

The Global Risk Assessment Framework

Concept Note

The Challenge

The adoption of The Sendai Framework for Disaster Risk Reduction 2015-2030 on 18 March 2015 (henceforth referred to as the Sendai Framework) articulated the need for improved understanding of risk in all its dimensions and created new requirements and new opportunities for those building societal resilience to environmental and technological shocks. Its fore-runner, the (2005) Hyogo Framework for Action (HFA) was an important instrument for raising public and institutional awareness and generating political commitment, yet over its ten-year duration, disasters continued to exact a heavy toll, with more than 1.5 billion people affected and total economic losses of more than \$1.3 trillion. The exposure of persons and assets in all countries increased faster than vulnerability decreased, thus generating new risks and a steady rise in overall disaster-related losses and damage. The decisions that are taken at all scales, in ever more interconnected societies reverberate across interdependent social, ecological, economic and political systems in increasingly diverse and correlated ways. Reflecting this, Member States adopted a scope for the Sendai Framework that was significantly broader than the HFA, to include man-made, as well as natural, hazards and risks. They recognised that now is the time for urgent action to better: understand the multi-dimensional nature of risk; increase accountability for disaster risk creation and propagation; collectively identify inter-dependent solutions enabling prevention of new risk; reduce existing risk, building back better through risk informed decision making; and strengthen resilience at all levels¹.

The Response

In response to this challenge, the United Nations Office for Disaster Risk Reduction (UNISDR) – mandated to support the achievement of the outcome and goals of the Sendai Framework and the 2030 Agenda for Sustainable Development (henceforth referred to as the 2030 Agenda) – was called upon by experts to establish a process to co-design and develop a Global Risk Assessment Framework (GRAF) to inform decision-making and transform behaviour. This will explicitly support, national and sub-national governments, as well as non-State actors, to achieve the global targets of all 2015 agreements: the Sendai Framework, Paris Agreement, the New Urban Agenda and the 2030 Agenda for Sustainable Development (the 2030 Agenda). It will inform and focus action within and across sectors and geographies by decision-makers at local, national, regional and global levels on the priorities for action set out in the Sendai Framework.²

This Concept Note openly invites all disaster risk reduction organizations and experts and users of risk to cooperate in the co-design and development of the GRAF, enabling it to catalyse and facilitate the input of information to support collective outcomes and explore open questions in relation to the implementation and alignment of the 2015 agreements. In this conceptualisation phase of the GRAF, an Expert Group (initiated Geneva, June 2018) has been tasked with producing a GRAF Implementation Roadmap 2019-2029 for consideration at the Global Platform on Disaster Risk Reduction in May 2019.

¹ *Sendai Framework for Disaster Risk Reduction 2015-2030*, paragraphs 3-6

² *Sendai Framework for Disaster Risk Reduction 2015-2030*, paragraphs 18 and 20

The GRAF Vision

To improve understanding of complex risk behaviour and where relevant and applicable, to transform behaviours and catalyse a proactive decision-making culture by democratizing everyone's understanding of the systemic nature of risk through time.

The GRAF Objectives

1. To improve understanding of complex risk and concatenating vulnerabilities in disaster environments.
2. To provide decision makers with **actionable insights and access to products, tools, demonstrations and scenarios at all scales** (spatial and temporal) to better understand positive, negative, direct, indirect, intended, unintended as well as short, long term systems impacts and consequences to prevent risk creation, manage and reduce existing risk, including systemic risk, transition risks and emerging risks accounting for values & risk perceptions, trade-offs of users
3. To **support decision-makers to maximise synergies** across the implementation monitoring, follow up and review, as well as achievement of the targets and deliverables of the 2030 Agenda, the Paris Agreement, the New Urban Agenda and the Sendai Framework
4. To build, and increase trust and confidence in, multi-sectoral risk assessments in an inclusive, evidence informed, open process, building on existing processes and data to the greatest extent possible
5. To **foster a culture of inclusive, collaborative, and proactive behaviour** based on interdisciplinary systems thinking and decision science
6. To **mobilize finance and de-risk investments** to enable risk-informed sustainable development

The GRAF Principles

- **Open** – open-access, open source, open data, open platforms, analogue and digital access
- **Collaborative** – co-creation, co-design, co-ownership, self-organizing, emergent learning
- **Universal** – at multiple scales, local-to-global and global-to-local, inclusive, self-sustaining for all users, co-designed for the long-term
- **Trusted** – credible, fair, accountable, reliable, with respect and integrity, user experience focus, an experimental space for innovation and iterative development
- **Practical** –re-usable, reproducible, scalable, maximising impact of resources (with due consideration given to other national and international frameworks
- **Transparent** – explain all assumptions, “glass box”, highlighting the unknown unknowns
- **Living with uncertainty** – Evolutionary and transformative, representing uncertainty in complex systems contexts

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Background

The UNISDR has been tasked to support both the implementation of the Sendai Framework and the follow-up to the 2030 Agenda. In this context it convened a gathering of 115 leading risk experts in Geneva on 20-21 November 2017. Participating experts included data providers, risk and hazard modellers, as well as experts on exposure, vulnerability and impact analysis, risk communication, application of risk information and end users of risk assessments.

All regions of the world were represented, bringing perspectives from high-, middle- and low-income countries wherein capacities for generating risk data and for risk assessment vary greatly. This enabled a broad examination of current practice and the use of risk information. It explored demand and feasibility for the development of a GRAF that more comprehensively represents the scope of the Sendai Framework and facilitates coherence with the 2030 Agenda, the New Urban Agenda and the Paris Agreement.

An independent expert review of the current Global Risk Model, developed by the UNISDR for the UN Global Assessment Reports on Disaster Risk Reduction (GAR) 2013 and 2015 and the GAR Atlas 2017, found that whilst crucial in supporting the conceptual shift from managing disasters to managing risk (that was subsequently enshrined in the Sendai Framework), it does not reflect the full range of risks, including small- and large-scale, frequent and infrequent, sudden and slow onset disasters caused by natural or man-made hazards, as well as related environmental, technological and biological hazards and risks that the Sendai Framework has been adopted to address. The meeting recognised the GRAF should provide an opportunity to build on existing practices established in the development of the Global Risk Model, generate leverage the wider body of work and expertise, and to bring forward innovative solutions, working practices and coordination and participation mechanisms.

Principle recommendations from the GRAF Expert Meeting

1. Access to state-of-the-art risk information through a global risk assessment framework, across the full spectrum of hazards and risks covered by the Sendai Framework, with emphasis on vulnerability, exposure and impact, at relevant and appropriate scale across sectors and geographies, is desirable to enhance risk-informed decision-making.
2. There is a need to develop clear short- and long-term deliverables that serve the purpose of assessing and identifying risk, and which ultimately can be made applicable to accelerated reduction and prevention of risk at national and sub-national levels.
3. A culture of openness should be engendered, with collective responsibility to optimize existing data in open support of the global public good, to realise the collective aspiration to connect systems, understand inter-dependencies and collectively identify solutions at scale.
4. Data or information on vulnerability (social and environmental) is recognised as severely under-developed and is recommended as a priority area for expanded work. Real reductions in risk will be through understanding and addressing patterns of vulnerability and exposure.
5. The GRAF must reach the city level and the sub-local level - as development challenges including poverty and unemployment, housing, basic services all tend to be concentrated at sub-local (district) levels, where the impact and consequence of risk preventative / risk reducing action, or inaction is most keenly felt. This mirrors the increased prominence that is accorded to mayors in international efforts to realise the 2030 Agenda and the other 2015 agreements, goals and outcomes.
6. The GRAF should be introduced in the GAR in 2019, to show the changes in global risk assessment post-2015, illustrate the evolution in approach to reflect more accurately risk in society, and describe the data and outputs that will be provided by the GRAF and how these could be used for improved decision making.

