REPORT

Global Risk Modelling Alliance

GRMA Programme in Malawi
Scoping Report

Table of Contents

1. List of Acronyms

Acronym	Definition
AA/EWS	Anticipatory Action / Early Warning Systems
AAL	Average Annual Loss
ARC Ltd	African Risk Capacity Limited
BGS	British Geological Survey
CAT DDO	Catastrophe Draw Down Option
CDRFI	Climate and Disaster Risk Finance and Insurance
CDRF	Climate and Disaster Risk Finance
CiSoNeCC	Civil Society Network on Climate Change
CIMA	Centro Internazionale in Monitoraggio Ambientale
CPI	Consumer Price Index
CRA	Climate Risk Assessment
DCCMS	Department of Climate Change and Meteorological Services
DoDMA	Department of Disaster Management Affairs
DRM	Disaster Risk Management
DRF	Disaster Risk Financing
DRMIS	Disaster Risk Management Information System
DTM	Digital Terrain Model
EAD	Environmental Affairs Department
EARS	East African Rift System
EGENCO	Electricity Generation Company Malawi Limited
EP&D	Economic Planning and Development
ESCOM	Electricity Supply Corporation of Malawi
FAO	Food and Agriculture Organization of the United Nations
FCDO	Foreign, Commonwealth & Development Office
GDP	Gross Domestic Product
GEM	Global Earthquake Model Foundation
GEF	Global Environment Facility
GCA	Global Center on Adaptation
GCF	Green Climate Fund
GFDRR	Global Facility for Disaster Reduction and Recovery
GRMA	Global Risk Modelling Alliance
GS	Global Shield
IBISA	Inclusive Business in Sustainable Agriculture
IDF	Insurance Development Forum
INFORM	Index for Risk Management
IPCC	Intergovernmental Panel on Climate Change
IFRM	Integrated Flood Risk Management
JBA	JBA Risk Management Limited
KABOM	Kamuzu Barrage Operation Model
KfW	Kreditanstalt für Wiederaufbau
MAGIC	Malawi Geographic Information Council
MASDAP	Malawi Spatial Data Platform
MoA	Ministry of Agriculture
MoFEA	Ministry of Finance and Economic Affairs
MoUs	Memoranda of Understanding
MSMEs	Micro, Small, and Medium Enterprises
MUBAS	Malawi University of Business and Applied Sciences

MUST	Malawi University of Science and Technology
NCCMP	National Climate Change Management Policy
NDCs	Nationally Determined Contributions
NMHRA	National Multi-Hazard Risk Atlas
NSCES	Ndata School of Climate and Earth Sciences
NSDC	National Spatial Data Center
NSDI	National Spatial Data Infrastructure
NSO	National Statistics Office
ODSS	Operational Decision Support System
PWP	Public Works Programme
RBM	Reserve Bank of Malawi
REPAIR	Regional Platform for Risk Financing Instruments
REPRESA	Resilience and Preparedness to Tropical Cyclones Across Southern Africa
RP50	Return Period 50 years
SSRLP	Shock-Sensitive Social Protection Programme
TA	Technical Assistance
TWG	Technical Working Group
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
	The Vulnerable Twenty Group of Ministers of Finance of the Climate
V20	Vulnerable Forum
WB	World Bank
ZEP-RE	PTA Reinsurance Company

2. Context

This report describes the basis of GRMA support to Malawi, and outlines the activities and outcomes of the first country workshop. This includes key themes that have emerged that will shape the focus of the GRMA's risk modelling work, as consultations with local stakeholders progress.

2.1. The Global Risk Modelling Alliance

The Global Risk Modelling Alliance (GRMA) results from a strategic agreement between the Vulnerable Twenty Group (V20) Group of Ministers of Finance and the cross-sector Insurance Development Forum (IDF). Funded by the German government through KfW, hosted at Frankfurt School of Finance & Management and supported by the international insurance sector, the GRMA offers countries open data, technology, and practical learning through co-development of risk management strategies and applied risk finance projects, its purpose is to strengthen climate and disaster risk insight, support strategic decision-making and help unlock risk finance for public good. Working side by side with officials and local experts in ministries and their agencies, it offers open risk management tools, technical assistance (TA) and funding for open models and data. Funded by the German government and supported by the international insurance industry, the GRMA offers countries open data, technology, and practical learning through co-development of risk management strategies and applied risk finance projects. It aims to strengthen local capacities in risk understanding and support the establishment of open-source risk modelling platforms. The GRMA programme is a significant contribution to the Vision 2025 of the InsuResilience Global Partnership, which aims to catalyse financial protection for 500 million vulnerable people by 2025.

Furthermore, the GRMA has been selected as a key resource for the Global Shield Initiative (GS), particularly during initial in-country climate risk assessments and subsequent capability development. The GS, launched at COP27, is an initiative launched by the G7 in partnership with the V20 Group of Finance Ministers for pre- arranged financial support designed to be deployed during climate disasters. It aims to increase protection for poor and vulnerable people by substantially enhancing pre-arranged finance, insurance and social protection mechanisms against disasters which will help to minimise losses and damages exacerbated by climate change, an efficient manner.

The objectives of the GRMA program include:

1. Strengthen long-term local capacities in risk understanding.

2. Co-develop clear (sub-)national risk priorities for application of risk analytics to disaster risk reduction, adaptation and Climate and Disaster Risk Finance and Insurance (CDRFI), as well as own (sub-) national climate and disaster risk management strategies.

3. Develop capacity on modelling techniques and data acquisition to enable sustainable access to open risk modelling data and tools through practical learning / experience.

2.2. Malawi request for GRMA support

The Department of Economic Planning and Development (EP&D), part of the Ministry of Finance and Economic Affairs (MoFEA) of Malawi, submitted an expression of interest (EoI) in GRMA support on May 12, 2025 (see Annex 1).

The letter outlines the opportunity that the GRMA programme presents for EP&D to enhance integration of climate and disaster risk modelling as part of the broader macroeconomic analysis, given its role in facilitating national macroeconomic analysis. It highlights how, facing increasing frequency and intensity of climate and disaster risks, specifically from floods, tropical cyclones, dry spells, pest and disease attacks, Malawi needs to better understand its current and future risks. This requires sustainable access to relevant models and tools, which allow for the development and continuous monitoring of (sub-)national strategies on climate and disaster risk management including risk reduction and risk finance measures. The letter also stressed that the GRMA programme will foster local capacities and provide access to sustainable tools necessary for autonomous assessment of risks related to climatic hazards and resulting socio-economic impacts.

