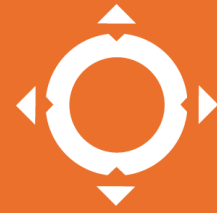


REPORT



Global
Risk
Modelling
Alliance

GRMA Programme in Nigeria

Scoping Report



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List of Acronyms


BMZ	Federal Ministry of Economic Cooperation and Development
CBN	Central Bank of Nigeria
CDRFI	Climate and Disaster Risk Finance and Insurance
CDRM	Climate and disaster risk management
CRA	Climate Risk Assessment
DRM	Disaster Risk Management
DRR	Disaster risk reduction
FIRS	Federal Inland Revenue Service
FMARD	Federal Ministry of Agriculture and Rural Development
GIS	Geographic Information System
GRMA	Global Risk Modelling Alliance Programme
GS	Global Shield against Climate Risk
IDF	Insurance Development Forum
IGP	InsuResilience Global Partnership
ISF	InsuResilience Solutions Fund
LGA	Local Government Areas
LOI	Letter of Intent for GRMA
MDA	Ministries, Departments and Agencies
MoE	Ministry of Environment
NAIC	Nigerian Agricultural Insurance Corporation
NASRDA	National Space Research and Development Agency
NCCC	National Council on Climate Change
NCPWD	The National Commission for Persons with Disabilities
NDC	Nationally Determined Contributions
NDM	National Disaster Management
NEMA	National Emergency Management Agency
NGF	Nigerian Government Forum
NGO	Non-Governmental Organisation
NIMET	Nigerian Meteorological Agency
NIRSAL	Nigeria Incentive-Based Risk Sharing System for Agricultural Lending
NBFI	Non-Bank Financing Institution
TA	Technical Assistance
UNDP	United Nations Development Program
V20	The Vulnerable Twenty Group of Ministers of Finance of the Climate Vulnerable Forum
WBG	World Bank Group

1. Context

This scoping report describes the origin of GRMA support to Nigeria, outlines the activities and outcomes of the first in-country workshop, and details the agreed scope and timeline for implementing the GRMA programme in Nigeria.

1.1 The Global Risk Modelling Alliance

The Global Risk Modelling Alliance (GRMA) results from a strategic agreement between the V20 Group of Ministers of Finance and the cross-sector Insurance Development Forum (IDF). 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 (IGP), which aims to catalyse financial protection for 500 million vulnerable people by 2025.



The GRMA is a public-private technical assistance programme to address persistent challenges of risk understanding in the most climate vulnerable countries. The GRMA programme will assist countries in building, sharing, and developing local capability in climate and disaster risk understanding, using open modelling principles and private sector knowledge to increase access to risk finance. The GRMA programme comprises three key elements:

1. An open-source risk modelling platform and open data standards to promote accessibility, choice, and sharing across departments and sectors.
2. A model and data component providing a funded mechanism to fill critical gaps with data and models produced as digital public goods, with a particular emphasis on co-developing these with local knowledge and information.
3. The GRMA technical assistance team, which provides human interaction and connects private sector experience to development needs.

Furthermore, the GRMA has been selected as a key resource for the Global Shield (GS) Initiative, particularly during initial in-country climate risk assessments and subsequent capacity building. The GS, launched at COP27, is an initiative of the G7 in partnership with the Vulnerable Twenty Group (V20) of Finance Ministers for 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 cost efficiently and effectively minimise and address losses and damages exacerbated by climate change. Though Nigeria is not a GS pathfinder country, through the GRMA programme, Nigeria has the opportunity to initiate the GS in-country dialogue and define areas of required public and private sector support in the sphere of climate and disaster risk financing.

1.2 Nigerian NCCC Request for GRMA support

The National Council on Climate Change (NCCC) – established in 2022 – formulates policies on all matters relating to climate change. The NCCC is chaired by the President of Nigeria, and its members include the Vice President, the Ministers of Environment; Finance, Budget, and National Planning; Mines and Steel Development; Water Resources; Agriculture and Rural Development; Women’s Affairs and Social Development; Transportation; Justice; and Power, as well as the Association of Local Governments, Governors’ Forum, Nigerian Youth Congress, Nigerian Conservation Foundation (representing the private sector), Central Bank, and representatives for Women Societies, Persons with Disabilities, and environmental CSOs.