1.0 GRAF Process

The work to co-design and develop the GRAF recognises that the 2030 Agenda, the Paris Agreement and the New Urban Agenda have enormous potential as a framework for engaging Member States and other stakeholders on the risks they face, and where they lag most on reaching the goals. The GRAF is intended to be a crucial component of a comprehensive UN risk assessment and analysis framework in support of the 2030 Agenda and will contribute to the Secretary-General's vision to support decision-making for an Integrated Platform on Prevention as well as within the UN Resilience Framework.

The GRAF co-design will be an evolutionary, emergent process focused on the needs of all stakeholders, especially decision makers (including local leaders)– both current and anticipated – and will offer a space for contributions to build a comprehensive assessment across contexts, geographies, sectors and scales of the determinants and drivers of risk in all its dimensions. It is a collaborative framework in which risk modelling and assessment capabilities, impact and consequence analyses, risk knowledge and tools can be braided together and made available, providing information for decision making as part of an integrated platform on prevention as well as within the UN Resilience Framework.

The GRAF aims to improve the understanding and management of current and future risks, at all spatial and temporal scales and across all relevant time periods, to better manage uncertainties and mobilise people, innovation and finance by:

- Fostering interdisciplinary systems thinking, at all scales, with *shared metrics and shared understanding*.
- Enabling the identification of anomalies and precursor signals, as well as the interlinkages, relationships, correlations and dependencies of multiple risks and actors across systems to build a *shared understanding* and enable decision makers to act.

By providing actionable insights, tools and demonstrations at relevant scales to decision makers on a timely basis the GRAF can build collective intelligence to steer societies towards the *shared metrics* of the 2030 Agenda, the Sendai Framework, the Paris Agreement and the New Urban Agenda.

1.1 Developing interdisciplinary systems thinking

The development of multi-user, open and inclusive, collaborative, shared methodologies for stakeholders to both contribute to, and become, users of the GRAF should stimulate interdisciplinary systems behaviours that will support transformative action. Adoption of shared systems and working practices, guidance on data standards and protocols, and communication of methodologies - employing representative users' stories to guide the process of co-design (see Annex 3 for examples of User Stories) – will be important.

Approaching risk from a systems perspective to build multi-dimensional maps of changing risk, on a foundation of multi-science (natural and social, including from indigenous sources), will help to reveal the interactions between hazards or shocks, exposure, and importantly vulnerabilities, across human, ecological and economic and financial systems.

To identify systemic risks, one must foster a nuanced approach that is sensitive to multiple risk environments. Since no one organisation or institution can capture all relevant perspectives, systemic risks must be assessed through consultations and co-design with multiple parties. With this understanding, the next hurdle is communicating the relevant information, including scenarios and options on which users can focus their efforts to reduce and prevent risk. Communication of risks and drivers must not only provide relevant information, but also prompt discussion and facilitate decision-making amongst users through, for example, scenarios and options.

Using relevant research, observations and data, the connecting and harmonizing of the effective models will improve understanding of the nature and interactions of risks, natural, social or technological. Such analyses should provide actionable insights on the potential impacts and consequences on multiple sectors of society and over many scales. In this way, risks can be better understood and managed to minimise loss and suffering of societies, ecosystems and economies - to steer towards and beyond the 2030 Agenda, the Sendai Framework, the Paris Agreement and the New Urban Agenda.

The co-development of shared methodologies will initially be facilitated by the UNISDR, as the custodian agency of the Sendai Framework. It will draw on resources and direction from across the United Nations system to support the GRAF Expert Group - which will lead the initial stages of co-design and development of shared methodologies leading up to the 2019 Global Platform.

1.2 Developing a shared understanding of risk

The GRAF will work with all stakeholders to:

- Create a framework and Community of Practice for the understanding and sharing of risk contexts, data, information, models and metrics, risk communication modalities and decision-making support.
- Focus outputs on the identification of anomalies and precursor signals, including the provision of decision friendly scenarios and options at relevant geospatial and temporal scales (including city-region and national scale), that incorporate sensitivities to change for the identified risk conditions, as well as an understanding of systems reverberations, bleed-over and feedback loops.
- Prevent or adapt discontinuities in critical systems (including human health, ecosystem functioning, economic development, etc.) by adopting a systems-based approach, create the potential to transform behaviours, enable self-organisation and learning focused on local processing of information by relevant stakeholders on the impacts and consequences of decisions across shared metrics.

1.3 GRAF Delivery Plan

The GRAF Delivery Plan is an evolving activity road map to achieve the GRAF vision and objectives. At the 1st preparatory meeting for the GRAF Expert Group in April 2018, a group of UNISDR staff and associates initiated production of this Concept Note. A key outcome of this preparatory meeting was the suggested immediate priorities and tangible actions for the Expert Group to consider at the 1st meeting of the GRAF Expert Group in June 2018.

Following further consultations at the Understanding Risk Forum 2018 in Mexico City, a consensus emerged around the need to think big but to focus effort on the design and development of the processes as well as the articulation of a preliminary, tangible GRAF Delivery Plan, with tangible activities and deliverables, rather than on the ultimate product of the GRAF; this to build confidence and trust with potential collaborators, supporters and users of the GRAF.

As set out in the Theory of Change (see Section 1.3.1), GRAF co-design and development will continue until 2029 in three broad phases of activity:

Phase 1: Design and set up – 2018-2019

This will comprise foundation activities to understand the current state of risk assessment science and practice, as well as plan activities and potential projects to be established in Phases 2 and 3. It will also establish the initial practical demonstrators and pilots to test and guide strategic consideration about GRAF scope. Working Groups focusing on fostering interdisciplinary systems thinking and communication (both communication of risk information as well as the communication strategy for GRAF) will also be launched as critical enablers for subsequent activity.

During this phase, including both sequential and parallel activities, the GRAF Expert Group with support from the GRAF Secretariat prioritization will identify priority GRAF Working Group activities to catalyse initial efforts for rapid scaled-up efforts. These will use feedback and learning loops to then enable rapid scale-up in Phases 2 and 3 which will facilitate experimental failure and learning, 'self-organising' modality and mobilization across networks.

Phase 2: Building the framework – 2019-2023

Based on the findings of Phase 1 activities, Phase 2 will focus on building the elements and dimensions of the Framework as depicted in the GRAF Impact Cube (see Section 1.3.3) along the three Causal Pathways³ set (the People Pathway, the Systems Pathway, and the Science Pathway) as set out in the Theory of Change to work towards the objectives and outcomes of GRAF, including several Working Groups and initiation of a range of demonstrators and pilot projects and the enabling elements for emergent learning and experimental innovation in a developing, interdisciplinary systems-thinking context.

Phase 3: Scaling implementation – 2023-2029

Building on Phase 2 activities, Phase 3 will realise the aspiration and impacts of the GRAF vision. At this stage it is too early to articulate the exact nature of the Working Groups and projects that will be operational in Phase 3 as these will be determined through the process outcomes and results of the activities undertaken in the earlier phases, with much of the activity in this final phase of the establishment of the GRAF is expected to be self-organised, locally-owned and managed and organically scaled with only limited strategic intervention from a centralised management structure.