The requested support by MoFEA is broadly centred around the following themes:

- Development of locally and practically relevant risk models, paying particular attention to jointly identified hazards that are not currently well modelled in country and have the greatest economic impact both over the short and longer terms.
- Enhancement of climate and disaster risk elements of MoFEA's macro-economic risk programme. Focus to be co-defined but could include integrating effects of climate disasters that are currently not modelled, development of sectoral approaches or integrating current and future trends such as climate and demographic conditions.
- Integrated with the above projects, capability development for the relevant stakeholders, such as the responsible implementing organisations and/or organisations who would use the outputs to inform climate and disaster resilience measures.

The GRMA kick-off workshop was held on July 2 in Salima, Malawi, on side of a series of meetings of the Disaster Risk Financing Technical Working Group. It was held back-to-back with a Global Shield meeting on July 1 which focused on finalising the Malawi's Global Shield Request for Proposal, in which risk analytics was identified by the technical working group (TWG) as a high-priority component.

2.3. Malawi context

I. Climate conditions and risk

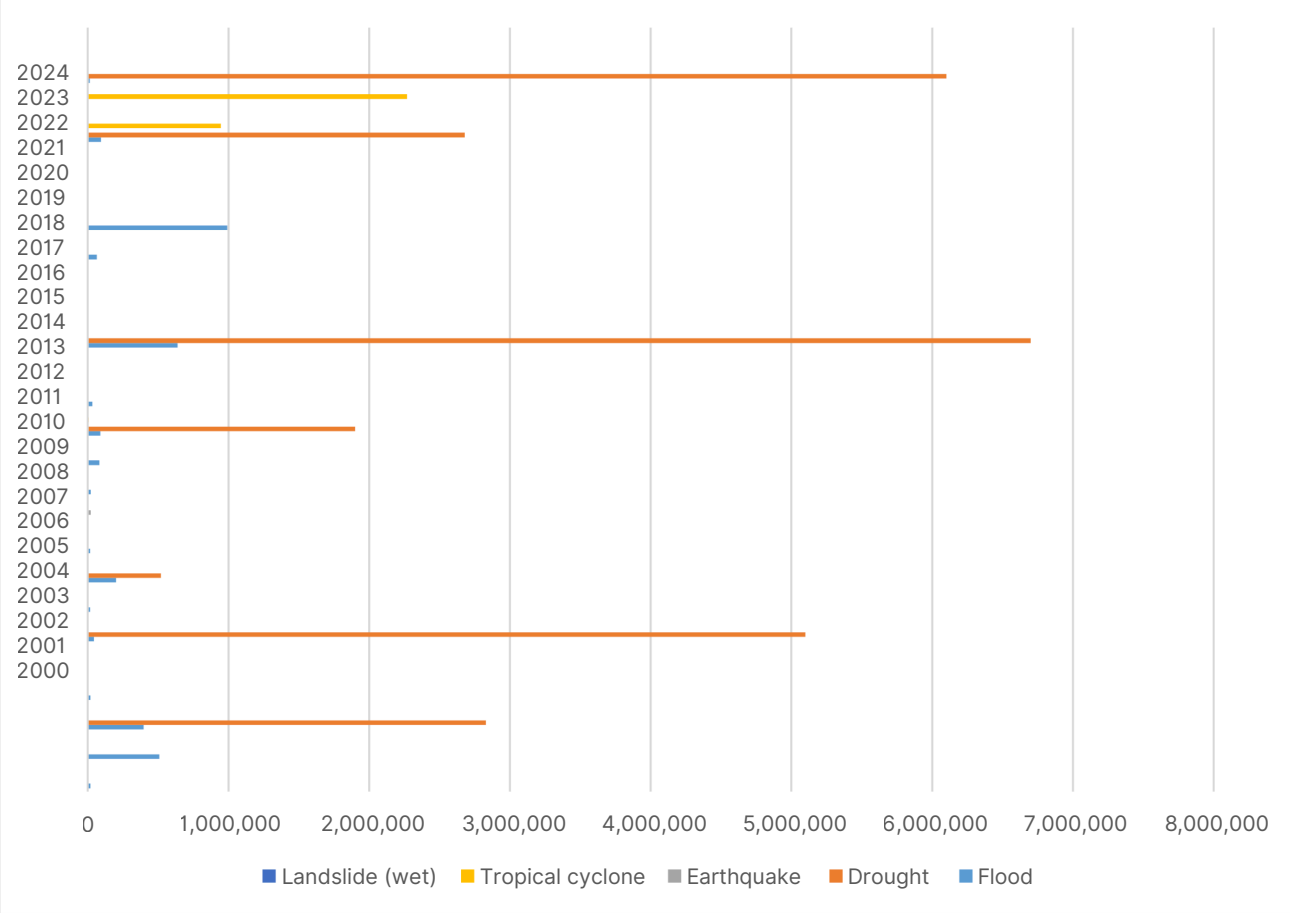
Malawi is highly prone to a range of natural hazards including droughts, intense rainfall and floods, tropical cyclones and earthquakes. Historically (see Figure 1) the most frequent and severe of these hazards have been droughts and floods (EM-DAT, 2024), and this is unlikely to change given climate change is expected to greatly increase the impact of these two perils in the future (World Bank Group, 2022).

The Inform index is commonly used to understand the general drivers of risk in a country and for comparison with similar countries in the region and globally. Malawi ranks 59 out of 191 on the Index (INFORM, 2024) and overall is rated as having medium risk with high vulnerability and low coping capacity. Indeed, the World Bank highlighted during the GRMA workshop that the poverty level stands at 70% of Malawian population. The Department of Disaster Management Affairs (DoDMA) further noted that cumulatively about 28.1 million people have been affected by disasters between 1990 and 2023 and that Malawi's vulnerability is largely driven by its dependence on agriculture, 85% of people are employed by the sector, and environmental degradation, especially in the southern region. According to the INFORM Index, the main drivers of natural catastrophe risk are drought, earthquake and river flood (rainfall-related flood is not accounted for by the Index).

Private sector presentations during the workshop further underlined that Malawi is highly vulnerable to river and flash flooding. Southern Malawi is regularly affected by tropical cyclones, bringing heavy rainfall and associated flooding. A common (as yet unconfirmed) observation from officials and local agencies is that tropical cyclones have become more severe and more frequent in recent years. Additionally, Malawi sits along the East African Rift System (EARS), particularly around Lake Malawi. Recent moderate earthquakes have been damaging and future repeats would likely have greater impact due to significant population and urban growth.