In its capacity as Nigeria’s climate change coordinating entity, the NCCC takes a whole-of-government approach to meeting Nigeria’s climate ambitions, for which adaptation and community-based resilience are core mandates. As a relatively new institution, the process of establishing its funding and partnerships is ongoing. The agency is positioned to partner with both local and international organizations, with the following mandates:

- Administer the Climate Change Fund
- Facilitate multisectoral coordination and partnerships with public, private, and CSOs on all climate change response matters.
- Policy formulation – preparation and implementation of appropriate green growth and sustainable development policies.
- Develop and implement mechanisms for Carbon Emission Trading, and for a Carbon Tax in Nigeria, in consultation with the Federal Inland Revenue Service (FIRS).
- To monitor and ensure conformity with the Carbon Emission Reduction target to reduce GHG, supporting sustainable economic development.
- Serve as Focal Point for UNFCCC processes.

Nigeria submitted its Letter of Intent (LoI) to GRMA in July 2023, and the first In-Country Workshop, hosted together with NCCC, was held on November 9-10th, 2023 in Abuja. The LoI requests technical support to build capacity in the face of increasing frequency and intensity of climate and disaster risks, specifically from droughts, floods (flash or riverine), excess rainfall, epidemics (viral & bacterial), storms and landslides. NCCC stressed the need for Nigeria to better understand its current and future risks, and access relevant models and tools that would allow the development and continuous monitoring of (sub-)national strategies on climate and disaster risk management including risk reduction and risk finance measures. This includes a request to:

1. Assess existing gaps in relevant climate and disaster risk models and local data.
2. Define the scope of support needed to assess climate and disaster risks.
3. Build local capacities to apply relevant risk models and tools for Nigeria.

Following the LoI, the GRMA intends to build technical competency in conducting risk assessments to enable informed climate risk management, and build capacity on metrics related to operational risk finance. Consequently, information should be made easily available to all sub-national and national level development planners and the private sector to mainstream the implementation of climate risk adaptation, risk reduction, and risk financing mechanisms, as well as of specific projects in all sectoral development areas. GRMA would enable relevant stakeholders to apply and further develop risk models and tools to gain autonomy in risk analysis. The co-development of country risk strategies in disaster risk reduction (DRR), adaptation, and Climate and Disaster Risk Finance and Insurance (CDRFI) is also a key focus.

The objectives of the program will be to:

1. Strengthen long-term local capacities in climate and disaster risk understanding.
2. Co-develop clear (sub-)national risk priorities for application to DRR, adaptation and CDRFI, as well as (sub-)national climate and disaster risk management strategies.
3. Strengthen capacity in climate risk modelling techniques and data acquisition to enable sustainable access to open risk modelling data and tools through practical experience.
4. Joint development of one strategic and 1-2 operational level risk assessment projects with a view to stimulating resilient investment or risk transfer instruments.

1.3 Nigeria context

Nigeria is Africa's largest economy and is expected to become to world's third most populous country by 2050. Nigeria is also home to the world's largest population living in extreme poverty. Humanitarian and security crises particularly in North and Middle Belts, and Niger Delta, exacerbate existing vulnerabilities of populations to climate change risks.

1.3.1 Climate conditions and risk

Temperate and precipitation trends

Nigeria has already experienced increase in temperature of 0.19°C per decade in the last 30 years and a decrease in predictability of seasonal rains in an already highly variable precipitation regime which results in flood and drought risks.^{1,2}

The 2021 Climate Risk Profile for Nigeria developed by BMZ estimates an increase of between 1.8°C (lowest estimate under RCP2.6) to 3.9°C (highest range in RCP6.0) in temperature. By 2080, there is expected to be 45 (RCP2.6) to 90 (RCP6.0) more hot days than in 2000. In 2000, 6% of Nigeria's population were exposed to heatwaves; this is projected to increase to a likely range of 10-27% under RCP2.6 and 14-34% under RCP6.0 by 2080, with central estimates of c. 20% for both scenarios. The implication for this on human health is that under RCP2.6, excess mortality due to heat could increase to 5 deaths per year by 2080 (and 10 deaths per year under RCP6.0) compared to 2.5 deaths per year in 2000. Sea level is also projected to rise by 31 cm (RCP2.6) to 39 cm (RCP6.0) by 2080 compared to 2000 sea levels.

Over the past century, annual total rainfall has decreased by 80cm. By 2050, annual total precipitation is more likely to increase than decrease, with estimates in the range of -33 to 114mm (RCP6.0) and -10 to 68mm (RCP2.6). The WB Profile estimates high uncertainty, including decrease and increase of c. 400mm. Regional trends in surface runoff indicate an increase (c.10%) of runoff in northern Nigeria, decrease (c.10%) in central Nigeria and no change in southern Nigeria. Potential evapo-transpiration is also projected to increase, resulting in little change in soil moisture. By 2080, there is expected to be a slightly higher number of days with heavy precipitation (average of 9 in 2080 compared to 7 in 2000).

