The Coalition of Finance Ministers for Climate Action

Support for sovereign climate and disaster risk functions: the Global Risk Modelling Alliance

Insurance Development Forum

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Introduction

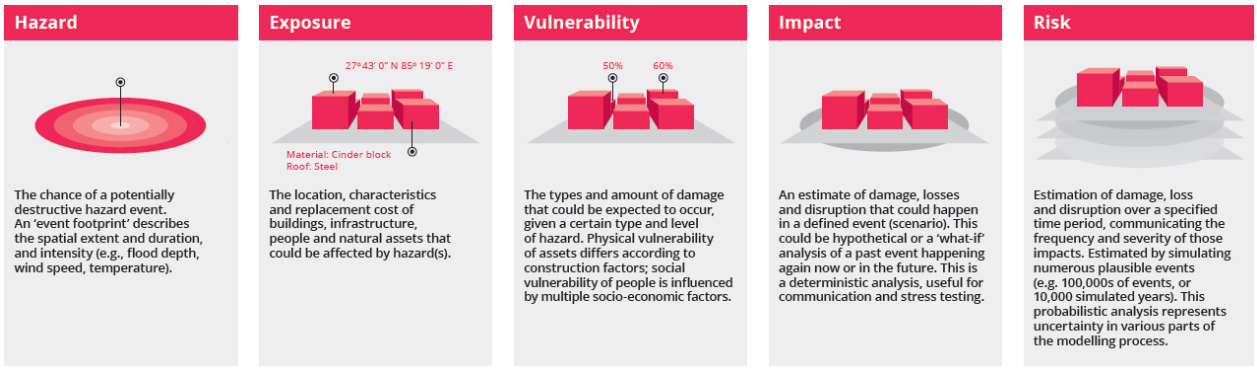
Ministries of Finance and economic planning are experienced modelers of credit risk, market risk and even political risk, and yet many are poorly equipped to price-in risk arising from catastrophes and a changed climate. In 2021 the V-20 Group of Ministries of Finance[1] recognized not only this need but also the opportunity to fill the gap by drawing on the (re)insurance sector's long experience of quantifying risk at the portfolio level. A landmark agreement was signed with the Insurance Development Forum at the UN climate conference COP26 *"for collaboration in risk and resilience analytics,"* and within weeks the German Government's Ministry of Economic Cooperation and Development (BMZ) committed significant funding to make the Global Risk Modelling Alliance (GRMA) a reality.[2]

A probabilistic understanding of risk, as practiced by the (re)insurance industry, can equip sovereigns to quantify risk beyond the bounds of historical experience. Models can simulate extreme impacts that have not yet happened but plausibly could under changed climate, economic, and demographic conditions. Money for adaptation can only move if the associated risk is known, so this quantitative approach is an essential means to guide finance toward future resilience.

MoF officials are unlikely to be catastrophe risk modeling experts; nor do they need to be. What is important is that they should recognize the value of climate and disaster risk insight at least as much as they would political, credit, or market risk. It is a fundamental for adaptation planning and fiscal policy.

MoFs are encouraged to recognize the pivotal leadership position they can hold in bringing together the components of the risk calculation from across public institutions.

Figure 1. Components of risk



Notes: Historical information is not always complete and is not a guide to the future. Models give a more complete picture of risk.
Source: Authors, adapted from GFDRR (2014)

The Global Risk Modelling Alliance

As Figure 1 shows, risk analysis is a puzzle and there is no single source for all the pieces. But Ministries can and should be the hub. The Global Risk Modelling Alliance (GRMA) is designed to help them combine the best of global and local, public and private sources, equipping them to build assumptions about the risks they own.

The aim is that MoFs should then be able to manage this process themselves, not as technical experts but as capable risk managers who can define the right questions for adaptation planning, commission the analysis, and know where to go for support. They should be able to interpret the

1 The V-20 is a forum for Ministers of Finance of the 68 Member States of the Climate Vulnerable Forum; see www.V-20.org.
2 The GRMA is funded by KfW on behalf of BMZ and is hosted and administered by the InsuResilience Solutions Fund (ISF) at Frankfurt School of Finance and Management. It is jointly led and staffed by the ISF and the Insurance Development Forum; see https://grma.global/.

results and understand the remaining uncertainties under which they will then develop a policy or make a decision.

Critically for MoFs, (re)insurance-style risk models include a financial module, which can indicate thresholds for risk retention (e.g., reserves or contingent credit), or for risk transfer for more extreme events (e.g., (re)insurance covers, catastrophe bonds, and other insurance-linked securities).

Frequently asked questions

Policy decisions raised by MoFs in GRMA workshops have often included:

- Fiscal planning and the relationship to sovereign debt
- National disaster risk reporting versus concerns about sovereign credit ratings
- Prioritizing the potential *impacts* governments care about the most (e.g., is it capital stock or supply chains? Is it nature or population? Now or the future?).

Technical issues raised in workshops:

- How to prioritize and plan the range of responses to risk, from adaptation (particularly informing National Adaptation Plans) through risk transfer and retention, to disaster risk management, recovery, and rebuilding.
- The quest for more data; in every initial workshop the most common comment from sovereign institutions and agencies, particularly in the least well-resourced countries, is "*we need more data*." Perhaps this could be paraphrased as "*we need less uncertainty.*" Invariably, more data (especially exposure data and vulnerability analysis) can be helpful, but a key focus for MoFs building risk functions should also be "*how do we make the best decisions when we don't know everything*?" Again, (re)insurance approaches can bring the benefit of operational experience to this challenge.
- Open data and open platforms; not only is more data desirable, but in many minds there is a nirvana in which all data is openly accessible and usable for their specific purpose. It very quickly emerges that there are complexities here, not least because the data requirement changes according to the risk question being asked. However, many open platforms and risk data resources are available, some of which are mentioned below.

