



**G L O B A L
S H I E L D**

How governments can better understand global catastrophic risk

August 2023

Executive summary

Global catastrophic risk (GCR) has the potential to inflict significant harm to human wellbeing on a global scale. In the most extreme case, the entire species could be at threat from extinction or permanent collapse. As a result, reducing GCR should be a national and international security priority. In particular, national governments have a responsibility to their citizens to proactively implement policy that would prevent, prepare for and respond to the risk. But the first step is to understand the risk.

Policy vision: Governments must ensure that they sufficiently understand GCR in order to design policies that prevent, prepare for, or respond to the risk. National governments should have a strong ability to identify, analyze and monitor the threats and hazards that lead to GCR.

Policy problem: National governments often struggle with understanding extreme risk, and GCR specifically. The nature of the GCR as an issue makes it difficult to understand and analyze. Governments can find it hard to think creatively about future and sudden changes to their risk profile. This is exacerbated by the frequent lack of scientific and technical expertise for extreme risk, including GCR.

Policy options: Governments must take action to better understand GCR and implement structures and processes that enable decision-makers to be more informed about the risk. A better understanding of GCR includes understanding the set of threats and hazards, the vulnerabilities to GCR, pathways and scenarios of risk, and their factors and implications. There are four areas in which governments can take action:

- **Risk assessment:** identify and analyze GCR holistically to sufficiently inform policies for prevention, preparedness and response.
- **Futures analysis:** improve practice and use of futures analysis, including horizon-scanning, forecasting and foresight activities, to alert policymakers to emerging threats and trends.
- **Intelligence and warning:** improve intelligence and warning capability on GCR to inform governments on imminent threats and trends in the global landscape.
- **Science and research:** Increase government's science and research capability on GCR so that policy solutions are supported by cutting-edge technical expertise.

The policy context

Since the mid-twentieth century, global trends in technology, politics, demographics and environmental impact have resulted in an unprecedented level of risk for human society. This global catastrophic risk (GCR) has the potential to inflict significant harm to human wellbeing on a global scale. In the most extreme case, the entire species could be at threat from extinction or permanent collapse.

The human species has always faced the risk of global catastrophe from natural hazards, such as supervolcanoes and asteroids. More recently, anthropogenic or human-driven threats to humanity have emerged and probably become a greater risk. These global catastrophic threats include advanced artificial intelligence, extreme climate change, nuclear winter and engineered pandemics.

The potential for harm posed by these threats means that national governments have a responsibility to their citizens to proactively implement policy that would prevent, prepare for and respond to the risk. But the first step in any risk management process is to *understand* the risk.

Governments around the world are beginning to turn greater attention to GCR. For example, the US National Intelligence Council highlighted these risks in their 2020 [Global Trends Report](#):

“Technological advances may increase the number of existential threats; threats that could damage life on a global scale challenge our ability to imagine and comprehend their potential scope and scale, and they require the development of resilient strategies to survive. Technology plays a role in both generating these existential risks and in mitigating them. [Human-induced] risks include runaway AI, engineered pandemics, nanotechnology weapons, or nuclear war.”

And the Secretary General of the United Nations also recognised GCR in his 2021 ‘Our Common Agenda’ report:

“These risks are now increasingly global and have greater potential impact. Some are even existential: with the dawn of the nuclear age, humanity acquired the power to bring about its own extinction. Continued technological advances, accelerating climate change and the rise in zoonotic diseases mean the likelihood of extreme, global catastrophic or even existential risks is present on multiple, interrelated fronts. Being prepared to prevent and respond to these risks is an essential counterpoint to better managing the global commons and global public goods.”

But more work is needed for governments to better understand the risk and turn that understanding into policy action.

Global catastrophic threats are those that could inflict significant harm to human wellbeing on a global scale

Global catastrophic risk is the collective risk that arises from the set of global catastrophic threats.

In general, prevention aims to reduce the threat or hazard, preparation aims to reduce vulnerability to the threat or hazard, and response aims to minimize harm and recover quickly should a risk event occur.

The policy vision

Governments must ensure that they sufficiently understand global catastrophic risk in order to design policies that prevent, prepare for, or respond to the risk. National governments should have a strong ability to identify, analyze and monitor the risk. They must also have a strong understanding of the government's and nation's contribution to GCR.