Key hazards and impacts

Flood

¹ GERICS (2015). Climate-Fact-Sheet, Nigeria. URL: https://www.climate-service-center.de/products_and_publications/fact_sheets/index.php.de

² Nigeria – Third National Communications 2020

Climate change trends in Nigeria are expected to increase the risk and intensity of flooding through increased frequency and intensity of heavy rainfall events. Most of its 51 flood events since 1985 were riverine floods attributed to heavy precipitation, which primarily affect the river plains in the north and south. Severe flooding in 2012 affected seven million people and caused economic damages estimated at US\$500 million (a later Post-Disaster Needs Assessment report estimated total damage at US\$16.9 billion, representing 1.4% of real GDP growth in that year), while flooding in 2015 affected one million people and resulted in damages of approximately \$25 million.

While Nigeria regularly experiences seasonal flooding, the floods of 2022 have been characterised to be the worst since the 2012 floods – additionally due to the release of water from the Lagdo dam in neighboring Cameroon, as well as the indiscriminate construction on natural flood plains and storm water paths together with poor drainage systems in many residential, particularly urban areas. All 36 states in the country - more than 4.9 million people - were affected. Total direct economic damages are in the range of US\$3.79 billion to US\$9.12 billion with the best (median) estimate at US\$6.68 billion, including damages to (non-)residential buildings (including building contents), to infrastructure, productive sectors and to cropland. However, overall economic losses from multiple climate risks – as a result of unbalanced urbanization and inequalities – now average US\$250 billion to US\$300 billion a year in damages³. According to the NIHA Annual Flood Outlook, 178 LGAs in 32 of 36 states and FCT are in highly probably flood areas in 2023, while 224 (of 744 LGAs) are in moderately probable, and 372 in probable flood areas.

Drought

Additionally, the country's northern Sahel areas are expected to experience increased aridity and drought, with significant impact on livelihoods. About 83.6% of Nigeria's area is considered drought-prone. Seasonal droughts are expected to be prolonged, which will cause problems especially in the central and eastern areas of the country. Nigeria experiences 30-year cycle droughts, which are usually regional, while the 10-year drought cycles are usually localised. From 1965 – 2015 drought affected about 3 million households with over US\$71 million in total damages. The most severe drought impact is usually experienced in areas within the Sudan/Sahel belt. Per the WG Risk Profile, in the east and central areas increased and prolonged droughts can be expected to exacerbate already-occurring famine, population displacement, conflicts, biodiversity loss, and land degradation. In combination these will affect food security and water availability.

Implications for agriculture

Agriculture accounts for 78% of Nigeria's total land area (48% arable, 42.8% pasture) and around one-quarter of GDP⁴. Only 1% of Nigeria is irrigated – 99% of crops are rainfed. Climate impacts on agriculture include flooding, erosion and soil loss in the south; decreased rainfall and increased temperatures in the north. Nigeria is a leading producer of cassava - though it is well adapted to heat and dry conditions, its yields can be reduced by flooding.

In terms of impacts, climate alone is not expected to change total water availability, but population growth will, from c. 3300 m³ to about 800m³ per capita in 2080. Water availability: Nigeria has 200 dams storing 31 billion m³ of water supply, but this supply has been unable to meet domestic, industrial and agricultural demand. Lower and irregular flow into dams is expected to further reduce potential for hydropower generation⁵.

³ [Okunola, 2021](#)

⁴ Nigeria (2018). First Biennial Update Report of the Federal Republic of Nigeria under the UNFCCC. URL: [https://www4.unfccc.int/sites/SubmissionsStaging/NationalReports/Documents/218354_Nigeria-BUR1-1-Nigeria%20BUR1_Final%20\(2\).pdf](https://www4.unfccc.int/sites/SubmissionsStaging/NationalReports/Documents/218354_Nigeria-BUR1-1-Nigeria%20BUR1_Final%20(2).pdf)

⁵ Nigeria (2018). First Biennial Update Report of the Federal Republic of Nigeria under the UNFCCC. URL: [https://www4.unfccc.int/sites/SubmissionsStaging/NationalReports/Documents/218354_Nigeria-BUR1-1-Nigeria%20BUR1_Final%20\(2\).pdf](https://www4.unfccc.int/sites/SubmissionsStaging/NationalReports/Documents/218354_Nigeria-BUR1-1-Nigeria%20BUR1_Final%20(2).pdf)