Finding risk research to match the risk question

Higher-income countries may go to commercial consultancies for support. This is a perfectly valid approach, but a Ministry loses something if it does not learn the language of risk for itself or cannot see how the model works. A principle of the GRMA is that the analysis should be as close as possible to the risk owner—nobody wants to make decisions based on somebody else's view of the risk.

Going back to the point about risk being a puzzle with many pieces, the GRMA starts work in countries by bringing together Ministries, Departments, Agencies and research institutions, each with their own view on impacts of concern and knowledge of exposures, hazards, or vulnerabilities. Usually under the leadership and political mandate of an MoF, a synthesis emerges of prioritized risk questions and the modeling required to address them.

The GRMA operates at the request of sovereigns, and each program is co-defined with a locally led technical working group. Requests cover a very wide range of impacts and financial objectives, even within each country. A few examples of work programs are provided below.

Madagascar

- Modeling the macroeconomic impacts of climate shocks to support the development of Madagascar's Climate Prosperity Plan (CPP)

- Developing a multi-hazard risk profile at commune-level resolution, accounting for cyclones and floods but also less well understood hazards such as drought, landslides, erosion, fires, red sandstorms, and locust invasion.
- Establishing a single data-sharing facility to better manage and exploit data on hazards, exposure, capacity, vulnerability, damage, and loss. While the MoF should retain oversight of such a facility, hosting and curation of data may well sit with a partner Department or Agency, such as the national statistics office, national disaster management authority, or a university department.

Pakistan

- Studying the vulnerability of rural communities to recurrent floods and their implications for the financing requirements of the Benazir Income Support Programme (BISP).

Costa Rica

- A strategic level multi-hazard analysis of infrastructure assets, as well as specific projects in the agriculture and tourism sectors. Probabilistic outputs from these models produce financial loss metrics for different frequencies and severities of events, such as annual average losses and probable maximum losses. These and other metrics have applications to the design of risk transfer instruments, such as insurance of public assets or income protection for micro-businesses in tourism and agriculture.

Ghana

- Modeling the impact of urban flash flooding in up to five cities, with a view to the protection of micro-businesses, the majority of these being run by women.

Every country is at a different stage in its journey of risk understanding, has different resources at its disposal, and has different levels of political support for developing a risk function. As an example, the greatest political support the GRMA has encountered was in a West African country (not named above), but it was also the least well equipped. In this case the most obvious need was for some basic exposure mapping, with insight into the impacts of rapid demographic change in the next 10–20 years.

Open-source

For lower-income countries that cannot afford seven- or eight-digit license fees, or want to take greater ownership of the analysis, a number of open-source resources are available. Some examples used by the GRMA include the following:

- CLIMADA: The open-source CLIMADA[3] platform (from ETH Zürich) was designed with investment and adaptation in mind. The UN University has supported Ministries in Vietnam, Honduras, and Ethiopia using CLIMADA for the analysis underpinning "Economics of Climate Adaptation" studies. In 2022 GRMA used CLIMADA to demonstrate the economic benefit of flood management measures in Ghana, and at the time of writing, it is using CLIMADA for analysis of tropical cyclone risk in partnership with the Government of Madagascar.
- OASIS Loss Modelling Framework: OasisLMF[4] is unique in being an open resource developed and maintained almost entirely by the private sector. Originally conceived to improve industry efficiency in mature markets using an open-source platform and a set of open data standards, it has become an ecosystem for model developers and users. Its

3 https://wcr.ethz.ch/research/climada.html.
4 https://oasislmf.org/.

base code is truly open source, it has a sustainable nonprofit business model, and it is therefore recommended by the GRMA for sovereigns growing their risk functions.

- Resilient Planet Data Hub: The Resilient Planet Data Hub[5] is not a risk modeling platform but a portal for precomputed risk data across the categories of People, Planet, and Prosperity. Designed for organizations taking their first steps in climate and disaster risk understanding, it allows non-experts to make choices about the hazards and impacts of greatest concern and select future epochs and warming pathways to compare results.

Management and governance topics for MoFs to consider

Climate and disaster risk management is a truly cross-sector challenge and can only be achieved by coordination across Ministries, Departments and Agencies, in partnership with the private sector and global partners. However, MoFs should be the fulcrum in this process. The observations made below are made from the perspective of the GRMA's work in countries so far.

a) Prioritize owning the problem: Identification of the risk owner, and acceptance of the principle of local ownership of the risk analysis. At times, this may seem difficult given the frequency of political change, but it is already in place for other key national risks such as health or security.

b) Embrace the idea that MoFs have a leadership role in bringing together the best of global and local, public and private. The GRMA encourages Ministries to recruit a technical working group from across multiple functions to focus and combine local expertise and resources.

c) Questioning, comparing, sharing the analysis, and the need for a continuously developing view of risk as a core function for MoFs. Otherwise (for example) how will they manage a changing climate and emerging hazards such as heat? To achieve this, insist on open data standards and open access to models, to encourage debate and validation of assumptions. This all makes for better decision-making.

d) Consider the merit of creating a national Chief Risk Officer, housed in the MoF or Economic Planning functions of Government.

It is only two years since the GRMA's first in-country engagement, so it is too early to be able to assess the impact on sovereign capabilities or programs. However, the evidence is that it is responding to a clear need: the buy-in from ministers, department directors, regulators and technical experts in all the countries it works with is very encouraging.

There is no greater indication of interest than over-stretched officials leaving their desks to give time to this new, exciting, and indispensable activity of understanding risk.

The views expressed herein are those of the author, based on experience as Co-Lead (Private Sector) of the GRMA, and do not necessarily reflect the views of the GRMA as a whole.

5 http://www.resilient-planet-data.org/.