRC), UNOCHA, UNFPA, UN Women, UNICEF, WHO, UNCTAD, WFP, UNEP, FAO, UNU, UNCCD, UNFCCC, ODI, DRR departments of the RECs, research organizations, GRAF Expert Group and Working Groups, UNDRR.

The Part will further investigate the under-developed aspects of environmental exposure and exposure trends as a result of growth.

Potential contributors: EU JRC, GEM, OASIS LMF, UNEP-GRID, World Bank, GEO Secretariat, UN Economic Commissions, IAEA, OECD, NEA, PAHO, IPCC, Coalition for Disaster Resilient Infrastructure (CDRI)

¹⁸ Gray rhinos – "are not random surprises but occur after a series of warnings and visible evidence"; The Gray Rhino: How to Recognize and Act on the Obvious Dangers We Ignore. Michelle Wucker. 2016



GAR 2022 proposes to examine trends in exposure. A proposed area of specific focus will be on the threats posed by neglected, aging infrastructure such as bridges, roads and dams, but also water, health, and communications systems, and the cost related to non-existent, long-term maintenance plans, which increase disaster exposure. It is proposed that such highly probable, high impact yet neglected threats¹⁸ will be assessed in terms of the proportion of exposure compared to new infrastructure, to evaluate resilience trade-offs in terms of financing and planning, but also in terms of systemic impacts of infrastructure failure. This will include analysis of aging (centralised) infrastructure and the potential systemic implications of disrupted energy generation and distribution.

¹⁷ This Part can build on work informed by Shared Socioeconomic Pathways – models which show how factors such as poverty, trade or inequality, impact different outcomes in land use or health, etc. and can affect risk.



PART III – Risk-informed decision making in the context of uncertainty

Our brains like what they know. Fear of the unknown, for most, is hard-wired and paralysing. We have a tendency to prefer being unhappy doing what we know does not, and will not, work. This is preferred by our brain to the uncertainty of possibly being better off or happy doing something new. We also have a tendency to confuse effort with impact; our effort is thus biased towards complicated rather than complex challenges¹⁹.

The human brain tries to make sense of risk information or what it perceives to be a risk, and then triages to determine the appropriate course and urgency of action, or magnitude of investment of effort. In so doing, individuals or groups determine whether priority is accorded to the high impact catastrophic outlier shock, or simply manage downside risk (those that pressure the individual most), the everyday, small-scale, extensive events that undermine individual and collective resilience and prosperity, or all. This is further complicated by cultural biases (or 'cosmologies'²⁰). As human attitudes towards risk are not homogenous and vary frequently according to such cultural biases, the risk response can differ from one context to another.

The DRR community has traditionally focused much of its effort on assessing risks and providing data, information and knowledge on risk that is as accurate as possible. However – and despite advances in the availability and accuracy of risk-related data, models and prediction tools – risk-informed decision-making remains the exception and not the rule. An enhanced understanding of what drives behaviour in the context of known risk can assist decision-makers develop solutions that are not only logical but are cognisant of prevailing risk behaviours, wherein the likelihood of acceptance and implementation is improved. d

Part III therefore proposes to investigate what drives risk perception – how our brains process risk information, how cultural bias shapes the risks that individuals and groups choose to identify with, and how this can drive individual or collective behaviour that may or may not be in the best interest of the decision-maker(s). The Part will examine behavioural aspects of understanding and managing risk and uncertainty, how risk perception drives behaviour and decision-making, and what this means for disaster risk reduction and designing effective risk communication interventions.

This Part proposes to examine examples of risk tolerance and how this links to behaviour. It proposes to include an analysis of temporal conundrums, when the human brain is hardwired to write off tomorrow and focus on risks that cannot be avoided, and build towards meaningful action to transcend those risk-blind behaviours. The Part will explore aspects of risk myopia or short termism – be they driven by political cycles, shareholder dividends, annual insurance contracts, or simply the inability of the individual to determine imminence or proximity of the threat – and how these challenge policy makers, or distort risk perceptions and thus the choices of decision-makers.