The total area of land exposed to droughts is expected to remain stable, but crop yields could change in the order of +15% by 2050 (sugar cane, cassava), +2-78% (soybeans, rice, cow peas, groundnuts), -5% (maize, millet and sorghum) and -10% (wheat). Flood exposure to urban land and roads is projected to double – to over 1% of the national total km of roads in 2080 (from 0.6% in 2000) and to 0.16% of urban land (2080) from 0.08% (2000). In both estimates there is significant uncertainty and potential underestimation of disruption caused by small frequent events ('extensive risk'). Rice production could suffer from shortened growing seasons and higher temperatures. Adoption of irrigation, with rainwater and groundwater harvesting, is identified as an adaptation option, along with use of drought-tolerant and earlier-maturing crops varieties and native vegetation cover, and improving produce storage facilities.

Livestock is the traditional agricultural focus in the north; productivity is expected to suffer due to over-stressed grazing lands and the direct impact of heat on livestock health; late onset of rains (water shortage) as well as flooding and saltwater intrusion are further stresses. Agricultural insurance and alternatives to livestock production are cited as necessary adaptation measures; ARC risk pooling approach has been adopted in Nigeria⁶.

1.3.2 Policy and institutional arrangements

Nigeria has a number of climate change linked strategies and policies in place. The Nigerian Constitution has made environmental protection a state objective, including maintaining an environment that is less vulnerable to climate change. Key documents include:

- National Climate Change Policy and Response Strategy (NCCPRS) in 2012: to promote low-carbon, high-growth economic development and build a climate-resilient society
- Nigeria's 2021 Climate Change Act and the National Climate Change Policy for Nigeria 2021 – 2030 by the Federal Ministry of Environment Department of Climate Change
- Nigeria National Disaster Risk Management Policy (2018): to expand understanding of disaster risk, strengthen multi-stakeholder governance systems for DRM, enhance preparedness capacity to reduce exposure, vulnerability and impacts of hazard events or conditions, increase social, economic and environmental investments
- Nigeria 2023 Climate-Related Disaster Preparedness Strategy
- National Adaptation Strategy and Plan of Action on Climate Change for Nigeria (NASPA-CCN) 2011
- National Biodiversity Strategy and Action Plan (NBSAP) 2016
- National Policy on Environment 2016
- National Policy on Drought and Desertification (NPDD) 2007
- National Health Policy (2016), National Water Policy (2012), National Transport Policy (2016), National Gender Policy (2006)
- Lagos Resilience Strategy 2020: The Lagos Resilience Strategy is the State's first urban resilience strategy document and it articulates an integrated approach to addressing the shocks and stresses the city experiences or might experience in the future.
- Nigeria Economic Sustainability Plan (outlines short and long-term recovery efforts, prioritises investments aimed at boosting jobs and economic activity and that have

⁶ African Risk Capacity (2018). Nigerian Government signs MoU with African Risk Capacity to address impact of extreme weather events. Press Release. [24 May, 2018]. URL: <https://www.africanriskcapacity.org/2018/05/24/press-release-nigerian-government-signs-mou-with-african-risk-capacity-to-address-impact-of-extreme-weather-events/>

positive impact on human, social and natural capital, protect biodiversity and ecosystem services, boost resilience and advance decarbonisation of the economy).

- A major reform of the National Health Insurance Scheme (NHIS) was initiated through the approval of the National Health Insurance Authority Act (2022) which makes health insurance mandatory for all Nigerians and seeks to establish the vulnerable group fund (VGF) with the aim of providing coverage for those who do not have capacity to pay.
- Nigeria is currently setting out to issue its third Sovereign Green Bond to fund a pipeline of projects targeted towards reducing emissions towards a green economy.

Agriculture targeted policies and strategies include:

- Nigeria Communication on Climate Smart Agriculture (2015)
- National Agricultural Technology Innovation Plan (NATIP) 2022-2026
- Nigeria Agricultural Policy 2001
- Agricultural Promotion Policy (APP) 2016 – 2020
- National Agricultural Resilience Framework (NARF) 2013
- Implementation of the National Livestock Transformation Plan (NLTP) through the programmes on Animal Breeding and Conservation, Grazing Reserves Development, Dairy Value Chain Development and Small Ruminant Development.