Global catastrophic risk should be considered as a combined set of threats, hazards and vulnerabilities, enabling governments to allocate and prioritize resources between them. And lessons and knowledge about one risk could be transferable to others. It would also help ensure policy responses for one risk do not exacerbate other risks.

A policy vision is an ideal state to which policymakers can aspire.

The policy problem

National governments often struggle with understanding extreme risk, and global catastrophic risk specifically. Three primary reasons drive a poor understanding of this issue.

First, the nature of the GCR as an issue makes it difficult to understand and analyze. The scale of the risk is unprecedented in human history. Global catastrophic risk impacts human civilization and its future, and, at worse, threatens human **extinction**. There is great uncertainty regarding how these risks unfold, how likely the scenarios are, and when the risks could occur. And many of the threats are novel and only now emerging on the horizon. Threats such as nuclear winter and climate change, for example, have been known for decades. But some threats arising from new technical frontiers, such as artificial intelligence and synthetic biology, have only recently begun to present catastrophic risk.

Second, governments can find it hard to think creatively about future or sudden changes to their risk profile. Political systems and bureaucratic structures are set up for existing problems, and foresight capability is small and nascent. To the extent that futures analysis is conducted, inserting its findings into strategic policy is tough. And futures analysis can be misguided if conducted by those that suffer from groupthink or myopia.

Third, scientific and technical expertise for extreme risk, including GCR, is often lacking or inconsistent. Aside from defense and civilian research agencies, deep subject matter expertise, particularly on technology issues, tends to reside outside the public sector. This expertise is crucial when improving the understanding of political leaders and senior officials who develop the policies. And engagement with the science community can often be ad-hoc or poorly managed.

The policy problem refers to those causes or reasons for why the policy vision has not been reached. Each national government will have their own unique circumstances. This policy problem attempts to articulate the most common policy problems faced by national governments.

The policy options

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The policy options aim to address the policy problems. This set of policy options is not comprehensive nor necessarily relevant for every country. It represents a menu of options that policymakers can take and adapt to their own political and policy context.

Quick wins

The following actions enable governments to quickly and cheaply improve their understanding of GCR:

- Commission a review of extreme risks,
- Map each of the global catastrophic threats against impact on critical infrastructure systems to find gaps and vulnerabilities
- Conduct a review of the government's horizon-scanning capability
- Develop a report on major trends identified in existing horizon-scanning products relevant for GCR.
- Allocate technology experts within the intelligence and defense community to conduct ongoing analysis of extreme technological threats, such as engineered pandemics, runaway artificial intelligence and advanced autonomous weapons.
- Conduct a review of current allocation of resources and research efforts to GCR research across civilian and defense science agencies
- Develop a shared list of policy and research questions between the policy and academic communities on GCR

The main policy options in the remainder of the report will require political, financial and bureaucratic capital. Where that capital is not available, these quick wins represent small but meaningful actions that could help governments on the path to more transformational change.

Risk assessment: Identify and analyze GCR holistically

Policy action 1: Develop centralized all-hazards risk assessment process

Simple option: Develop and implement a regular all-hazards risk assessment process for all threats and hazards to the homeland originating domestically or internationally, ensuring to capture long-term and highly unlikely risk.

The simple option is based on the practice of multiple countries according to OECD's 2017 cross-country comparison (see also case study 1).

Advanced option: Develop a detailed assessment of global catastrophic and existential risk, including a comprehensive list of potential catastrophic or existential threats, including even those that may have very low likelihood, as well as technical assessments and lay explanations of the risks, including potential pathways and scenarios.

The advanced option is based on the Global Catastrophic Risk Management Act of 2022.

Case study 1: UK National Risk Assessment

The UK's [National Risk Assessment](#) process, run out of the Cabinet Office, is an example that could be learned from by other countries. Since 2008, the biennial review has considered domestic hazards, with the purpose of informing national resilience planning and local-level emergency planning. Separately, since 2010, the five-yearly [National Security Risk Assessment](#) has reviewed security concerns overseas to inform the National Security Strategy and Strategic Defence and Security Review. In 2019, both assessments were combined so that domestic and foreign risks were assessed against a common methodology.