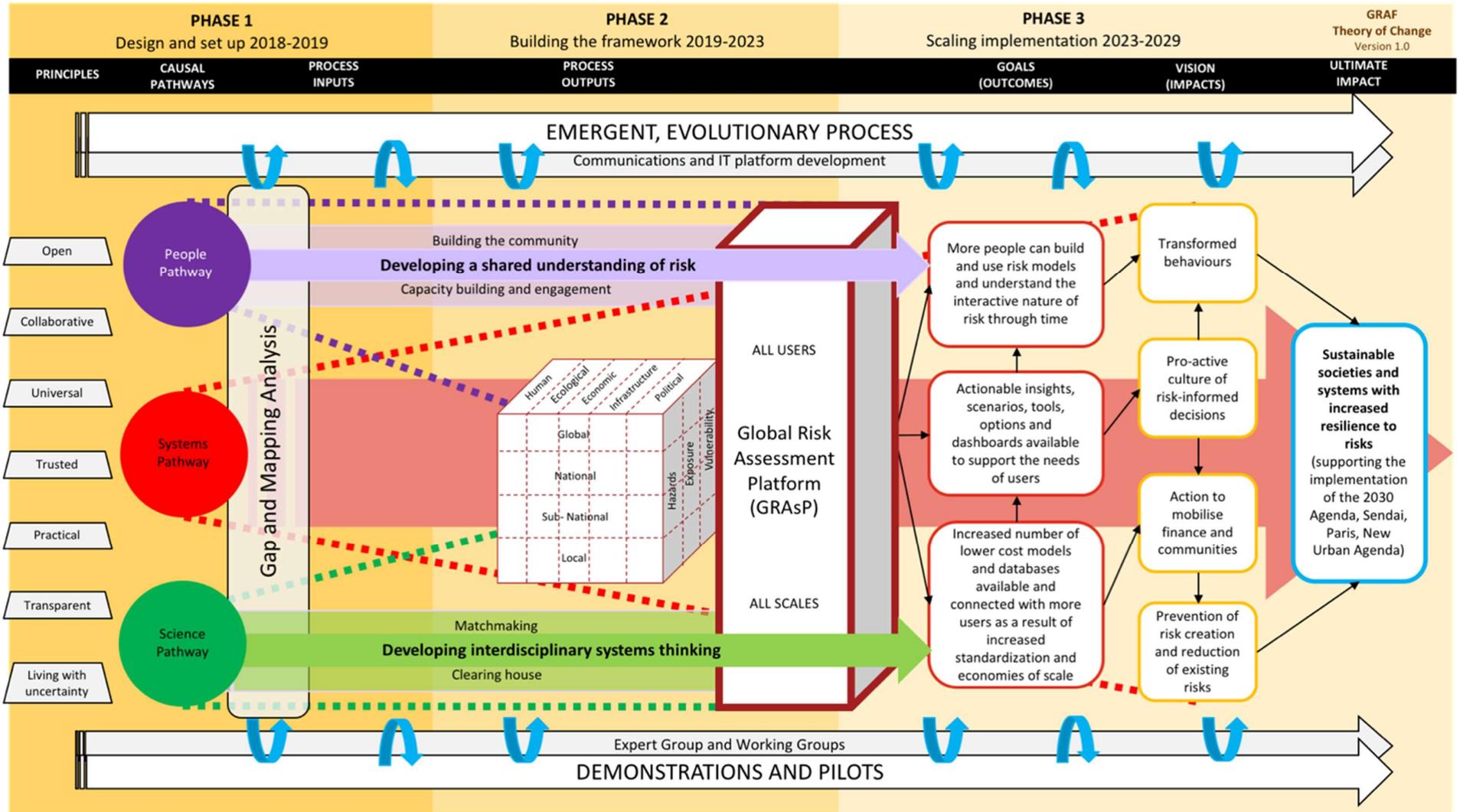
1.3.1 Theory of change and the GRAF Implementation Roadmap 2019 – 2029

The Theory of Change articulates the characteristics of the GRAF inputs, outputs, outcomes and impacts up to 2029. This live document will be edited by the GRAF Secretariat with Expert Group approval.

Version 1.0 below illustrates the early thinking about the development and implementation of key elements of the GRAF. This includes the Causal Pathways (people, systems and science) and the importance of the foundational Mapping and Gap Analysis (see Section 1.3.2.1) in the context of the multi-dimensional nature of the GRAF represented in the GRAF Impact Cube (see Section 1.3.3) and the development of the Global Risk Assessment Portal (GRASP). All of which will build on the foundation activities initiated in *Phase 1: Design and set up* (see Section 1.3.2) and the subsequent activities identified as priorities from the Mapping and Gap Analysis and the lessons from the initial demonstrators and pilots.

³ The Causal pathways are intended to clearly and explicitly define the questions to be addressed and the elements to be tested and established. They are useful in identifying pivotal linkages, dependencies and correlations between various activities in a complex process environment such as the GRAF.

Theory of Change



1.3.2 Immediate priorities: Phase 1 – Design and set up

The four Working Groups set out here were prioritised based on extensive consultations (see 1.3 above) and refined through Expert Group discussions (June 2018). The prioritisation of these groups will not preclude the establishment of others (the process of which will be outlined in the Operating Model), or projects within them in Phase 1, if approved by the Expert Group.

1.3.2.1 Mapping and Gap Analysis Working Group

The Expert Group members are strongly in favour of the immediate formation of a Working Group to develop the scope and Terms of Reference (TOR) for a comprehensive Mapping and Gap Analysis exercise, for rollout from Q3 2018 to Q1 2019. This Analysis will inform the focus and level of effort of key topics to be developed in Phases 2 and 3. It will map activities and identify gaps within the dimensions of the GRAF Impact Cube (notably the different scales including global, national, sub-national and local; hazards, exposure and vulnerability; and the different dimensions of impact and consequence including human/ societal, ecological, economic, infrastructure and political).

The Working Group will complete the TOR for review before the 2nd Expert Group meeting in November 2018, with a final report of findings issued in advance of the 3rd Expert Group meeting in April 2019 to include in the GRAF launch at the Global Platform 2019.

The Working Group will determine the specific areas of focus for the analysis that will be identified in the context of the three Causal Pathways articulated in the Theory of Change. It is expected these will include the following topics⁴, as articulated in the Expert Meeting on the GRAF in November 2017, the various consultations since, and the 1st meeting of the Expert Group in June 2018, to be considered in confirming the final scope for the analysis:

People Pathway

1. Identification and mapping of **existing initiatives** that are focused on improving the understanding of risk, including identification of **key data and model organisations and individuals** for GRAF to collaborate with for future development
2. Extension and elaboration of existing **user requirements, including user stories** to develop a representative understanding of potential **user needs and user profiles of decision makers**, including research and mapping of current initiatives to address known gaps and leveraging the networks of the Expert Group and beyond. This will help to develop a comprehensive and inclusive understanding of the profiles of potential users of GRAF and their needs (existing and anticipated) to build risk literacy and move towards a pro-active culture of decision-making. It will entail both a meta-analysis and direct engagement process to develop a broader set of user-centric metrics
3. Mapping of current **capacity building, engagement and training** approaches including identification of gaps and mapping of current initiatives to address known gaps and mapping of current approaches to building communities of practice

⁴ Note that the list of potential topics is limited by the nature of the consultations undertaken to date by the GRAF Secretariat and is, by definition, non-exhaustive.

Science Pathway

4. Identification of the status of, and gaps within, current approaches to hazard, exposure and vulnerability data access and modelling, including coverage, maturity, interoperability, standards, availability and access, including data, models and methods to determine physical/ economic, social and ecological vulnerability functions.
5. Identification of gaps in current approaches to impact and consequence analysis, keeping in mind the emergent techniques and technologies that may become relevant in the coming years (Artificial Intelligence, crowd-sourcing, prediction markets, etc.).

Systems Pathway

6. Identification and mapping of current approaches adopting and fostering **interdisciplinary systems thinking and behaviours** including those that focus on interlinkages, coherence, correlations and dependencies across and between systems.
7. Identification and understanding of gaps in current approaches to **manage uncertainty** in complex systems contexts.

Organisational design and development

8. Identification of **funding models and resources** currently in use for large scale, collaborative network initiatives.
9. Identification and understanding of leading practices for **governance and organisational design/ structure** for large scale, collaborative network initiatives.
10. Identification and understanding of leading practices and potentially relevant **IT systems, platforms, communication approaches and interfaces**.

1.3.2.2 Fostering systems thinking: understanding and modelling risk creation Working Group

With exposure and losses continuing to rise faster than vulnerability decreases, it is important for GRAF to explore the opportunities for nurturing systems-based thinking and approaches to enhance understanding and modelling of risk creation, and solutions.