In addition, Nigeria is party to several international agreements on climate and disaster risk reduction, albeit with limited success according to some stakeholders in-country:

- The implementation of the 2015 Paris Agreement - ratified in March 2017
- Nationally Determined Contribution (NDC) 2021: Nigeria unconditionally intends to reduce its greenhouse gas (GHG) emissions intensity of GDP by 20% by 2030, and conditional reduce GHG by 47% on a basis consequent upon receiving climate finance, technology transfer and capacity building from the developed countries.
- Sendai Framework for Disaster Risk Reduction (building on the Hyogo Framework for Action 2015)
- Great Green Wall for the Sahara and Sahel Initiative National Strategic Action Plan (GGWSAP) 2012
- National Adaptation Plan 2020
- National Adaptation Communication (NFACT) 2021 and National Communications to UNFCCC

2. Scoping Workshop, Abuja, November 2023

The requested GRMA support is holistic with prioritisation given to flood hazard. Considering the current gaps in risk modelling and data, the GRMA suggests that Nigeria can benefit from the technical assistance, data acquisition and modelling support offered within the program. An initial country workshop was organised to define the scope of the work jointly with key officials and subject matter experts in Nigeria, and was attended by 75 participants from government, development sector, civil society, academia, NGOs, and private sector (see Annex 1 for participant list). The workshop concept note is included in Annex 2.

The outcomes of this workshop were:

1. A proposal for the project scope that sets the basis for a draft roadmap to be co-developed with key stakeholders to meet the proposed needs for GRMA support.
2. Key stakeholders in Nigeria gained an understanding of the GRMA Programme, the potential scope of support and proposed programme for Nigeria. Those stakeholders had the opportunity to contribute to defining the GRMA project through their existing and aligned activities.
3. Co-development of the programme plan for Nigeria ensuring an alignment with Nigeria's policies, existing institutional framework, and capacities by:
 - a. identifying key stakeholders including Nigerian cross-ministerial coordination and commissions, including potential project partners and their roles.
 - b. identifying existing policies, projects and activities related to the GRMA support request, and their interlinkages ensuring complementarity and synergies of the programme with existing risk information, technical capacities, and analytical activities in Nigeria.

Through interaction with the stakeholders in the workshop and bilateral meetings, we identified the key sectors and hazards to include in the GRMA project scope that would be crucial for building resilience against climate-related damages in Nigeria. We worked on identifying technical needs and suitable tools, framework/roadmap for GRMA activities in the country, and needs of the local and national stakeholders/ experts. We also identified the existing programs in the country and established an approach to find synergies to leverage existing research and earlier work.

Around the workshop, bilateral meetings were held with NCCC, National Hydrological Services Agency (NIHSA), Ministry of Water Resources, National Commission for Persons with Disabilities, National National Commission for Persons with Disabilities, Nigerian Meteorological Agency (NiMet), Ministry of Agriculture and Rural Development, National Emergency Management Agency (NEMA), United Nations Development Programme (UNDP), and the Ministry of Finance. See Annex 3 for notes from bilateral meetings.

3. Outcomes of the scoping workshop

During the scoping workshop, the following country needs were identified:

1. Good quality and more granular risk data to help with targeted disaster risk response and planning of appropriate prevention measures,
2. Development of locally adjusted models for requested hazards,
3. Assistance to better understand projected climate impacts and possible benefits of adaptation and risk-transfer solutions to guide, incentivise, and accelerate public and private sector investments for a climate-resilient transformation, and
4. Technical capacities for conducting quantitative climate risk analyses with open-source models and building pool of local experts.

3.1. Insights from participant discussions

Workshop discussions and preceding bilateral meetings demonstrated that in Nigeria there is a lack of established and reliable datasets to undertake more accurate, forward-looking modelling and in-depth analysis of the hazards identified during the workshop. The models that do exist are based largely on historical data. Where international consultants have conducted assessments,

there may have been limited knowledge and expertise transferred to local stakeholders, with limited use of local knowledge and datasets.