Despite the UK's relatively mature process, the UK's Parliamentary Office and Science [identified](#) further challenges and limitations, including the focus on short-term acute risks rather than long-term and chronic risks, such as climate change or antimicrobial resistance. The House of Lords published a [report](#) in December of 2021 which evaluated the UK government's preparedness for extreme risks. It found that the government's focus on risks as discrete, rather than interconnected, was ignorant of their complex nature. Additionally, the NSRA's reports are published with an unnecessary degree of secrecy that makes them impenetrable to outside expert scrutiny, which would only improve them. Finally, the assessment continues to be unsuitable to address high impact low-likelihood risks and chronic risk events.

In 2021, the UK Cabinet Office Civil Contingencies Secretariat [commissioned](#) the Royal Academy of Engineering (RAEng) to review the National Security Risk Assessment (NSRA) methodology. The review made 11 recommendations to encourage greater resilience, many of which RAEng claims have been incorporated into the 2022 NSRA process. In 2023, the UK [released](#) its latest National Risk Register based on the upgraded process.

Policy action 2: Understand the country's contribution to the manifestation of global catastrophic risk

Simple option: Map existing government programs against how they relate to national and global catastrophic risk.

Advanced option: Conduct a review of actions of all stakeholders - such as state and local governments, business sectors and citizens - that contribute to manifestation of national and global catastrophic risk.

These policy options are original to this report. The purpose of these actions is for each country to recognize and analyze how they contribute to GCR, which would inform policy efforts to reduce the risk. Currently, no government study has determined its contributions to GCR. One meaningful effort in this direction is an academic paper that compares how major powers contribute to GCR, such as nuclear war, climate change and AI.

Policy action 3: Conduct a capability and resilience assessment

Simple option: Develop a national capability assessment to understand the capabilities - such as critical infrastructure, emergency services and other national assets - that would reduce impact of nationally significant threats and hazards.

Advanced option: Develop a holistic and regular capability and resilience assessment for GCR.

The simple option is based on similar policies in some countries (see case study 2), though national capability assessments do not appear to be commonly practiced. When conducted, they do not adequately consider GCR.

The advanced option is original to this report, but based somewhat on the Global Catastrophic Risk Index.

Case study 2: Capability and vulnerability assessments

National capability assessments are conducted by some countries in order to understand their capabilities and vulnerabilities to inform efforts for building national resilience. For example, under Presidential Policy Directive-8, the US government is required to prepare an annual [National Preparedness Report](#). Similarly, New Zealand has previously conducted a [National Capability Assessment](#) to identify strengths and weaknesses, any trends in capacity and capability, and gaps or areas for improvement.

The [Global Catastrophic Risk Index](#), first released in 2022 by the Global Governance Forum, attempts to quantify the overall vulnerability of 118 countries to GCR. However, the seven aspects that the composite index includes - economic stability, quality of governance, education and skills, gender equality, business environment resilience, environmental vulnerabilities, and exogenous vulnerabilities - do not appear to empirically or rigorously assess such vulnerability.

Futures analysis: Improve practice and use of futures analysis

Policy action 4: Increase and improve futures analysis through central unit or agency that leads regular foresight and horizon-scanning activities

Simple option: Create a futures analysis center in a central government agency that provides support, training and frameworks to other departmental foresight units, leads whole-of-government foresight activities for major policy questions and initiatives, determines the work program in line with the wider agenda, and maintains a database of horizon-scanning products to prevent duplication of effort and to encourage knowledge sharing.

Both simple and advanced options are based on existing futures, horizon-scanning and foresighting activity practiced around the world (see case study 3).

Advanced option: Create a futures analysis agency reporting to the head of government, which, in addition to the activities of the central futures analysis center, conducts all-source assessment and policy analysis for GCR, and coordinates with stakeholders inside and outside government.

Case study 3: Futures analysis around the world

Singapore's [Centre for Strategic Futures](#), based in the Prime Minister's Office, is a noteworthy example for horizon scanning for the government. It focuses on issues that may be blind-spot areas, pursues open-ended long-term futures research, and experiments with new foresight methodologies.