The Expert Group recommends the establishment of a Working Group to help the Systems Pathway ensure systems-approaches are incorporated into the GRAF. This Working Group will explore establishing projects to better understand:

- i. The level of **understanding and competence** in systems thinking and systems-based approaches to understanding and managing risk, particularly considering the challenges and opportunities inherent in the wider scope of hazards and risks as represented in the Sendai Framework (including in Paragraph 15). Projects will explore methods to better understand hazards and risks (including probabilistic modelling, expert opinion, bow-tie analysis and more) as well as the development of approaches to incorporating them into the GRAF outputs.
- ii. The basis of decision making which does not incorporate systems thinking - and which leads to increasing risk creation, including exploration of the incentives and information typologies used by different types of decision makers and the nature of silos and barriers to interdisciplinarity.
- iii. The opportunities for alignment and synergies across the 2030 Agenda, the Paris Agreement, the New Urban Agenda and the Sendai Framework by fostering systems thinking paradigms

- iv. The drivers of risk creation (societal, ecological, financial and political).
- v. **Systemic risk and transition risks**, potentially using the global financial crisis of 2008 as an exemplar to understand gaps in the current processes and approaches to identifying systemic risk.
- vi. The opportunities for systemic innovation, including developing the positive impacts of fostering interdisciplinary systems thinking.

1.3.2.3 Demonstrators and pilot projects Working Group

Establishing a Working Group to identify and initiate practical demonstration projects of the GRAF principles and objectives is important in building trust and confidence in the potential of the GRAF in the lead up to the Global Platform in May 2019. These demonstrators will serve as both proofs of concept and examples of the component structures of the eventual GRAF that the framework aims to systematise and make more concrete.

An early demonstration case study project has been proposed by several members of the 1st Expert Group meeting, as detailed below. The 2nd Expert Group meeting in November 2018 will consider other proposals and determine the need and interest for additional demonstration projects in conjunction with this Working Group.

Proposed case study: the GRAF Risk Index (Q3 2018 – Q2 2019)

This project aims to broker and connect the combined efforts of a range of pre-eminent organisations to build a new global and regional risk index (the GRAF Risk Index) based on a modification to a proven composite indicator methodology. The risk index will assign a risk score to all countries between 0 and 10 based on their hazards, vulnerability and coping capacity. The pilot will start from the INFORM Index for Risk Management⁵ - a well-established risk index - and modify it to make it fit-for-purpose for Sendai Framework monitoring, according to the GRAF principles and with GRAF added value.

1.3.2.4 Communication and organisational design Working Group

Communication of risk information for better decisions

Communication and dialogue is an integral component of effective engagement with decision makers. However, increasing the sophistication and availability of risk information, even in the context of a better understanding of the needs of decision makers, will not support the achievement of the GRAF vision and goal without a new approach to communicating risk. Communication must go beyond providing information to addressing the other barriers to decision-making and action such as risk perceptions, norms and self- and collective-efficacy. The GRAF aims to provide actionable insights and reduce the information load on decision makers. This will require a move from numbers to stories, scenarios, and other strategies that enable users to conduct their own "what if" analysis.

This Working Group will bring together the multiple dimensions of communication, and dialogue between scientists and technicians with decision makers, to facilitate the widest possible engagement with the GRAF through subsequent phases of activity. It will explore and develop ways to help decision makers to understand their risk, and to take appropriate action, including:

- Involving decision makers in the production of risk models, data, and information.
- Giving decision makers tools to experience and play with, so that they can run “what if” scenarios themselves and build their capacity to manage risk by ‘understanding through doing’.

⁵ <http://www.inform-index.org/>

- Creating risk dialogues between experts and decision makers, the process of which can help producers of risk information better understand end-user or decision-maker needs
- Communicating examples of success stories (and failures) of action based on risk information.

This Working Group will also build capacity in understanding what risk information can be used for what decision, and the range of decisions that are advisable given the uncertainty in future trends (e.g. trajectories of climate change) and our ability to model them.

Organisational design

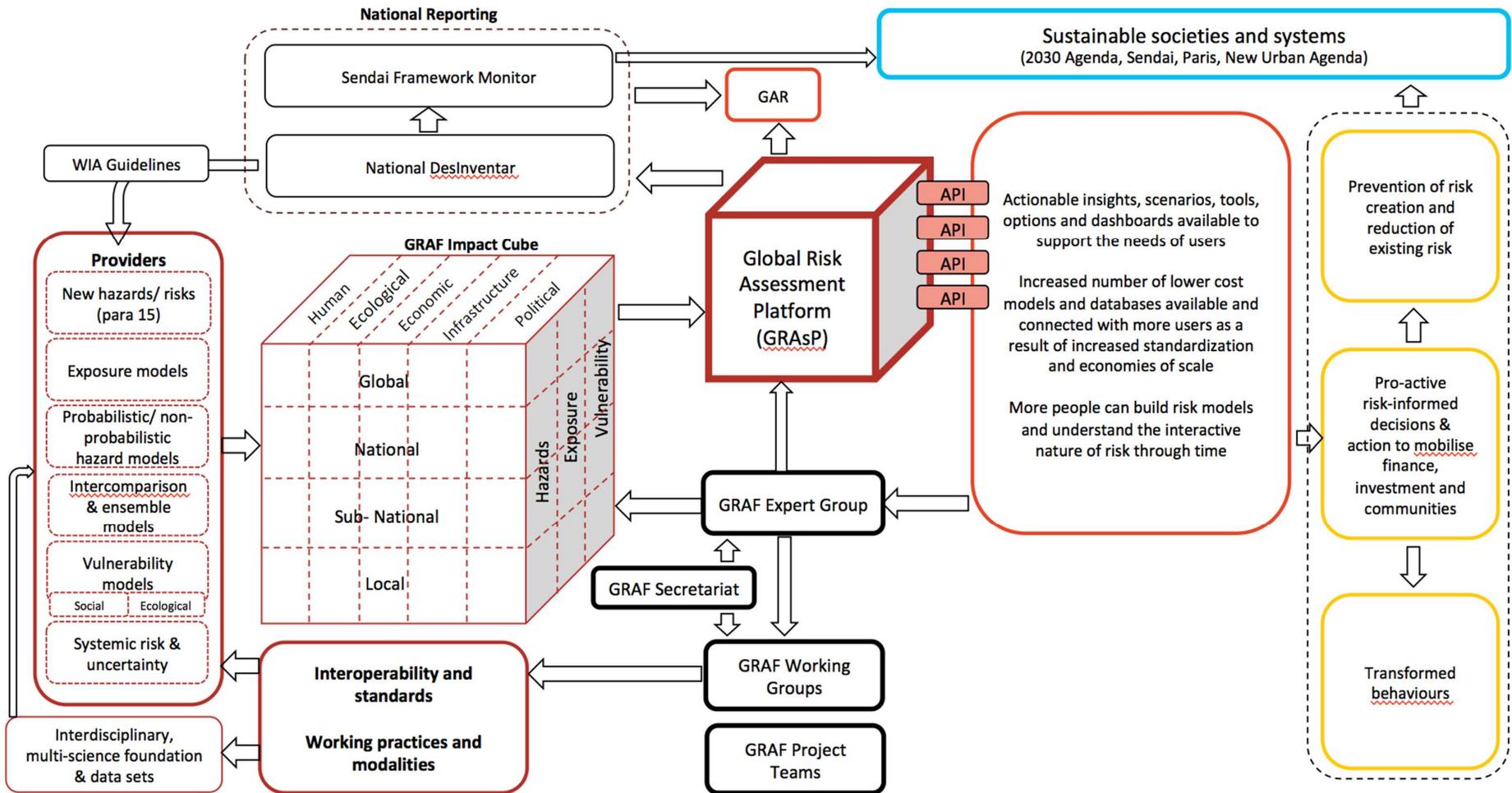
This Working Group will also focus on the development of the **GRAF Operating Model**, potentially including developing:

- The **communications strategy and activities** for GRAF, including the various digital and print channels to communicate GRAF project activity, key meetings and events and other relevant information necessary for advocacy, building a broader understanding of what GRAF is, engagement and outreach
- The **funding and resource mobilisation approach** for GRAF in the context of the known Working Group and Project activities and developing capacity for future activities
- The **GRAF IT Collaboration platform**, including summarizing the understanding of GRAF expectations, challenges and requirements for the supporting IT platform and depicting an approach and methodology to identify relevant technology options and definition of a high-level solution design in terms of the overall Operating Model.