These perils are confirmed as being the main risk drivers by historical impact data, available for the country through EM-DAT (EM-DAT 2024). From 2000 - 2024 Malawi has been impacted by 32 floods (15 riverine, 5 flash flood, and 12 unknown), 6 droughts, 4 tropical cyclones (the impact was from tropical cyclones related flooding rather than wind), 2 earthquakes and 1 rainfall-related landslide.

Figure 1: Number of people affected by natural hazards 2000-2024 (EMDAT, 2024)



Whilst floods happen most frequently droughts affect by far the greatest number of people. Nine of the top 10 events, in terms of population affected, were droughts. The only non-drought related event in the top 10 is Tropical Cyclone *Freddy* which struck the country in 2023 and is also recorded as the costliest ($ losses) event in Malawi's history (EM-DAT 2024). However, this may be due to the difficulty in accurately reporting financial losses from drought events and therefore this data often not being available within the historical database.

From a probabilistic perspective, regional/global risk models[1] provide further information for Malawi, though models diverge quite considerably due to the analysis being done at different points in time or different approaches. The CDRI risk assessment provides a combined Annual Average Loss (AAL) for Malawi of $37.7 million (earthquake – $18.7 million, flood - $19 million and landslide $0.038 million) with the World Bank (WB) report indicating that 1.7 million people (incl. drought) are expected to be impacted by an event each year. In a bad year that happens approximately once in a person's lifetime (RP50) the cost is expected to rise to $200 - $230 million (not accounting for landslide or drought losses).

Each year on average, it is expected that hydrological drought will cause the largest losses and impact the most people, with the AAL to agricultural income alone exceeding $60 million, approx. 1% of GDP (WB, 2015). In contrast flood losses are expected to range from $19 to $30 million (note that CDRI assessment is for all modelled sectors buildings, power, telecommunications, roads and railways, water and wastewater, oil and gas, ports and airports, whilst the WB assessment is only for buildings so the range would be expected to be even greater if they were comparable exposures) and impact approximately 100,000 people on average each year.

In terms of climate change, Malawi is highly vulnerable to a changing climate with changes in temperature and precipitation patterns expected to exacerbate the risk challenges that the country faces. Key challenges are food security, (Maize, the main staple crop, is one of the most vulnerable to climate change (IPCC 2014)), and power generation, both of which rely on the amount and timing of precipitation events. Malawi's export trade is also climate-vulnerable, with tobacco, coffee and sugar cane making up 90% of foreign income.

Over the past twenty years, a trend is emerging that shows rainfall patterns in Malawi are changing with fewer dry days and a shortened rainy season (Haghtalab et al, 2019). However, the country is also seeing more frequent and intense drought and flood events with impacts on the population going well beyond the direct impact to include indirect impacts such as food insecurity, reduced access to essential services (World Bank Climate Change Knowledge Portal) and rural out-migration (Lewin et al. (2012); Suckall et al. (2015)). The increase in events is likely to be one of the main causes for severe food insecurity in the population to have risen by 5% over the last 10 years with a similar change in the prevalence of undernourishment in the population (Food and Agriculture Organisation (FAO), 2023).

Whilst the impact of climate change on hydropower generation is somewhat uncertain due to the regulating effect of Lake Malawi, the overall macroeconomic impact, assuming no adaptation, is high. Estimates are that drought and flood events are already costing the economy 1.7% of its GDP every year (Pauw, K., et al, 2010.) and this is exacerbated in future scenarios. In the worst case, interestingly a SSP1-1.9 wet climate scenario, GDP losses hit a high of 19.5% below baseline in 2040 and then start to reduce. Much of these losses are driven by the changes in precipitation and direct damage from rainfall/flood events, in particular to the transport sector (World Bank Group, 2022)

[1] The World Bank's Country Disaster Risk Profile quantifies the risk for flood, earthquake, drought and landslide based on 2015 exposure that was developed for population, agriculture and building stock (GFDRR 2015); The Global Earthquake Model provides aseismic risk profile for the country using their global exposure and hazard models (GEM 2023); The Coalition for Disaster Resilient Infrastructure (CDRI) Global Infrastructure Resilience Index (GIRI) in 2024 quantified risk based on global exposure and hazard models for flood, earthquake and landslide (CDRI, 2023)

II. Institutional arrangements in disaster and climate risk

Locally, Malawi's institutional framework for Disaster Risk Management (DRM) is guided by the Disaster Risk Management Act of 2023, which replaced the 1991 Disaster Preparedness and Relief Act. A new structure includes national, district, area, and village-level committees with defined roles for disaster prevention, response, and recovery.

At the global level, Malawi is a member of The Vulnerable Twenty (V20) Group of Ministers of Finance of the Climate Vulnerable Forum.

Agency	Description
Ministry of Finance and Economic Affairs (MoFEA)	Responsible for formulating economic and fiscal policies as well as overseeing the management and implementation of the national budget. The Ministry plays a crucial role in formulating fiscal policies, managing national debt, coordinating economic policies, and mobilising financial resources for development programmes. It leads national economic planning and strategy formulation. The Ministry is responsible for developing risk financing mechanisms, including contingency funds and risk transfer instruments. It undertakes risk retention measures such as the allocation of resources for disaster preparedness, response, and resilience-building. MoFEA also houses the National Statistics Office, the department mandated to collect, compile, analyze, and disseminate official statistics, including being responsible for Malawian Social Registry (renamed from Unified Beneficiary Registry).
Department of Disaster Management Affairs (DoDMA)	DoDMA is the primary government agency responsible for disaster risk management and disaster risk reduction in Malawi. It operates under the Office of the President and Cabinet and is mandated to coordinate disaster preparedness, response, recovery, and mitigation efforts across various sectors and stakeholders. They provide direct relief assistance to disaster-affected people and are responsible for coordinating early warning systems and emergency preparedness plans and climate information systems in the country. DoDMA has set up early warning systems and climate information systems in 21 of the 28 districts of Malawi. In their presentation, DoDMA highlighted that they have two core divisions: Disaster Resilience & Recovery and Disaster Preparedness & Response. These divisions coordinate everything from early warning systems and contingency planning to capacity development and risk financing. DoDMA performs policy functions including overseeing the implementation of the National Disaster Risk Management Policy and ensuring mainstreaming of disaster risk management into national development plans.
Ministry of Agriculture	The Ministry of Agriculture (MoA) plays a critical role in disaster risk management and climate resilience, particularly in agriculture, food security and irrigation. Given that Malawi's economy heavily relies on rain-fed agriculture, the Ministry is responsible for reducing vulnerability to climate shocks, ensuring food security, and promoting sustainable water management. The Ministry is responsible for coordinating, implementing, and promoting agricultural policies and programmes. It serves as the focal point to the Adaptation Fund. The Ministry collaborates with other public institutions on DRF mechanisms, e.g., ARC policy, and with the Ministry of Gender on social protection.