In the UK, the [Horizon Scanning Programme](#) team in the Cabinet Office provides a central coordination function for the UK's horizon-scanning efforts, while the Government Office for Science's [Futures](#) team supports portfolio-level horizon scanning, conducts futures analysis on cross-cutting and long-term issues, and delivers training and development for civil servants.

This capability provides governments with a way to develop and interpret a range of possible futures. Used in conjunction with risk assessment efforts, these capabilities can help identify new threats, explore future scenarios and reduce uncertainty.

Researchers of existential and global catastrophic risk have commonly used and recommended these techniques, such as horizon-scanning, scenario-building, forecasting competitions and red-teaming. For example, researchers from the Future of Humanity Institute [recommend](#) 'regular horizon scanning', to identify unknown threats, and also to set up organizations in such a way that they regularly and promptly receive this information.

Policy action 5: Inject futures analysis into government policy-making processes

Simple option: Develop a future analysis toolkit for policy officers and train them on the techniques, and create a small team to broker between foresight producers and policymakers.

The simple option is based on the UK's Futures Toolkit.

Advanced option: Incorporate a mandatory futures analysis process during major policy decisions, supported by a senior horizon-scanning oversight group, which commissions new work, ensures relevant judgements and implications are drawn from horizon-scanning activity, and reports highest priority implications to decision-makers.

The advanced option original to this report, drawing lessons from existing efforts (see case study 4).

Case study 4: Lessons from government futures activities

Linking strategic-level insights with policy-making is a major challenge for most governments that conduct futures analysis, based on multiple reviews of foresight activities.

One of the widest [reviews](#) of foresight and horizon-scanning practice in government was conducted by the European Union Institute for Security Studies in its 2013 yearbook.

The European Commission's internal expert group, the Research, Innovation and Science Experts, published a [report](#) in 2015 on the lessons for policy-making from foresight in countries outside Europe, with a focus on countries in the Asia-Pacific region.

Leon Fuerth's 2012 [report](#), "Anticipatory Governance: Practical Upgrades", provides a detailed analysis of foresight-policy integration and recommends four broad policy actions: organizing a foresight system, brokering between foresight and policy, incentivising foresight, and training professionals for foresight.

Switzerland-based think tank, the Center for Security Studies, released a [report](#) in 2009 on horizon scanning to inform the Swiss government.

The Institute of Risk Management provides a [practical guide](#) for risk managers to conduct horizon scanning.

Intelligence and warning: Improve intelligence and warnings capability on GCR

Policy action 6: Devote specific resourcing towards analyzing and warning about existential threats and global catastrophes

Simple option: Develop a standing capability, such as an extreme global threats team, sitting within the central analytical agency to conduct all-source intelligence analysis on current and emerging threats.

Advanced option: Establish an intelligence mission around GCR, with a mission manager that allocates the resources devoted to this mission, coordinates agencies around the topic and presents a central point of responsibility for policymakers.

The simple and advanced options are based on an [article](#) in The Bulletin of Atomic Scientists.

Intelligence communities are well-equipped to focus on understanding GCR and informing their decision-makers. Intelligence agencies are generally highly capable and well-resourced parts of government with experience in assessing complex and decentralized threats. However, the focus of intelligence communities tends towards national security, defense and foreign policy issues. Intelligence collection and analysis is targeted towards the most immediate or direct threats, rather than uncertain, highly unlikely or speculative risk.

Policy action 7: Regularly publish intelligence products on issues relating to GCR

Simple option: Produce regular assessments on national security aspects and implications of GCR, such as extreme climate change, advanced artificial intelligence, engineered pandemics, near-earth objects, solar storms, speculative emerging technologies and geoengineering.

Advanced option: Develop a global risk register with a long-term (say, 20-plus years) outlook along with an annual report to national leaders.

The simple option is based on an [article](#) in The Bulletin of Atomic Scientists.

The advanced option is also based on the article, and inspired somewhat by the US National Intelligence Council's Global Trends Report released every four years.

Policy action 8: Establish GCR monitoring and warning system

Simple option: Develop a set of warnings and triggers within the central intelligence analysis capability across a range of global catastrophic threats and conduct continuous surveillance and monitoring.

The simple option is original to this report.

Advanced option: Establish a National Warning Office.