The workshop discussion helped to confirm which hazards are most prominent in terms of impacting the majority of sectors:

1. Flood – pluvial (surface flood) and fluvial (river flood)
2. Agricultural drought
3. Coastal erosion
4. Epidemics (human health)
5. Pest and disease (locust)

Key sectoral impacts of the climate hazards identified include (but are not limited to):

- Coastal erosion impacting infrastructure (as per the NEWMAP project, in 2012, 6000 km² were reported as being affected by erosion, with a further 3400 km² reported as ‘highly exposed’. Over US\$100 million of damage per year was estimated at that time – affected area and estimated damage has only increased since).
- Desertification and high aridity, particularly in northern Nigeria (encroachment of the Sahara Desert), leading to impacts on fisheries and aquatic biodiversity and related services. Additionally, these sectors are also impacted by the drying up of water bodies (e.g., Lake Chad reduced to 1/40th of its area compared to 40 years ago). Groundwater recharge is negatively impacted, particularly in southwestern and southeastern Nigeria.
- Damage/destruction of properties, including public infrastructure and facilities (schools, hospitals, roads) due to floods.
- Strain on/depletion of disaster relief budgets and fiscal deficit due to various climatic hazards impacting different economic sectors on varied spatial and temporal scales.
- Loss of lives and livelihoods/income and increased farmer-pastoralist resource conflicts as impacts of flood.
- Food insecurity – reduced productivity or loss of crops and livestock, and loss of labour productivity due to heat-related stress and agricultural droughts.
- Homelessness and displacement, including knock-on effects on peace and security – particularly in north/northeast Nigeria owed to primarily floods and droughts.

Common, recurring themes during the group discussions are highlighted below (Annex 4 provides the guiding questions posed during the workshop) and are further elaborated in Chapter 3.3.

1. With limited in-country expertise in modelling and analysis, capacity building for climate risk analysis is of the highest concern. Currently very few climate risk analyses are available using state of the art risk modelling techniques and a national overview is lacking.
2. There is a very strong request for capacity building in all sectors (ministries, academia, governmental agencies) and given the size of the country, and decentralisation of power, also for targeting stakeholders from national to state levels. There is need for improvement in capacities of technical know-how and implementation to identify, quantify, and implement adaptation and resilience solutions to climate vulnerabilities.
3. Knowledge and expertise on adaptation and risk financing is not widely shared and implemented.
4. The lack of centralised risk data and modelling suitable for simulating complex climate impacts hinders climate mitigation and adaptation planning.

The workshop discussions also helped to identify the technical needs, available suitable tools, and roadmap for GRMA activities. Highlights from presentations made by representatives of key stakeholders on Day 1 of the workshop are presented below.

National Emergency Management Agency (NEMA)

The National Emergency Management Agency (NEMA) has changed its earlier focus on disaster response, to its present role as a coordination agency for preparedness, with response capabilities. NEMA focuses on building a climate-smart, resilient economy, which can withstand and recover from shocks and stresses. They work towards diversifying the economy away from oil and gas and invest in resilient infrastructure.

- Primary interest: community-level resilience - local communities are the first affected and are thus trained as the first responders.
- DRR tools in use: hazard maps, early warning systems, community-based DRM, GIS, emergency response plans, community and public awareness campaigns, and vulnerability and capacity assessments. NEMA also noted that Nigeria has building codes which consider the needs of disabled people.
- Policy tools are in place, however coordination between levels in the institutional framework (Figure 1) is challenging. Note that SEMA – the State Emergency Management Authorities – are not part of NEMA.

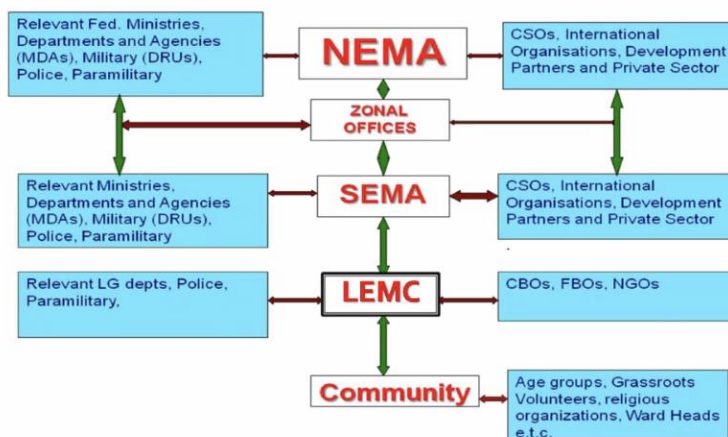


Figure 1 The institutional framework for disaster management in Nigeria (Source: NEMA presentation)

- Working with local communities has revealed the value of local information and need to manage additional hazards alongside natural hazards (e.g., snakes in houses following floods)
- NEMA take into account barriers to actions, for example financial and religious barriers to insurance, and the fact local communities rely on experience, which may not be correct in a future climate scenario. Thus, while NEMA acknowledges and uses local information they also stress the need to help local communities use modern tools and scientific information in understanding and managing risk.
- The agency works closely with NiMet, National Space Research and Development Agency (NASRDA) and NHSA and others to coordinate DRR activities.