Reserve Bank of Malawi	The Reserve Bank of Malawi (RBM) is the central bank of Malawi, responsible for monetary policy implementation, financial regulation, and maintaining financial stability. It plays a crucial role in ensuring price stability, controlling inflation, supervising financial institutions, and fostering economic growth. The Bank regulates and supervises the financial sector of Malawi. The Pension and Insurance Supervision Department of the Bank is responsible for the supervision and regulation of the insurance sector. Specific insurance supervision functions include i) licensing and regulation of insurance companies; ii) supervision of insurance firms; iii) consumer protection and market conduct regulation; and iv) development of insurance and risk management policies. The RBM hosts a new Climate Change Centre, a dedicated unit established in early 2025 as part of the Bank's broader strategy to "green" Malawi's financial sector. It is designed to institutionalize management of climate-related financial risks within the central bank's core functions of monetary and financial stability.
Ministry of Natural Resources and Climate Change	The Ministry of Natural Resources and Climate Change is responsible for policy development, regulation, and management of Malawi's natural resources, environmental conservation, and climate change adaptation and mitigation efforts. The Ministry ensures sustainable utilisation of natural resources, biodiversity conservation, and climate resilience to support Malawi's socioeconomic development. The Ministry hosts the following departments/committees/secretariat: • Department of Climate Change and Meteorological Services: produces periodic state of climate in Malawi reports, uses Climate Risk Maps for risk management and emergency preparedness, and also uses the DRM forecast tool to provide timely predictions on extreme weather events • The Environmental Affairs Department (EAD): the lead government agency responsible for environmental management, conservation, and climate change policy implementation in Malawi. It operates under the Ministry of Natural Resources and Climate Change and ensures the integration of environmental sustainability into national development policies. The EAD is responsible for coordination of environment and natural resources topics. It serves as the focal point to the UNFCCC and to climate finance mechanisms such as the Green Climate Fund (GCF). EAD also coordinates the National Steering Committee on Climate Change and the National Technical Committee on Climate Change. These committees meet on a quarterly basis and are mandated to provide policy and technical recommendations on climate change management as provided for in the national climate change policy respectively. • Serves as the contact point to the Global Environment Facility (GEF). The Ministry coordinates the implementation of Malawi's climate policies, including the National Climate Change Management Policy (NCCMP) and NDCs.

3. Country workshop, Salima, 2 July 2025

The objective of the workshop was to engage key officials and subject matter experts from Malawi in developing the work programme for the support requested in the expression of interest submitted to the InsuResilience Solutions Fund (host of GRMA) by the Ministry of Finance and Economic Affairs (MoFEA) of Malawi on May 13, 2025. The workshop was attended by a total of 48 participants, including 19 from the public sector, 12 from the private sector, 6 from academia and research institutions, 1 from civil society, 6 from international organisations, and 4 from the GRMA team.

The day featured an introduction to the GRMA Program and its potential support to Malawi, including its objectives, principles, and an overview of Malawi's request. Opening remarks were delivered by representatives from the Ministry of Finance and Economic Affairs, KfW, and GRMA, setting the stage for a collaborative and informative session. Participants were introduced to the current landscape of climate and disaster risk information in Malawi through presentations by DoDMA, the National Statistics Office, and GRMA, covering available climate data, future demographics, and existing DRM activities. The GRMA team facilitated an interactive group exercise focused on identifying critical needs in disaster risk management and defining potential technical projects, along with key stakeholders for each. In the afternoon, groups shared feedback, followed by presentations from global and regional private sector institutions on their CDRFI and risk analytics efforts. A roundtable discussion assessed the macroeconomic impacts of extreme weather events. The day concluded with a session on project design and outlining next steps for the GRMA application process.

3.1. Ongoing CRA and CDRFI activities in Malawi

The workshop and bilateral meetings allowed GRMA to consolidate, confirm and deepen, knowledge developed from the earlier literature review, and provided an opportunity to take stock of the ongoing or planned climate risk assessment (CRA) and CDRFI activities of the government and development partners active in Malawi. This aims to ensure that there is synergy between complementary activities, existing analytics are leveraged as much as possible, and GRMA avoids duplication of work or adding fragmentation to the local infrastructure.

This section summarises the initiatives that were presented or introduced during the course of the Global Shield Technical Working Group meeting on 1st July and GRMA workshop on 2nd July.

I. Multi Hazard or Non-Hazard Specific

Macroeconomic modelling work in MOFEA

MoFEA, specifically EP&D, outlined the Ministry's approach to understanding and addressing the macroeconomic impacts of extreme weather events in Malawi. EP&D explained that climate shocks have direct and cascading effects on macroeconomic performance. They reduce annual productivity, particularly through agriculture which forms over 20% of GDP and links to many other sectors. Recurrent shocks force the reallocation of government spending from long-term investments to emergency relief and infrastructure repair, limiting Malawi's fiscal flexibility.

MoFEA also elaborated on the inflationary consequences of climate events, especially through food scarcity, since food represents over 45% of the Consumer Price Index (CPI) basket. Other long-term effects discussed include productivity losses due to damage to labour (e.g., displacement, illness, disrupted education) and capital (e.g., damaged roads, power lines), as well as reputational costs that may deter foreign direct investment.

To better assess these impacts, the Ministry introduced its MacFisc model, a macroeconomic tool with 52 equations built on the E-Views platform. Although still under development and limited by data gaps, the model allows the Ministry to simulate economic outcomes under climate stress scenarios and support more informed policymaking.

National Multi-Hazard Risk Atlas (NMHRA)[2] and Comprehensive Multi-Hazard Risk Assessment

Owned by DoDMA, the NMHRA for Malawi contains a significant quantity of data spanning exposure, vulnerability, hazard and associated socio-economic factors. Model outputs contained in NMHRA include return period hazard maps and high-level loss information (e.g. AAL from earthquakes or the average number of people impacted by floods per year) and reflect the potential impact of climate change. It was recommended during the workshop that additional risk analytics tools should build on this.