The advanced option is a proposal suggested by Richard Clarke and RP Eddy (see [case study 5](#))

Case study 5: National Warnings Office

Former senior US national security officials, Richard Clarke and RP Eddy, **recommend** a National Warnings Office be installed in the White House to focus on possible catastrophes that are not being addressed in other parts of government. Their idea is based on the National Intelligence Officer for Warning, which was the intelligence community's principal advisor on warnings and had a direct line to the White House, but was disbanded in 2009. They recommend the office sit outside the intelligence community.

“A formalized National Warning Office, in the Executive Office of the President, would be the administration's focal point for identifying disasters on the horizon. This small, elite team should not be...part of the intelligence community, although it could task intelligence agencies to collect and analyze information. Rather, the office would have a broad, even intentionally vague, mandate to look across all departmental boundaries for new and emerging threats. The office should not address ongoing, chronic problems, such as obesity. Rather, the focus should be on possible impending disasters that are not being addressed by any part of government. The National Warning Office should also work through the interagency and the White House on two institutional goals: first, to create management and decision-making environments that nurture, rather than stamp out, dissent and warning from qualified experts; and second, to develop a small cadre of people drawn from every cabinet agency to establish processes and information sharing to recognize sentinel intelligence.”

Science and research: Increase government's science and research capability on GCR

Policy action 9: Develop in-house science and research on GCR

Simple option: Appoint in each department a chief science advisor and office with ownership over studying and understanding GCR in their portfolio.

The simple option is original to this report.

Advanced option: Develop a cross-government team from civilian and defense research and science agencies to study domestic and international security and economic effects of GCR, capitalize on and consolidate existing knowledge, and develop and apply methodologies and models to assess risks, vulnerabilities and exposure to all hazards.

The advanced option is original to this report.

Policy action 10: Improve linkages between science and policy for GCR

Simple option: Form an external advisory group to the government on extreme and global catastrophic risk that includes key sectors such as health and education, academia, civil society, defense, food, energy, infrastructure, banking and insurance.

The simple option is original to this report, based on similar recommendations, such as in "Risk management in the UK" as well as real-world practice, such as the use of external panels to study Havana syndrome, a disease ailing US spies and diplomats.

Advanced option: Establish an independent body that provides independent analysis and recommendations on policies relating to GCR.

The advanced option is original to this report, based on practice in other policy areas (see case study 6).

Case study 6: The UK's science-policy linkages

The UK is a world leader in improving the linkages between science and policy. The UK government has a network of [departmental chief scientific advisors](#) (CSAs), led by the Government Chief Scientific Advisor (GCSA). No less than 26 other departments and agencies have CSAs. The GCSA also chairs the [Council for Science and Technology](#), which is the Prime Minister's independent advisory body on cross-cutting science and technology issues. Its members are leading figures in the science, technology, academic and technology business community. The [Parliamentary Office for Science and Technology](#) (POST) provides in-house support and analysis to the UK parliament on public-policy issues related to science and technology. POST publishes short and long form briefs for parliamentarians, conducts horizon-scanning activities and supports linkages between parliament and the academic communities. And scientific advice permeates into the policy-making space too, such as the [Committee on Climate Change](#), which is an independent statutory body that advises the government on all aspects of policy relating to emissions targets.

Policy action 11: Support academic and scientific research on GCR

Simple option: Provide funding to external advisory groups or centers and institutes that study the science of GCR to conduct policy-driven research.

The simple option is original to this report.

Advanced option: Develop a standing capability with academics and researchers to conduct joint research on GCR.

The advanced option is inspired by similar efforts, such as a [report](#) that was jointly produced by The Alan Turing Institute, the Centre for the Study of Existential Risk and the Defence Science and Technology Laboratory of the UK Ministry of Defence.

About Global Shield

Global Shield is the world's first international advocacy organization devoted to reducing all-hazards global catastrophic risk (GCR). We work with governments worldwide to enact policies to better understand, prevent, prepare for, and respond to global catastrophes, regardless of the threat that may produce them. We believe an all-hazards policy approach to addressing GCR can ensure governments are effectively shielding all of us from global catastrophes. At Global Shield, we envision a world in which all governments have acted decisively to reduce and, where possible, eliminate global catastrophic risk. Our mission is to ensure countries around the world enact and effectively implement policies that reduce global catastrophic risk.