The Part will recognise that our efforts to deal with complexity and provide actionable insights on the basis of robust risk information are evolving in an environment of increasing data and information, where conversely the integrity of that information is frequently challenged. It will acknowledge that 'fake news' and social media are increasingly replacing traditional information outlets as sources for facts on any topic (including risk information), and that politically motivated inflation of risks that exaggerate fears are not



¹⁹ GAR 2019 (gar.unisdr.org)

²⁰ Douglas, M. 1970. Natural Symbols: Explorations in Cosmology



uncommon, while scientifically proven risks may be deliberately understated or disregarded for the same reasons.

It is proposed that the Part will be informed by research analysing the requirements of end-users for risk analytics and information, how users employ the outputs of risk analysis and assessment, and what impedes risk-smart decision-making.

As risks become increasingly complex in a hyper-networked, connected world, we must avoid submitting to business as usual and adopt innovative solutions; solutions that this GAR proposes to showcase and explore. Cognitive science has long recognized that our ability to process and understand information is linked to the way in which it is packaged and visualized, as well as communicated. And that human behaviour is based on a perception of reality rather than reality itself. The World Economic Forum (WEF) issues a perception survey to determine the landscape of *perceived* risks (the Global Risks Report), rather than depending upon sophisticated scientific risk assessments. And so this Part also proposes to assess the efficacy of approaches adopted by risk experts when responding to user demand and providing advice, and examine inter alia how Artificial Intelligence (AI), or better, collective intelligence²¹, can represent a more accurate reality.

Drawing on existing knowledge and practice – including within policy making (e.g. UK²² and US²³) – as well as new research, GAR 2022 proposes to evaluate what this means for risk-informed decision-making and what challenges this presents for effective risk communication, particularly in the context of the latent uncertainty of systemic risks. Additionally, the Part proposes to examine the role that social media and informal communication plays in risk perception and resilience building, as well as investigate culture of risk perception, within and between stakeholders and incentives or impulses to act, and what brings change in behaviour.

Finally, the Part will assess the question of trust when dealing with uncertainties. The black swans, the unknown unknowns, how to manage these without succumbing to paralysis. Exploring approaches that allow us to become more comfortable with uncertainty as the new normal, when taking risk related decisions.

Potential contributors: Understanding Risk community, Behavioural Insights Team – UK Government, Global Centre for Security Policy (Nayef Al-Rodha), Centre for Global Disaster Protection, The Good Judgement Project, Future of Humanity Institute, GRAF Working Groups, gapminder foundation, cognitive psychologists, behavioural scientists, cultural theorists, research entities, Wilson Center 'missing the slow train'

²³ <u>https://obamawhitehouse.archives.gov/the-press-office/2015/09/15/executive-order-using-behavioral-science-insights-better-serve-american</u>



²¹ GAR 2019 (gar.unisdr.org)

²² https://www.bi.team/



PART IV – Managing and governing systemic risks – emergent solutions

Recognising that many decision-makers baulk at the complexity of understanding systemic risks and the challenge of developing systems-based approaches to address multidimensional challenges in contexts of uncertainty, this Part offers an exploration of effective and emergent approaches to managing systemic risks to sustainable and resilient societies and ecosystems.

Whereas the adoption of systems-thinking and systems-based approaches to understanding and managing risk have long existed in some fields – public health management, construction engineering, design schools – other disciplines are increasingly recognizing the imperative to assess, analyse and manage risk using approaches that adopt a systems perspective.

In exploring emerging threats to human and natural systems and the infrastructure upon which these systems are built, GAR 2022 proposes to explore approaches to understanding and managing risk through a systemic lens, emphasising systems-based approaches being employed at differing scales, and examining the consequences for sustainable development, the ramifications for the decision-maker and the institutions, governance and financial architecture in which systemic risk will need to be managed.