The NMHRA was developed to visualise output from the Comprehensive Multi Hazard Risk Assessment project co-led by CIMA Foundation, Global Earthquake Model Foundation (GEM), Malawi University of Business and Applied Sciences (MUBAS) and British Geological Survey (BGS). The project consortium produced Malawi's first set of hazard and risk maps on a national level with a level of detail useful also at provincial level, using a probabilistic risk assessment approach to hazard assessment. Hazards include extreme winds and precipitation, earthquakes, landslides, and river floods. The project was funded by Ministry of Water and Sanitation of Malawi.[3]

During the GRMA workshop, GEM Foundation presented on the example of earthquakes, where probabilistic seismic hazard maps (PSHA) developed by GEM Foundation enable local stakeholders to identify zones of higher or lower seismic hazard, guiding zoning and planning decisions. GEM also highlighted outputs from the MHRA that indicate where the absolute Average Annual Loss (AAL) and loss ratio values are highest - two examples of key risk metrics to support downstream decision making. Another key use case highlighted was the ability to use risk metrics to simulate earthquake scenarios and estimate the resulting losses. Recommendations were made to

- Invest in the seismic retrofitting of existing buildings to reduce their vulnerability (and risk)
- Improve seismic design regulations accounting for new buildings and population growth, guided by seismic hazard maps to prioritise accordingly.

MASDAP

MASDAP is an official public geospatial data portal maintained by the National Spatial Data Centre (NSDC) within Malawi's Department of Surveys, under the Ministry of Lands and related authorities. It was launched in November 2012 as part of Malawi's Open Data for Resilience Initiative (OpenDRI), supported by the World Bank and GFDRR. The National Spatial Data Centre (NSDC) oversees MASDAP and helps enforce national geospatial coordination, including the creation of the Malawi Geographic Information Council (MAGIC) and the development of a National Spatial Data Infrastructure (NSDI). MASDAP is hosted as a GeoNode instance—an open-source geospatial content management system—enabling robust data sharing and map publishing with a user-friendly interface.

[2] HTTP://MALAWI.IS-PORTAL.ORG/#/HOME

[3] https://www.cimafoundation.org/en/project/comprehensive-multi-hazard-risk-assessment-in-malawi/

The Disaster Risk Management Information System (DRMIS)

Owned by DoDMA, the DRMIS a digital platform enabling real-time reporting and coordination of disaster data across local councils. DoDMA noted that the DRMIS has significantly improved reporting speed, data accuracy, and disaster response through mobile apps and integrated dashboards.

DoDMA highlighted that support needs included scaling DRMIS to more councils, localizing the risk atlas, integrating existing systems, and expanding public awareness efforts.

Study: Agricultural Sector Risk Assessment 2015

This World Bank study assessed existing agricultural risks to the sector, prioritized them according to their frequency and impact, and identified areas of risk-management solutions that require deeper specialized attention.

II. Hazard-Specific

Hazard	Initiative	Description
Flood	Risk Analytics Available	JBA provides the following: • Flood maps for river and rainfall driven flooding at 30m resolution for 20, 50, 100, 200, 500, and 1500-year return periods. • A flood catastrophe model that simulates flood risk profiles and quantifies the likelihood and impacts of both frequent and extreme flooding. • In the resilient infrastructure sector, climate vulnerability and risk assessments for the road network have been conducted in partnership with the Global Centre on Adaptation (GCA). • Localised flood modelling developed by Haskoning underpins an early warning system for flash flooding. This system triggers anticipatory action activities by the Malawi Red Cross in communities affected by flash floods in northern Malawi (UNICEF-supported).
	Shire River Basin Flood Risk Management Strategy 2024	The Shire River Basin (SRB) is highly flood-prone. This strategy is owned by the Department of Water Resources (DWR). The strategy is based on flood modelling using a high-resolution digital terrain model (DTM), which is held by the DWR. The DTM has been purchased and is freely available for use by all government departments. The strategy involves high-resolution flood risk modelling and a comprehensive flood management plan for the SRB.
	Updating of ODSS and integration with KABOM 2024	Owned by the Department of Water Resources. An Operational Decision Support System (ODSS) was developed in Malawi, with operators from both DWR and the Department of Climate Change and Meteorological Services (DCCMS) trained in its use. The ODSS performs multiple forecasting functions for decision support, including: • Riverine flood and flow forecasting • Catchment flash flood forecasting • Seasonal forecasts of flows and water levels (including Lake Malawi)

		• Drought monitoring • A crop calendar with seasonal rainfall predictions and agricultural guidance The ODSS has recently been integrated with the Kamuzu Barrage Operation Model (KABOM), which regulates barrage operations—a critical function for managing flow along the Shire River. The ODSS is designed to integrate early warning data from contributing agencies. Stakeholders can access ODSS via DoDMA to obtain early warning data.
	Final Integrated Flood Risk Management Plan for Blantyre City 2024 and Blantyre Urban Structure Plan (2024-2039)	Owned by Blantyre City Council. A strategy was developed due to Blantyre's economic significance. High-resolution modelling informed the updated urban structure plan. This 15-year plan incorporates IFRM strategies and replaces the 1997 version.
Cyclone	Disaster Impact Studies by World Bank	The World Bank conducted studies following Cyclones Idai and Freddy. One study following Cyclone Idai aimed to assist the Government of Malawi in strengthening its capacity to respond to extreme weather events—particularly El Niño and La Niña. The study reviewed past responses, drew lessons for future planning, and identified preparedness and response gaps for future extreme weather events. A Cyclone Freddy Performance Review was also conducted by the World Bank, with contributions from JBA. While not yet publicly available, the outputs will be accessible for government use. The study assessed infrastructure and early warning system (EWS) performance, including how adequate and accurate the EWS was.
	Resilience and Preparedness to Tropical Cyclones Across Southern Africa (REPRESA)	Supported by FCDO and co-led by three academic institutions,[4] this is a regional project aimed at improving forecasting and early warnings for cyclone-induced flooding across Southern Africa, including Malawi.
	Other Technical Assistance	Following Cyclone Freddy, JBA, in collaboration with the World Bank and local partners, supported local stakeholders in understanding and contextualising the event. They also provided recommendations for reconstruction and improvements to early warning systems.

[4] The Global Change Institute at the University of the Witwatersrand (WITS), Eduardo Mondlane University (UEM), and the University of Bristol (UoB)

III. CDRFI solutions

WB's CDRF in Malawi

The World Bank has been supporting the Government of Malawi with pre-arranged financing efforts through various existing projects.

Under the Shock-Sensitive Social Protection Programme (SSRLP), the World Bank supported the design and implementation of a scalability mechanism that allows social cash transfers and climate-smart public works programmes (PWP) to scale up automatically in response to climatic shocks. This mechanism is backed by two financing instruments: contingent financing and insurance.