1.3.3 GRAF Schematic

The GRAF Secretariat has developed a provisional multi-dimensional schematic of GRAF activities (below) includes the interaction of the GRAF with decision makers, the governance structure, the ultimate impact - sustainable societies and systems. Central to this is the GRAF Impact Cube, a 3-dimensional representation of the matrix of dimensions that GRAF will cover including: the range of scales (global, national, sub-national and local), the five impact dimensions (human/ societal, ecological/ environmental, economic/ financial, infrastructure/ physical and political), and the dimensions of risk (hazards, exposure and vulnerability).

Draft schematic of the possible Global Risk Assessment Framework

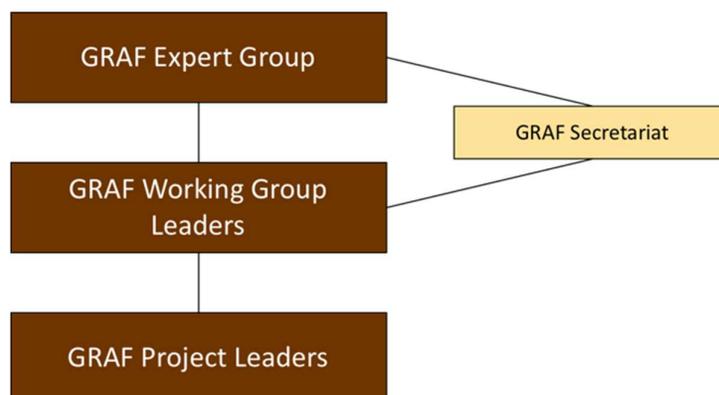


2.0 GRAF governance and management

Two principles guide the governance and management structure of the GRAF:

1. Governance structure should facilitate and not impede collaboration
 - a. A lean and flat structure with a coordination layer that ensures better collaboration between all GRAF contributors
2. Empower GRAF contributors to achieve the objectives with requisite oversight but minimal intervention
 - a. Accountability for GRAF activity, outputs and objectives is allocated to the relevant level and type of GRAF contributor
 - b. A robust but simple reporting framework to facilitate oversight and intervention on an exceptions basis

Summary Governance and Management Structure⁶



2.1 Expert Group

The initial remit of the Expert Group is to provide guidance and direction in the co-design and collaborative development of the GRAF, including strategic, technical, functional and operational aspects.

The Expert Group will guide the co-creation and development of the GRAF Implementation Roadmap, including the establishment, definition and possible composition of GRAF Working Groups required to support the co-design and development process and the execution of the GRAF Delivery Plan.

The 1st meeting of the Expert Group was convened by Mami Mizutori, the Special Representative of the Secretary-General for Disaster Risk Reduction in June 2018. The Expert Group will meet twice a year in April/ May and October/ November (consistent with cycles for Global Platforms for Disaster Risk Reduction and the UN General Assembly). Members of the initial Expert Group were selected from the responses to a call for Expressions of Interest and are expected to be in position until the 4th meeting of the Group in November 2019, a period of approximately 18 months - equivalent to the co-design and initial development phases of the GRAF – whereupon they may be considered for reselection. During this initial tenure it is expected that the Expert Group will consider future governance requirements.

All subsequent terms for Expert Group members will be for a period of two (2) years commencing in November. The short term is to build in flexibility and ensure that the appropriate blend of experts can contribute to each stage of the design and implementation of the GRAF between 2019 and 2029, which will by the nature of the tasks and challenges at each stage require a diverse range of skills and experience.

⁶ Refer to Annex 4 for more comprehensive Governance and Management Structure diagram

It is intended that Expert Group members will be in position for approximately 18 months prior to each of the Global Platforms, and 6 months post, to ensure that they have:

- Adequate time to contribute to specific design and implementation elements of the GRAF to be released at respective biennial Global Platform and annual HLPF events, and
- A period of consolidation and review prior to the change of composition approximately 6 months after the Global Platform.

Further details in relation to the Expert Group are included in Annex 1.

2.2 Working Groups and Working Group Leaders

The Expert Group is mandated to establish Working Groups (as described in section 1.3.2) to address, leverage and stimulate activity in key areas at each stage of the co-design and development process of the GRAF. These are expected to cover a wide range of topics which may require only short-term project activity (for example, Mapping and Gap Analysis or a demonstrator) or to be established to explore complex, longer-term challenges (for example, drivers of systemic risk). This will necessitate different life cycles of Working Groups; some will be very short-term, yet others may operate through to 2029. In membership is likely to change over time depending on needs as defined in updates to the Terms of Reference for the Working Group – the definition of which rests with the Working Group

Each Working Group, with approval of the TOR from the Expert Group, will have a call for expressions of interest for membership; once members have been selected, a Working Group Leader will be appointed. The Working Group will meet on a recurring basis (in person and/ or virtually) with a frequency commensurate with the nature and needs of the group.

The Working Groups will identify, support, elaborate, and execute GRAF projects in alignment with overall GRAF vision, objectives and principles. Transparent selection of these (existing and new) against established, publicly communicated, criteria may be supported by a Project Steering Group.

Working Group Leaders will be expected to oversee the projects relevant to their Working Group and, with the GRAF Secretariat, support the Project Leader and Project Team, as required, by:

- Supporting the Project Leader in creating a Project Steering Group (see Annex 4)
- Supporting the Project Leader by informing them about relevant leading practices, learning from other previous projects, use of approved templates, etc.
- Periodically reviewing project progress
- Directly supporting project delivery, if requested by the Project Leader
- Taking note of the Project Close Report documentation and transmitting it for future GRAF projects to the GRAF Secretariat

2.3 Project Leaders

Once a project has been selected, the Project Leader is tasked with constituting a Project Team to be communicated to the GRAF Secretariat and the relevant Working Group Leader. The Project Leader is responsible for drafting and managing the project in line with the Project Plan, this includes:

- Project objectives and scope
- Benefits and performance measures
- Project approach
- Project task plan
- Project organisation and resource plan
- Assumptions and dependencies
- Stakeholder engagement and communication
- Project controls – QA, version control & change control

The Project Leader is also responsible for:

- Proposing the composition of the Project Steering Group, which will govern the project and issuing progress reports to the relevant Working Group Leader and to the GRAF Secretariat
- Completing the Project Close Report highlighting achievements, deviations in scope, performance metrics, and key lessons for future GRAF projects

The Project Steering Group will maintain the Project Risk and Issues Register that will document all risks to project delivery, an assessment of their impact and probability of occurrence and the mitigation strategy in place. It will also document all issues that happened in the project, an assessment of their impact and how they were addressed/ remediated. It is anticipated that all project documents will be established as forms and templates accessible on the GRAF IT Collaboration Platform.

2.4 GRAF Secretariat

UNISDR will host the GRAF Secretariat and perform an executive management and coordination role across all activities through the GRAF co-design and development phases. The key role of the GRAF Secretariat is to facilitate a cultural change in encouraging multi-partnership ownership of evolving risk assessment methodologies – maintaining a shared, trusted, space for multiple partners, rather than owning the GRAF.

The Secretariat will, to the greatest extent possible, act as a trusted broker to leverage existing efforts. It will also deliver administrative and operational functions to support the activities of the Expert Group, including facilitating the collaborative working environment, supporting Working Groups activities, effective implementation and execution of projects, taking responsibility for communication with the UNISDR Support Group, the Senior Leadership Group on Disaster Risk Reduction (SLG on DRR) and the Executive Office of the Secretary-General.