Furthering the enquiry presented in GAR 2019, this Chapter proposes to further develop and articulate understanding of the possibilities inherent in assessing systemic risks. Still in its infancy, new approaches to modelling and understanding systemic risk are required if the incentives that will drive policy makers to go beyond the conventional view of risk, are to be developed. The Part will present and assess innovations in systemic risk assessment and analysis, including but not restricted to the use of multi-agent systems research, systemic risk modelling, collective decision making, collaborative planning that deals with uncertainty and scenario building.

It will showcase research and demonstrations of how new technologies and science are, and will be, applied in risk assessment and risk reduction, including the opportunities presented by AI, deep learning, machine-learning, and automated systems to solve problems, alongside collective human intelligence.

The Part will also provide country examples showcasing the outcome of systemic risk assessment as the practical application of the Global Risk Assessment Framework (GRAF).

Potential contributors: IIASA, ICES Foundation, Resilience Brokers, EIT Climate-KIC, University of Oxford, SEI, Santa Fe Institute, SRC, PIK, MIT, IBM, ITU, GFDRR, Finnish Innovation Fund, UNCTAD, UNEP-GRID, FAO, UNEP FI, research centres, academia, GRAF Working Groups

Propelled by Chapter 2 of GAR 2019, this Part will examine examples and elements of effective systemic risk governance – including inter alia, understanding the interconnected elements and interdependencies among individual risks, or the imperative for flexibility and continuous adaptation to context, or the willingness to adapt or revise often non-linear, non-sequential processes, and the willingness to accept and resolve trade-offs. It will also explore systemic risk governance challenges – including the difficulty of establishing causal attribution for systemic losses as the basis for assigning accountabilities and responsibilities (both individual and collective).







With finite resources at the disposal of the decision-maker, prioritizing action is difficult (whether a Member State or a household) and is – as much as is possible – informed by an understanding and balancing of trade-offs in choices and decisions. Prioritization and decision-making for reducing systemic risks are processes that should be adjusted constantly, underpinned by assemblages of all available data and contextual mapping of information describing an ever-changing reality – ideally employing what GAR 2019 referred to as collective intelligence.

This Part will assess proven feasible solutions and in so doing begin the systematic framing of such solutions to support access, selection, and application by decision-makers; incorporating aspects of inter alia scale, articulated demand, decision-making behaviour, and scalability. Recognising that cases are not necessarily exportable beyond context and the need to embrace diversity in solutions, the Part will unpack principal components that may be more readily transferable.

The Part will review the gamut of responses, including low-cost approaches that generate long-term (even lifelong) positive dividends. The Part will also examine barriers to workable solutions, including the tension that can exist between the pursuit of efficiencies and resilience.²⁵

Through the presentation of selected case studies, GAR 2022 proposes to provide a contribution to the global discourse on how to manage complex systems trade-offs when implementing the SDGs in a changing climate, from the perspective of risk-informed sustainable development. Cases will seek to integrate aspects of some of the systemic transitions being mainstreamed into development and efforts to promote social, economic and ecological resilience: 1. energy systems / infrastructure, 2. Land, oceans and ecosystems, 3. Urban infrastructure, 4. Industrial sector / infrastructure, 5. Societal transitions.

Potential contributors: IRGC, IIASA, SRC, SEI, UCL IRDR, EIT Climate-KIC, UNDP, OECD, Harvard Kennedy School, Lee Kwan Yu School of Public Policy, National Science Foundation, research entities, Sustainable Infrastructure Solutions Labs

²⁵ A system may be made more resilient by the application of multiple concepts, an approach that can also result in redundancies.



The Part will also explore overarching principles that can guide the process of understanding and managing risk through a systemic lens, navigating trade-offs, providing examples of effective approaches to bring forward portfolios of solutions, as well as the means to resource such systems-level transformations. Through the presentation of selected case studies²⁴, GAR 2022 proposes to provide a contribution to the global discourse on how to manage complex systems trade-offs when implementing the SDGs in a changing climate, from the perspective of risk-informed sustainable development.

²⁴ that could for example include: restoration and safeguarding natural capital; rewilding; afforestation; silvopasture; sustainable finance; urban systemic risk management.