The Catastrophe Draw Down Option (CATDDO) has been in place twice and was drawn down for both the COVID-19 response and the drought responsein2024. The REPAIR project is a regional platform through which countries can access pre-arranged financing instruments and technical assistance. Instruments available under REPAIR include a reserve fund, contingent financing, and risk transfer mechanisms. Malawi is poised to join REPAIR once the Board approves participation this month.

A Rapid Response Option, linked to the Crisis Emergency Response Project (CERP), has also been established—Malawi is one of the first countries to implement this approach. Additionally, a number of projects include a Crisis Response Window or Crisis Emergency Response Component (CERC), which triggers financing to support emergency response when needed.

The World Bank is also providing technical assistance in various areas, including support for Disaster Risk Financing (DRF) strategy development and DRF diagnostics. Capacity building has included trainings in risk analytics, with a focus on financial risk assessment, financial response design, and financing gap analysis.

Other insurance solutions

A number of local insurers or pilot programs offer CDRF solutions in Malawi, as identified in the Global Shield stocktake process. This section outlines the specific CDRF solutions that were discussed during the GRMA workshop.

Britam offers weather index insurance and area yield index insurance. JBA is currently providing support in the development of parametric flood insurance products. ARC Ltd provide a sovereign drought insurance policy to the country. ARC Ltd highlighted the process for countries to engage the regional risk pool, including steps such as risk[4] modelling, policy customisation, payment and coverage, trigger and payout, and impact delivery. ARC Ltd also noted that they leverage some of the maps shared during the workshop to inform their work.

3.2. Insights from participant discussions

The workshop brought together participants from local and international stakeholders. In the group work session, participants were asked to brainstorm potential technical projects and the associated gaps, roles, capacities, and sustainability. Four breakout groups at the workshop each identified two potential projects that could be submitted to the GRMA for support. The eight projects proposed were as follows (in no order of priority):

Project 1

Short description	Modelling the impact of prolonged energy disruptions - caused by disasters - on micro, small, and medium enterprises (MSMEs) across Malawi[5]
Target beneficiaries	MSMEs across Malawi
Region/locality (if not national)	National
Use of modelling output	• Informing risk transfer strategies (e.g. insurance policy for EGENCO and ESCOM) • Cost-benefit analysis with or without resilient infrastructure • Impact on foreign direct investment

Project 2

Short description	Study on the effects of pest infestations, particularly fall armyworm, on the agricultural sector
Target beneficiaries	Farmers and government
Region/locality (if not national)	National
Use of modelling output	• Methodology for impact assessment • Probabilistic metrics for pest infestation • Timing of preventative measures

Project 3

Short description	Modelling to enhance food security for smallholder farmers by expanding existing risk transfer mechanisms and improving recovery measures
Target beneficiaries	Smallholder farmers
Region/locality (if not national)	National
Use of modelling output	• Yield correction report and impact curves • Policy briefs highlighting drought hotspots and vulnerable districts to inform allocation of financial resources for recovery and humanitarian responses • Enabling significant scale up (not new pilots)

[5] On **24 January 2022**, **Tropical Storm Ana** battered southern Malawi with heavy rainfall (150–300 mm in some areas) and strong winds over 80 km/h, triggering flash floods across the region—including the Shire River basin where the Kapichira Power Plant is located. Kapichira's full generation capacity of approximately 129.6 MW (about 30–33 % of Malawi's national electricity capacity) was entirely lost when the plant went offline World Bank+15Hydropower & Dams International+15Hydropower+15.

Project 4

Short description	Development of drought modelling for maize farmers to support risk advisory services and risk transfer strategies
Target beneficiaries	Maize farmers
Region/locality (if not national)	National
Use of modelling output	Support risk advisory services and risk transfer strategies at both macro and micro levels

Project 5

Short description	Enhancement and update of the Malawi Social Registry (previously Unified Beneficiary Registry) to ensure better social protection programming
Target beneficiaries	All affected populations including elderly, PWDs, women, children, pregnant women
Region/locality (if not national)	National
Use of modelling output	Improve efficiency and effectiveness of social protection systems

Project 6

Short description	Integration of information management systems into a single platform covering hazard, exposure, and vulnerability data
Target beneficiaries	All affected populations including elderly, persons with disabilities, women, children, pregnant women, particularly in the agriculture sector
Region/locality (if not national)	Flood-prone districts: Phalombe, Chikwawa, Karonga, Nsanje and Salima
Use of modelling output	Ensure data accessibility and promote data use by local stakeholders

Project 7

Short description	Modelling the impact of flooding on livelihoods to inform irrigation strategies and strengthen risk prevention and transfer
Target beneficiaries	Communities of Lower Shire Basin
Region/locality (if not national)	Lower Shire Basin
Use of modelling output	Vulnerability index for high and low risk areas; Community case studies on traditional coping and recovery mechanisms; Inform financial mechanisms and humanitarian responses

Project 8

Short description	Modelling the impact of tropical cyclone-induced flooding on maize production and/or affected communities
Target beneficiaries	2.2 million people
Region/locality (if not national)	Southern districts
Use of modelling output	Probabilistic risk modelling for risk transfer; Forecasting to inform anticipatory action, forecast-based financing, disaster cash voucher transfers, risk financing mechanisms, and early warning systems (AA/EWS)

Online contributors added that probabilistic risk modelling are key to enhance disaster risk financing strategies, anticipatory action and shock-responsive social protection system within the country.

Overall, these breakout groups confirmed that the country lacks openly available risk analytics for critical perils and does not have the in-country capacity to utilize analytics if they were available. There was significant support for the capacity building part of GRMA and appreciation that this was currently a gap in the development operations in Malawi.

4. Bilaterals and side meetings

4.1. UNDP, 30 June 2025

The meeting was with the UNDP Private Sector team in Malawi. Their interest is in attracting private sector investment within a national green financing framework. UNDP itself has a Green Economic Transition product (Green Economic Transition Facility – GETF) offering incentives to deploy green business solutions. The national framework includes a Green Taxonomy for Malawi and issuance of Green/Blue Bonds.

Interests include:

- Climate risk assessments relevant to investment
- Nature as an asset class. For example, they are researching the potential for the world's first Freshwater Bond to help protect Lake Malawi
- Green Financial Products, blended finance vehicles, bonds, to support the financing of green-compliant investments.

UNDP works closely with Reserve Bank of Malawi, Climate Change Centre, in the implementation of the Green Business and Financing Country Action Roadmap for Malawi.

4.2. EP&D, MOFEA, 24 July 2025

MOFEA further elaborated on the link between macroeconomic modelling and disaster risk finance, indicating they would like support with being able to quantify the fiscal impact of climate and disasters (i.e. on MOFEA budgeting processes), thereby also enabling them to identify appropriate disaster risk financing instruments to address gaps identified.