A review of the hosting arrangements of the GRAF Secretariat could be anticipated at the mid-point of the Implementation Roadmap 2019 – 2029. The key functions of the GRAF Secretariat include:

- GRAF coordination
- Communications
- Funding and resource mobilisation
- IT management
- Science and technology support

The GRAF Secretariat will welcome secondments of personnel from partner organisations in-kind contributions and funding support to enable the appropriate resources to be available. The Expert Group estimated resource costs for the GRAF Secretariat to be in the range of USD 1 - 1.5 million per annum. The Expert Group has recommended that the required resources be dedicated to the GRAF Secretariat by the time of the Global Platform 2019.

This is to be explored further by both the GRAF Secretariat in reinforcing its capacity and by the Operational Design Working Group in securing strategic resources to enable the operationalization of key functions of the GRAF.

2.5 Reporting framework

In line with the governance and management principles there should be a robust but simple reporting framework to facilitate oversight and intervention on an exception basis; the following are proposed as the minimum reporting requirements:

- **GRAF Expert Group Meeting reports**
 - Bi-annual (April/ May and October/ November)
 - Responsibility of the GRAF Secretariat with input from the Expert Group
- **GRAF Annual Update**
 - Annual (May)
 - Responsibility of the GRAF Secretariat with input from the Working Group Leaders and Expert Group:
 - *A 2-3 page document to form part of UNISDR's Annual Report – to include in reporting for the biennial Global Platform and the annual High Level Political Forum*
 - *The report will highlight key GRAF achievements and each of the Working Groups over the past year including any significant challenges/opportunities*
 - *Plan of action proposed for the next phase (1 to 3 years)*
 - *Funds spent and expenditure forecasted*
- **Working Group progress reports**
 - Bi-annual (April and October)
 - Responsibility of Working Group Leaders with input from GRAF Secretariat and Project Leaders as required:
 - *A one-page spreadsheet reporting tool which serves as a snapshot of the status of all projects in each of the Working Groups*
 - *The report will form the basis of discussion during the bi-annual GRAF Expert Group meetings*
- **Project progress reports**
 - Periodic with content to be based on the Project Plan
 - Responsibility of the Project Leader with input from the Project Steering Group and Project Team:
 - *A 1-page spreadsheet reporting tool which serves as a snapshot of the status, activities completed, activities forecasted, outcomes and impacts, and major risks and the mitigation strategy*
 - *The report will form the basis of discussion during Working Group meetings*

All reports to be converted into forms and templates with the GRAF IT Collaboration platform.

2.6 Building the collaboration by informal and formal processes

A critical early phase of activity in developing the governance and management of the GRAF will be the use of informal processes and new partners to lay the foundation for future developments through extensive iterative engagement and discussion with relevant stakeholders (across the Stakeholder Groups - see Annex 2) to gather support and feedback, and advance.

This to be explored in more detail in the Operating Model.

3.0 GRAF Timeline

The following timeline sets out the timing of activities - to be undertaken by: UNISDR, in the role of GRAF Secretariat; the GRAF Expert Group; and supporting experts – needed to ensure that appropriate co-design and development and initial project activity has been completed, and that endorsement and support from key stakeholder groups has been secured, by the time of the launch of GRAF at the Global Platform in May 2019.

20-21.11.2017 Expert Meeting on the *Global Risk Assessment Framework in support of the Sendai Framework for Disaster Risk Reduction 2015-2030, the 2030 Agenda for Sustainable Development, and the Paris Agreement* – report distributed on 28.03.2018

16-17.04.2018 1st preparatory meeting for the GRAF Expert Group, Geneva

14-18.05.2018 2nd preparatory meeting for the GRAF Expert Group at the World Bank Understanding Risk Forum 2018 (UR2018), Mexico City

Including two consultation meetings:

14.05.2018 1630-1800

Risk Information needs from the end user perspective – concept-testing the Global Risk Assessment Framework in support of the implementation of the Sendai Framework and related SDG targets (formal side-session in UR2018, 40+ participants)

16.05.2018 0830-1230

Preparatory Consultation Meeting on the Global Risk Assessment Framework (external session at Hotel Le Méridien, 45 participants) including discussion groups providing input on 5 key areas for co-design and development:

1. Users: user-centric design and development (user perspectives, user groups and risk communication)
2. Providers: data, models and model outputs, assessment, exposure, vulnerability, impact / consequence analysis
3. Interoperability and standards
4. Organisation and working modalities: Working groups, IT and information systems
5. Initial priorities and phasing

25.05.2018 3rd preparatory meeting for the GRAF Expert Group, Geneva

31.05.2018 GRAF Concept Note FOD completed and distributed to GRAF Expert Group

13-14.06.2018 1st meeting of the GRAF Expert Group, Geneva

31.07.2018 GRAF Concept Note with Delivery Plan to be finalized following approval from GRAF Expert Group

06-11.2018 Broadcasting and consultation on co-design and development of the GRAF with UNISDR regional offices and programmes, including invitation to contribute additional user profiles and identification of potential Working Group members

08-10.2018 Establishment of initial Working Groups

08-09.11.2018 2nd GRAF Expert Group meeting, Geneva

Provisional agenda:

1. Review of activities and initial tangible deliverables against the GRAF Delivery Plan
2. Stocktake of the establishment and progress of the Working Groups
3. Agreement on action plan through to Global Platform May 2019
4. GRAF communications
5. Review of updated draft GRAF Implementation Roadmap

04.2019 3rd GRAF Expert Group meeting, TBC

Provisional agenda:

1. Review of activities and delivery of identified priority activities and outcomes against the GRAF Delivery Plan, including progress assessment of action plan to establish the GRAF by Global Platform
2. Stocktake of the progress of the Working Groups and consideration of establishment of additional Working Groups post-launch
3. Agreement on GRAF Implementation Roadmap to be presented at the Global Platform (and High Level Political Forum)
4. Choreography of GRAF launch at Global Platform

05.2019 GRAF Global Launch, Global Platform on Disaster Risk Reduction, Geneva

Annex 1: Expert Group

Expert Group Selection Criteria

The following criteria are used for the selection of the Expert Group to the greatest extent possible:

- Technical and operational relevance to the design and development of the GRAF
- Updated and scientifically sound experience and topic excellence, in the following disciplines:
 - Risk/ hazard modelling
 - Exposure
 - Vulnerability
 - Natural hazards
 - Environmental risks
 - Technological risks
 - Biological risks
 - Human-induced risks
 - Risk communication
 - Disaster-related statistics
 - Uncertainty understanding, management and communication
 - Organisational development
 - Work on the SDGs, Paris Agreement or the New Urban Agenda
- Global geographic experience:
 - County of origin
 - Geographic area of focus
 - Africa
 - Americas
 - Arab States
 - Asia-Pacific
 - Europe
 - Global
- Representation of major stakeholder groups:
 - International organizations
 - National governments and institutions
 - Regional and local authorities
 - Science and research
 - Private sector
 - Civil society
 - Youth
- Gender balance

The UN places no restrictions on the eligibility of men and women to participate in any capacity and under conditions of equality in its principal and subsidiary organs.

Annex 2: Stakeholder focus

There are seven (7) major groups of stakeholders that have been initially identified for the design, development and implementation of the GRAF:

1. **UN system**, with a focus on establishing a process whereby they work together to identify regional risks and emerging threats, and to develop regional prevention strategies, focusing on transboundary issues and cross-country issues.
2. **International organisations**
3. **National institutions**, relevant parties at National scale.
4. **Local authorities**, with a focus on engaging with aggregators of mayors and relevant city authorities including traditional leaders.
5. **Private sector**, with a focus on aggregations of insurance, investment and businesses operating in the private sector
6. **Civil society**, including women, youth, indigenous people, NGOs, workers and trade unions, farmers and faith communities
7. **Science and research**, with a focus on networks of science, including both physical and social science, with broad geographical representation and including transdisciplinary and interdisciplinary groupings

Several hypothetical user stories have been created to bring the collaborators and users across the major groups of stakeholders of the GRAF to life, these are included in Annex 3

Annex 3: User Stories

In designing the GRAF, it is important to acknowledge that all metrics are user-specific, user-dependent and must resonate with users' narratives. In meeting users' needs, they will need to evolve subject to the dynamic environment in which users operate. Sample user stories and perspectives have been drafted to inform the user-centric co-design process for the GRAF.