University of Abuja – Prof. Shuaib Musa Hassan

Professor Hassan, Director of the Center for Environmental Studies, presented on the current state of climate risk research in the country, the increasing vulnerabilities of communities and available local knowledge, and made a case for the effective implementation of DRM policies.

- Evidence cited on disasters as consequence of poor risk identification and management – e.g., Ogaga et al. 2021, and acknowledgement of the significant progress and collaboration that has taken place in Nigeria, especially through the activities of NEMA.
- Call for more focus on risk prevention and reduction rather than response, and called for greater connection between academia and policy/industry.
- Citing EM-DAT statistics, an overview of hazards was presented, which highlighted epidemics as the most common event, accounting for c.45% of events, followed by flood. Key vulnerability factors identified which exacerbate the impacts of these hazards on the population include substandard housing, absence of basic infrastructure and poor environmental sanitation.
- The importance of involving local cultural and religious leaders in climate and disaster risk management efforts was reiterated, given their local knowledge and influence within their communities on climate change coping strategies adopted by its members.

National Bureau of Statistics (NBS)

The mandate of the NBS is to conduct national surveys and collate data on quality and integrity of public services, on the National Labour Force, migration and from various administration relevant areas. It aims to empower government decision making by harnessing climate risk analytics and tools to bolster macroeconomic and resilience indices, and improve the country's understanding of physical and transition risks. Some of the key statistics cited included:

- Agriculture: 92.6% of employment (Q1), 21% GDP, and the only income source for a large proportion of Nigerians
- 78 million Ha agricultural land exist in Nigeria – 38 million ha are cultivated (mainly rainfed). 80% of the land span only 20 states in Nigeria and are concentrated more in the northern part of the county (57% croplands and 23% grassland).
- Nigeria has significant potential for irrigation expansion, with an estimated 2.1 million ha of potentially irrigable area.
- However, productivity been declining over last few decades – leading to expansion of agricultural areas.
- 2-11 % GDP could be lost due to decline in agricultural production and activities by 2024 / 6-30% by 2050. 10-25% decline in agriculture, and 4.5% shrink of GDP is expected by 2080.
- Water scarcity: droughts expected every 1 in 5 years. Persistent water shortages are further linked with land degradation, desertification, habitat loss, conflict, etc.
- Major floods events occurred in 2011, 2015/26, 2019, 2022. More frequent, heavier rain fell in the south; more heat was experienced in the north.
- GHG emissions: agriculture 60%, energy 16%, waste 10%, forest / other LU 9%, IPPU 5%

A representative of the NBS reiterated the organisation's commitment to developing and sharing statistics for the purposes of climate change planning and response. A key challenge highlighted was that stakeholders across ministries, departments and agencies (MDAs) at different levels in Nigeria are continuously creating and collecting meaningful data, however, and not recording their

activities and output in a way that can be accessed by those who require it. It was also acknowledged that the data collected is demand driven, therefore it would be recommendable to develop a template of sorts that aligns with the need, and which is streamlined across institutions who have mandates around data to consolidate. Such a common platform would be key.

The NBS is currently in the process of developing a new National Strategy for the Development of Statistics (NSDS) for the period 2024-2028. The NSDS will serve as a comprehensive framework to guide the systematic and coordinated development of statistical activities in the country, designed to enhance the quality, relevance, and accessibility of statistical data, as a basis for evidence-based decision-making, policy formulation, and national development planning. A key aim is to enable a statistical system that caters to the needs of all segments of society, by addressing data gaps related to marginalised groups, regions, and sectors, including issues about gender, persons with disabilities, and those at the local government level. The Bureau seeks to utilise latest technological advancements to streamline data collection to ensure an integrated, unified data production system bringing together agencies across the three levels of government that produce or manage data.

Federal Ministry of Agriculture and Rural Development (FMARD)

FMARD briefly presented on the roles of Climate Smart Agriculture (CSA) in empowering smallholder farmers through disaster risk mitigation and food systems resilience in Nigeria. The mandate of this ministry covers the ensuring of food security in crops, livestock and fisheries, stimulation of agricultural employment and services and rural socio-economic development, promotion of the production and supply for raw materials to agro-industries, provision of markets for industrial sector products, as well as the generation of foreign exchange. Its main target group are smallholder farmers and pastoralists. Both climate adaptation and mitigation goals form the basis of the MoA's approach, hence its focus on the CSA approach.