In a related point they mentioned the need to internally strengthen their understanding of sovereign insurance policies, support their conversations with insurance providers such as ARC Ltd. and their ability to make informed decisions regarding solutions that best fits their needs.

4.3. Insurance association, Blantyre, 3 July 2025

On 3rd July, the GRMA team met with the Insurance Association of Malawi. The Insurance Association highlighted that the members include eight general insurers, one reinsurance company, and one reinsurance broker. At least one association member is actively seeking to expand its agricultural insurance portfolio through strategic partnerships with banks and other stakeholders. The industry jointly participates in weather index insurance via a pooling arrangement.

Currently, catastrophe risk is excluded from standard insurance policies and is instead treated as a 'special risk.' Across the industry, actuarial expertise—particularly in the design of policies for emerging risks—is entirely outsourced to international service providers.

At least one local insurer collaborates with multiple regional and global reinsurers to manage risk exposure. The insurance market operates under a regulatory framework that sets a minimum solvency requirement, while allowing full pricing freedom within a competitive, open market environment.

4.4. MUST, 3 July 2025

Malawi University of Science and Technology (MUST) is actively engaged in work related to disaster risk management (DRM), analytics, and climate resilience. The university comprises four key academic schools:

1. The Institute of Technology
2. The Medical Academy
3. The School of Culture and Heritage, which includes a focus on indigenous knowledge systems
4. The Ndata School of Climate and Earth Sciences (NSCES)

The NSCES plays a central role in DRM-related efforts and consists of four departments:

- Climate Sciences, which incorporates disaster risk management
- Energy Resources
- Water Resources
- Earth Sciences

NSCES is also in the process of establishing a Centre of Excellence in Environment and Sustainability, further strengthening its capacity in climate and environmental research.

MUST maintains Memoranda of Understanding (MoUs) with several key government agencies, including the Department of Climate Change and Meteorological Services (Met Office), the Department of Disaster Management Affairs (DoDMA). These partnerships support collaborative efforts in risk analytics and data sharing.

Insights on Risk Modelling and Analytical Priorities

Stakeholders at MUST identified several priority areas for improving risk modelling and analytics. A primary focus is on urban risk modelling to support city planning, risk mapping, and broader climate resilience strategies. In support of this, a pilot project is currently underway in Zomba, targeting city councils and vulnerable communities. This initiative is financed by UNDP and UN-Habitat, and aims to demonstrate how localised data and planning tools can enhance preparedness and reduce vulnerability.

Despite this progress, stakeholders emphasized a significant gap between the risk data that exists and how it is applied. There is a need to institutionalise risk data management and increase collaboration across agencies to make data more accessible, usable, and actionable.

The Malawi Hazard Risk Assessment (MHRA) was also discussed. While it currently places heavy emphasis on tropical cyclone risks, there is growing recognition that it should also address cascading hazards and seismic risks, which are currently underrepresented in national risk frameworks.

MUST also highlighted the need to understand how risk analytics and regional collaboration through platforms like GRMA could help shape safer construction practices, resilient infrastructure and improve long-term resilience at the community and national levels.

4.5. Trócaire, 7 July 2025

Trócaire has a strong operational presence in Malawi, where it is actively engaged in both practical climate resilience projects and advocacy efforts. The organisation focuses on supporting communities to build resilience by helping them make more informed decisions based on improved access to climate information. A key component of this work involves enhancing the use of forecasts from the Meteorological Department and assisting communities in developing climate-informed action plans.

Trócaire partners closely with the Civil Society Network on Climate Change (CiSoNeCC), as well as with village-level disaster risk management (DRM) committees, ensuring that its initiatives are rooted in local realities and community participation.

Trócaire is working on two primary areas of focus:

- Making loss-and-damage mechanisms relevant and accessible to local communities, particularly in terms of improving their access to funding and support following climate-related events.
- Exploring non-economic losses and damages, and seeking practical ways to quantify impacts such as cultural loss, displacement, or psychological trauma—areas often overlooked in traditional risk and recovery frameworks.

5. Options for GRMA support

5.1. Capability development needs identified

A key principle and goal of the GRMA programme is the sustainability of the data and models developed during the GRMA project – especially in their availability, use, maintenance and improvement over time. Change must also be locally-led, long-term, and generated and managed collectively by beneficiaries. In this regard, the following needs so far have been highlighted through the course of the workshop and bilateral consultations. It is important to note that this section captures what was discussed, and not all topics are necessarily within the scope of the GRMA mandate. Topics will be further prioritised and elaborated on in subsequent discussions with MoFEA.

- A significant gap between the risk data that exists and how it is applied. This signals a clear need to have a capability development plan to ensure that any outputs produced from GRMA projects are accompanied by the appropriate training and knowledge transfer measures to ensure sustainability of application in the country.
- Need to strengthen understanding of sovereign insurance policies, support their conversations with insurance providers such as ARC Ltd. and their ability to make informed decisions regarding solutions that best fits their needs.
- Need for capacity building support to build CDR into fiscal and macroeconomic analysis in general
- Need for capability in identifying and quantifying unmodelled risks

5.2. Potential projects

Overall, jointly with MoFEA, it was agreed that the GRMA support programme would be structured along these areas. Specific details are to be defined in the next Technical Workshop, taking into account the list of potential project suggestions and insights from Section 3.2 as well as the Global Shield stocktaking and gap analysis exercise. Acknowledging the significant existing CRA and CDRFI work that already exist or is underway in Malawi, the GRMA would strive to ensure additionality. Some of the early areas of focus that emerged from the workshop includes, but not limited to:

- Enhancement of climate risk analytics, focusing on identified hazards that are not currently well modelled in country and have the greatest economic impact both over the short and longer term. The exact scope of activities required to support improved risk analytics is yet to be identified but could include development of the input data necessary to support analytics (e.g. exposure, vulnerability and hazard data) and/or further development of the analytical tools and models available to local institutions to produce necessary outputs for risk management decision making. These could be developed at national or sub-national scale and incorporate climate change impacts where required
- Enhancement of climate and disaster risk elements of MoFEA's macro-economic risk programme. Focus to be co-defined but could include integrating effects of climate disasters that are currently not modelled, development of sectoral approaches or integrating current and future trends such as climate and demographic conditions.
- Integrated with the above projects, capability development for the relevant stakeholders, such as the responsible implementing organisations and/or organisations who would use the outputs to inform climate and disaster resilience measures. Specific topics to also be jointly defined alongside the scoping of the above projects. This is to ensure knowledge transfer and strengthen institutional capacity to apply and operationalise the outputs of the support, thereby ensuring sustainability of projects and associated outputs.