National governments and institutions

Government Chief Scientist.

Margareta and her team provide advice on science issues to the Government. These largely relate to hazardous events that may impact on population (internationally). The information she requires must be timely – usually delivered in hours to days, to stimulate appropriate response. Information usually focuses on the exploration of possible likely and 'worst-case' scenarios. Examples would be: the repercussions of a volcanic eruption on health, travel, the economy; the residual risks of future events following an earthquake – including the likelihood of secondary events – such as landslides; or the health and economic impacts of a pandemic disease. She requires the GRAF to allow multiple, inter-connected, risks to be assessed rapidly.

Warning system operator in developing country.

Lufti is a tsunami warning system operator in a developing country that is dominated by islands with high earthquake and tsunami risks. Tsunami warning is problematic because the warning time for tsunamis may be as little as 5 minutes. In many cases it is not possible to evacuate local populations in time, and most buildings and infrastructure are highly vulnerable. The warning system receives some data from a national seismic system but must rely on earthquake locations coming from international sources. Some limited amount of tsunami inundation analysis has been done, but it is very crude, so the uncertainties in scenario planning are large. Emergency communications are made via mobile phone, radio or TV. Some warning exercises have been conducted, but only sporadically and with limited success. How can GRAF enable Lufti to provide reliable warnings and to save lives? Where should the warning system invest to reduce loss of life? Are there other ways to reduce risk that should be considered to complement the warning system? How can the community gauge the benefit of a better warning system versus changes in land use?

Financial regulator.

Hans is a hard-working regulator based in Bonn and has been trying to get an under resourced team to be able to give value to his jobs team of evaluating the risk management procedures of the Insurance Industry. Currently they are using what are often called "black box models" which are very complex and hard to understand. Hans hopes that GRAF will be a base for open models that will give a greater insight into the complexity of so called catastrophe models. He is also aware that many in the Insurance industry don't have models available for some parts of the world and hopes that this new initiative will be able to fill some of these gaps. He does think that this will be tough as the organisations he meets are already complaining of the amount of work to meet the existing regulation and hopes that whatever is done is consistent to merging standards of data, schemes and technology. In the meantime, Hans realises that he and the team will have to work late again to meet all the deadlines.

Development agency-backed ILS cat-Bond.

Aakriti is responsible for designing a new World Bank backed parametric based 3-year catastrophe bond against flooding in her country to protect the poorest section of the population against losses to their property and livelihoods from the apparently increasing number of river and flash floods. She needs to decide how much the losses will potentially be from future floods in the next 1-3 years at various probabilities and return periods, what level of risk to protect against (e.g. 1 in 5, 1 in 20 or 1 in 100) and the limit, and access to high-resolution real-time data on which to trigger pay-outs.

Regional and local authorities

Mayor of well-resourced and well-connected city.

Juan has a Chief Resilience Officer and has signed on to the various City Agreements in support of the SDGs, so he support GRAF efforts. His team tells him that he has good data on environmental conditions and city infrastructure investments. He is afraid that risks reflecting his region/nation will need data covering areas other than what is under his control, but the city consultants have developed data sets that are "proprietary" and his staff tell him that he needs to spend more money to be able to compare. Is this true? Can GRAF help? What should he change to avoid this problem in the future?

Mayor of under-resourced city.

Maria is mayor of a city which has just experienced a massive flood and many neighbourhoods were affected. Everything in city hall is gone. She needs to establish new plans and help her residents rebuild in safer places. Can GRAF help? When? She requires resources. It is needed to rebuild the city infrastructure and new ways to plan.

Local Government technical advisor.

Mohammed requires a picture of risks that may affect his municipality over a 30-year period to inform decisions about investments he makes for taxpayers. He does not have easy access to science or data, or specialist technical equipment, but wants to understand the relative risks related to hazards that operate over widely varying timescales (e.g. annual minor flooding to large-scale earthquakes). He needs to understand how these will change in time (e.g. with climate change, with economic growth and with population expansion). He wants the GRAF to provide him with tools that allow him to demonstrate to his superiors as well as to residents why the analysis he undertakes is sound, and that the decisions they make on this basis are 'optimal'.

Urban planner.

Julio is an urban planner in a large city in South America. The city is growing rapidly, but the city is not able to keep up with the demand for services nor assure compliance with regulation. Risks from disasters (mainly flood, earthquake, landslide) are increasing, as 70% of new construction is informal and located in places of relatively high hazard (e.g. on unstable soils, in flood plains). The city has invested funds into retrofitting some critical infrastructure to mitigate risks and to develop a master plan for future infrastructure growth. They have census data that provides some information about buildings, and they have an asset database for critical infrastructure, but very little is known about the typology of buildings or their vulnerability, their distribution, or replacement costs. Julio wants to know how the city can optimize the investment in improving critical infrastructure to improve day-to-day performance, how to maintain the infrastructure over time, how to reduce impacts from disasters for current urban infrastructure as well as the risks 20 years in the future, and how to have funds in place to recover from events that may occur. Julio would also like to know how much to invest in developing better control mechanisms such as building codes, and enforcement of code compliance. How can the GRAF help?

Private sector

Investor (Asset Manager).

White Asset managers want to know the economic impacts of climate change on the companies in which they invest. Their focus is on large multinational corporations, as well as on smaller companies who may be domiciled in a single country serving their domestic market or exporting their goods to other countries in the region or further abroad. They want to be able to compare companies and estimate what the future value of companies would be with and without the impact of climate change in the next 25 years. This way they can ascertain and compare how much of the value is at risk from climate change. They are interested in the impact of changes in extreme events as well as weather such as mean temperatures and extreme heat/cold. They want to know things like the impact of climate change on physical locations/facilities, production & export capabilities, operating/energy costs (e.g. cooling/heating) and factors such as workforce supply, and the economy of the country in which they are operating needs to be taken into consideration. They are aware that some companies may be more able to adapt to climate change than others and would like to know what mitigating impact this could have.

Insurer.

CCAT insurance company provides insurance for households and businesses against the risks of catastrophic loss from extreme events such as cyclones, floods, earthquakes in a low-income country. Only 4% of the population currently takes out insurance, and after a major cyclone/flood event two years ago, many people had to take out high-interest loans to re-open their businesses, and the government had to finance the rebuilding of 10,000s properties, a process which is still underway. There is now support from multilateral development agencies to increase insurance penetration against climate-related risks in the country. However, previous claims have been much larger than expected and one of the other 8 insurance companies in the country went out of business. CCAT wants to understand what its potential losses might be from its growing portfolio, what level of risk they can afford to take on and at what price, what perils they will cover, and how much reinsurance they need to purchase to remain solvent in a worst-case scenario.

SVP Overseas Business Development for a major Japanese multi-national corporation,

Sato is responsible for major investment decisions in relation to where to locate the next manufacturing plant for the corporation robotics division which is expected to be in operational production for at least 10 to 15 years. Key considerations are low cost land, availability of highly skilled labour and an ability to secure Japanese finance, all of which the corporation is very confident of achieving. He does not consider that the corporation needs further risk information as it purchases risk analyses from trusted Japanese service providers and any risk that is beyond standard risk-financing will always be covered by the Japanese Government.

How will GRAF be able to better inform his decisions in the context of his current situation and the current information sets that he already has access to? He is interested in understanding more about how global phenomena, such as changes in extreme precipitation events or access to water and even potential regional drought or desertification would affect both the corporation's specific asset locations as well as on the direct connections to its supply chain. He wants to understand what measures are in place by local authorities and the relevant national governments to mitigate risks and reduce any potential business interruption. Further, he needs to be able to confidently compare risk across very different locations and most importantly its ability to maintain access to both conventional risk-financing instruments and the support from the Government of Japan.