5.3. Other observations

- Stakeholders stressed on the need to explore pathways to more resilient construction, with interest in how platforms like the GRMA could contribute. Risk analytics and regional collaboration were highlighted as critical for promoting safer construction, resilient infrastructure, and long-term national and community resilience. Resilient infrastructure was also noted as a priority in the Global Shield discussions.
- It was also noted that the coverage of hazards under the Malawi Hazard Risk Assessment (MHRA) should expand to include cascading and seismic hazards.
- Emphasis was placed on the need to institutionalise risk data management and improve collaboration across agencies. It was also noted that there is a heavy reliance on international service providers for actuarial expertise, particularly in designing policies for emerging risks.
- Making existing risk data more accessible, usable, and actionable was identified as a priority. It was noted in particular that there is a strong supply of flood and rainfall data in Malawi, but quality needs to be improved.

6. Next steps

A second in-country workshop is planned to take place in October 2025 to focus on finalising the scope of projects and capability development needs, as well as defining a work plan for projects and capability development. A risk analytics-focused technical working group will be established and chaired by MOFEA. This will leverage the existing DRF TWG structure. At the same time, MOFEA has completed the formal application for GRMA support following the application process and templates available at grma.global/join-the-alliance/.

7.ANNEXES

Annex 1: Concept Note and Agenda

Timing	Item	Lead
08:30 - 09:00	Registration	
09:00 – 09:15	Welcoming remarks • Ministry of Finance and Economic Affairs • KfW • Global Risk Modelling Alliance (GRMA)	
	GRMA Program and Offer to Malawi	GRMA
09:15 – 09:45	Introduction to the workshop agenda – why are we here? The GRMA Programme • Objectives & Principles • Overview of Malawi's request for GRMA • How does GRMA work?	
09:45 – 10:15	*Group Photo & Coffee*	
	Introduction to Risk Information & Existing Landscape in Malawi	
10:15 – 10:45	• Status of climate change and risk information (in Malawi) ◦ Including topics such as climate outputs available, future demographics, vulnerable beneficiary database • Status of disaster risk management activities (in Malawi)	DoDMA/ National Statistics Office
10:45 – 11:15	• Fundamental concepts, applications and examples of climate and disaster risk assessment • Existing risk information in Malawi	GRMA
	Prioritisation and Group Work	
11:15 – 12:30	Group Work Activity: • Identifying critical areas concerning disaster risk management and risk analytics in Malawi • High level definition of technical projects that could be supported by GRMA • Key stakeholders for each identified project	GRMA
12:30 - 13:30	**Lunch**	
13:30 - 14:00	Group Work Activity: • Feedback from groups	GRMA

Timing	Item	Lead
	Alignment with Ongoing Initiatives	
14:00 – 15:00	Overview of CDRFI and risk analytics activities of partner institutions (10 min presentation each)	Presentations from private sector: Nico, Britam, ARC, JBA, GEM, IBISA
15:00 – 15:30	Roundtable: Assessment of macroeconomic impacts of extreme weather events	MoFEA
	Next Steps	
15:30 –16:00	Project design, development of workplan and Next Steps: How do we go about the application process	GRMA
16:00	Closing	MoFEA & GRMA

Annex 2: Participant list

Public sector

Name	Last Name	Organisation
Hilda	Kabuli	Department of Agricultural Research Services
Chandiona	Munthali	Department of Agricultural Research Services
Gloria	Banda	Department of Disaster Management Affairs
Fyawupi	Mwafongo	Department of Disaster Management Affairs
Zione	Viyazyi	Department of Disaster Management Affairs
Andrew	Msosa	Department of Land Resources and Conservation
Cassim	Bakali	Ministry of Agriculture
Mphako	Chiwewe	Ministry of Agriculture
Doshanie	Kadokera	Ministry of Agriculture
Phillip	Banda	Ministry of Finance and Economic Affairs
Bernadetta	Chilumpha	Ministry of Finance and Economic Affairs
Charles	Chinkhuntha	Ministry of Finance and Economic Affairs
Edith	Chinyumba	Ministry of Finance and Economic Affairs
Ronald	Phiri	Ministry of Gender
Madalitso	Mng'ombe	Ministry of Water and Sanitation – Department of Water Resources
Louis	Thanki	Ministry of Water and Sanitation – Department of Water Resources
Mulder	Mkutumula	National Local Government Finance Committee
Sautso	Wachepa	National Statistical Office
Ndiuzayani	Kanshulu	Reserve Bank of Malawi

Academia & Research

Name	Last Name	Organisation
Patricia	Gomani	Malawi University of Science and Technology
Vincent	Katonda	Malawi University of Science and Technology
Tamara	Nthara	Malawi University of Science and Technology
Maggie	Munthali	MwAPATA Institute
Nadia	Leonova	University College London

Civil Society

Name	Last Name	Organisation
Edwin	Munthali	Civil Society Agriculture Network (CISANET)

Development partners and international organisations

Name	Last Name	Organisation
Eduarda	Fontes	Global Risk Modelling Alliance
Nick	Moody	Global Risk Modelling Alliance
Alastair	Norris	Global Risk Modelling Alliance
Arun	Rana	Global Risk Modelling Alliance
Hui Lin	Chiew	Global Risk Modelling Alliance
Edwina	Hanjahanja	Kreditanstalt für Wiederaufbau (KfW, German Development Bank)
Sothini	Nyirenda	African Development Bank
Abdul	Waheed	Food and Agriculture Organization of the United Nations (FAO)
Cinzia	Tecce	United Nations Development Programme
Moses	Jemitale	WFP
Kondwanie	Chirembo	World Bank
Dumi	Chirambo	World Food Programme

Private sector

Name	Last Name	Organisation
Pieter	Visser	AON
Aumashvini	Gobin	ARC Ltd
Norberto	Mahalambe	ARC Ltd
Maclonex	Mwase	Britam
Helen	Crowley	GEM Foundation
Paul	Henshaw	GEM Foundation
Jamie	Pollard	Global Parametrics
Wycliffe	Kiplagat	IBISA Network
Louisa	Whitlock	JBA Risk Management Limited
Mebrahtu	Gebre	Milliman, Inc.
Angela	Azary	Renaissance Re
Gloria	Karissa	ZEP-RE (PTA Reinsurance Company)

Annex 3: Selected workshop photographs


Global
Risk
Modelling
Alliance


Global
Risk
Modelling
Alliance
Hazard


Global
Risk
Modelling
Alliance