SME in the informal sector in Tanzania.

Winnie operates one of the busiest vegetable markets on the outskirts of Dar-es-Salaam. She has no reserves and at least 3-4 times every rainy season her entire stock gets wiped out and at least half a dozen more times each season most of her suppliers who are small farmers have their harvest wiped out. Many of her suppliers are now using something called "We Farm" that provides them with a bit more information.

Winnie works 7 days a week, 12-14 hours a day and relies on her family and the goodwill of her customers to support each other to manage through the bad times; she has no access to banks for loans or insurance companies.

She relies on local knowledge of the seasons but that seems to be getting less reliable as the years go by. Increasingly, Winnie tries to learn what she can from weather forecasts and news on crop forecasts on her most precious possession, her smart phone, and she is fortunate to have pretty good 3G access and so she does try to read as much as she can to plan – but there is just so much information. Winnie does not always know whom to trust and where to go to make sure she can have more reliable access to vegetables throughout the year.

How can the GRAF help her and the other small, vulnerable businesses in her city as they provide the food and basic services to most of the people who live in the outer areas of Dar?

Senegalese farmer growing groundnut.

Youssef is a groundnut farmer. His family income is dependent on selling his crop, and they are in the bottom 10% of income level of all farmers. His farm is approximately 1.5 acres. His groundnut yield varies on average by 30% year to year and in extreme years he can have complete loss in a catastrophic year or a bumper harvest of 120%+ of his previous year's yield. Catastrophe losses are caused by drought, flood and pests. Since 2005 he has had 3 complete losses of his harvest.

At the beginning of the growing season he wants to know what rainfall he will have and when, so that he can plan his planting properly.

If it is not enough he will delay planting until there is sufficient rainfall for his seeds to germinate. He also wants to know if there will be intense rainfall which will wash his seeds away or cause flooding/standing water once his crop is growing and established. For the rest of the growing season, he wants to know if it will be a drought year or a good year so he knows what seed to buy. There is a short-cycle seed available which germinates more quickly (and costs more), but if there is no rain in the germination period, it would be better to have the traditional slower growing variety.

Civil society

NGO worker in Somalia.

Ayaan has been working in Somalia for 6 months. Her main concern is dealing with the social impact of the extreme weather on agriculture and crop yields which have life and death implications. Most of the time the dry weather can produce severe lack of water to local crops. At other times the rains can be so severe that they and combined flood waters can devastate crops and damage housing. She has started working with local village elders to get some planning into the system and she knows that this knowledge must come from them. She believes that there is data available that may help with forecasts and wants to see some simple info that she thinks may be available from satellites. She realised that whatever data is available needs to be available on a mobile phone which is mostly the only way to get outside data. She is aware that droughts usually occur every two to three years in the *Dayr* and every eight to ten years in both the *Dayr* and the *Gu*. The locals say this is changing but she wants to find some reliable information that backs it up.

NGO in the remote hill communities of Nepal.

The NGO supports community-owned projects that build and run health posts and schools in villages away from road networks at around 3000 to 4000m elevation.

They have no mains electricity, no WIFI (only mobile data which is very expensive), no TV, no heating, no running water and no drinking water, almost no books etc. Some of the children walk up to 2 hours to get to school and it is very cold in the winter in the classrooms so sometimes they do not go. Doug (the head of the NGO) wants the communities running their projects to be able to understand the risks connected with their physical location and how they are changing compared to historical norms for the village. He wants them to choose locations and building design practices that keep buildings and people safe. For example, space for building a school might be very limited due to the need for a large flat area, but what design features can they incorporate to the site to protect against landslides and mudslides? They want to know about rainfall patterns so they can build water storage tanks for irrigation through the dry season. Each farmer has 2-3 fields of wheat and 2 or 3 cows or goats. They want to know how to build Earthquake-resilient structures with locally available materials. Because of the mission of the NGO, Doug wants the community to be able to access and understand this information themselves and take their own risk-informed decisions.

Science and research

Research Council scientist.

Sarah seeks areas of science that require the development of novel research that has a positive impact on society. She wants to understand where analysis or technical development of a problem (usually around processes, be it natural, or engineered (including technical) is required that can be undertaken and the problem 'solved' in about 3-5 years. Novelty is important; this is where her scientists gain most reward. Sarah needs to understand in the risk modelling world – and GRAF – where this is most likely to be found (less novel research is often delivered by consultants). In the GRAF she is interested in developing applications – probably around theoretical concepts that have the potential to have a meaningful impact on society.

Scientist.

Peter is a scientist leading a group on flood risk modelling, including a global flood model. He follows the work of other global flood modelling groups, and they have discussed that model intercomparison would help them all to improve their models, but they do not get around to it. Now the GRAF provides an ideal context for doing this, so it becomes interesting to participate in the intercomparison exercise. Not only will the work be useful, but it will provide visibility to the model and the scientists working on it (in a UN publication and in a peer reviewed publication). The GRAF Working Group on floods provided a detailed intercomparison protocol so that with minor tweaks to the output format the flood model can produce the necessary output quickly. Once the data is ready, he uploads it in the GRAF. This work helped Peter's reputation (and career) as a scientist, and he is willing to stay engaged with GRAF to improve the models further.

Scientist.

Daniela is a scientist involved in compiling scientific input for the National Risk Assessment of country X. She is struggling to demonstrate to her superiors that probabilistic risk maps provide a more objective and spatially explicit way of looking at risk compared to an expert panel. She does not have the resources to develop such maps. Daniela uses the AAL from the global models in GRAF. Following GRAF guidelines for national risk assessment, she combines this with an old dataset on hazard "G" from a university, to create a rough picture of the risk in her country, enough to convince her government to invest in a national probabilistic model for hazard "H" (contracted to a university). When the model is ready, she would like to feed it back into the GRAF to replace the global data of lower quality. It is an in-kind contribution from Country "X" to the GRAF. Daniela still relies on GRAF data for transboundary risk of hazard "Q", and she is also keenly following GRAF's work on systemic risk and emerging risks. Who knows if this will become important in her country too? Maybe she can convince her bosses to invest in a new national model for emerging risk "E"?

International organisations

UN Resident Coordinator.

Elliot is a resident coordinator. He hopes the GRAF will improve the availability and usefulness of information on risk. First, he would like it to provide a shared evidence base of risk which he can use in his discussions with government counterparts and partners. Having this shared evidence base will help the UN align its activities to manage risk. Second, he would like it to help him as a service provider. Having access to an already curated and reliable set of risk information will help UN organisations undertake analysis that can support their joint work and inform the UN Development Assistance Framework. Last, he would like GRAF to provide a series of basic risk information products that can be used in all countries, even with low capacities, so that they are credible and are presented in such a way as to be easily-understandable for decision-makers; particularly with disaggregated data that would allow him to accurately and promptly link to development and sustainable development initiatives.

Annex 4: Governance and Management Structure

This is an example of the functioning of Project Steering Groups for the GRAF in the case where there are three Working Groups established, each with a Working Group Leader reporting back into the Expert Group. In this example, Working Group 1 has initiated two projects, each of which has a Project Steering Group. The Project Steering Group for Project 1.1 is comprised of the Working Group 1 Leader and the Project 1.1 Leader, and potentially members of the Project 1.1 Team. Project 1.2 has a similar Project Steering Group structure with the Working Group 1 Leader and the Project 1.2 Leader. Working Group 2 has initiated one project in this example (Project 2.1) and has denied one proposed project (Project 2.2), the Project Steering Group for Project 2.1 is similar in structure to Projects 1.1 and 1.2.

Working Group 3 has also established one project, however, for the Project Steering Group, due to the nature of Project 3.1, it was determined that it is appropriate for the Working Group 3 Leader, the Project 3.1 Leader and the GRAF Secretariat participate. This example structure illustrates a small number of the variations that are possible within the flexible Governance and Management structure that is explained in the Concept Note in Section 2.0