Since 2013, the MoA has made significant strides implementing several programmes and projects on climate smart agriculture to mitigate the impact of climate change in Nigeria. Some of these, which are relatively more relevant to the GRMA programme, are listed here: installation of Automatic Weather Stations, construction and rehabilitation of on farm run-off water harvest and mini earth dams, distribution of climate resilient seeds and seedlings, transboundary animal diseases/pests control, and establishment of pilot demonstration farms on agroforestry (AF), Farmer Managed Natural Regeneration (FMNR), and Conservation Agriculture (CA).

Federal Ministry of Humanitarian Affairs, Disaster Management and Social Development

The Federal Ministry of Humanitarian Affairs, Disaster Management and Social Development was established in 2019 by the President to lift 100 million Nigerians out of poverty. The Ministry is charged with the responsibility of implementing a wide range of social assistance programmes (including the NSIP) as well as overseeing the activities of strategic government agencies involved in the implementation of social protection and humanitarian related programmes and schemes in Nigeria.

3.2 Ongoing CRA and CDRFI activities in Nigeria

The workshop provided an opportunity to take stock of the ongoing or planned climate risk assessment (CRA) and CDRFI activities of various development partners active in Nigeria, adding greater context and information to publicly available or well-known information. This stocktake is particularly critical in the context of the Global Shield, which aims to address and improve the

fragmented state of the current global CDRFI architecture. Under this umbrella, the GRMA aims to ensure that there is synergy between complementary activities and avoid duplication of work. Key partners, in addition to private sector stakeholders, were invited to attend and exchange on this topic during the workshop. Highlights from the literature review, bilateral meetings and workshop discussion are presented below and are used to identify the added value provided by GRMA support.

Table 1: Climate risk assessment activities in Nigeria

Document & author	Publication	Highlights, of relevance to GRMA programme
GERICS German Climate Service Center report	2015	<ul style="list-style-type: none"> • Presents climate change figures based on primary data - large ensemble of projections from different global climate models for three different scenarios (low, medium, high). • Data updated to the basis of the IPCC's 5th Assessment Report (AR5 IPCC)
Nigeria's Third National Communication under the UNFCCC, Government of Nigeria ⁷	2020	<ul style="list-style-type: none"> • Multi-sectoral overview of impacts from climate change • Range of adaptation options to mitigate impacts
Fragility and Climate Risks: Nigeria, USAID	2019	<ul style="list-style-type: none"> • Identification of key areas of concern in context of humanitarian and security crises. • Assessment of historical data on six key hazards—rainfall anomalies, chronic aridity, wildfires, floods, cyclones, and low-elevation coastal zones
Climate Change Country Profile: Nigeria, USAID	2023	<ul style="list-style-type: none"> • Key climate impacts identified for agriculture (saltwater intrusion, desertification), water, health (heat mortality and food security) and energy (infrastructure damage, reduced hydropower)
Climate Risk Profile: Nigeria, BMZ	2021	<ul style="list-style-type: none"> • Profile summarises projected climate parameters and their impacts in Nigeria to 2080, using a low emissions scenario of RCP 2.6 and high scenario of RCP 6.0.
Climate Risk Country Profile: Nigeria, World Bank Group	2021	<ul style="list-style-type: none"> • Profile provides a range of projections (RCP 2.6, 4.5, 6.0, and 8.5 to 2100) for average temperature and average precipitation. • Focus: national scale, multiple hazards/sectors
Managing the water 'megacity' – FSD Africa	2021	<ul style="list-style-type: none"> • Flood risk and resilience in Lagos

⁷ URL: <https://unfccc.int/documents/226453>

Document & author	Publication	Highlights, of relevance to GRMA programme
Nigeria's Annual Flood Outlook Reports (NIHSA) ⁸	Annual	<ul style="list-style-type: none"> Yearly outlook and monthly bulletins on flood prone areas – coastal states (Bayelsa, Delta, Lagos and Rivers) identified as high risk due to rise in sea level and tidal surge
Geospatial Mapping of Areas at Risk to flood Along Sokoto-Rima River Basin, Sokoto Nigeria ⁹	2022	<ul style="list-style-type: none"> Mapping of flood prone areas along Sokoto-rima river basin considering soil type, precipitation, land use, slope, drainage density, and elevation. Methods and materials: Landsat 7ETM+ of 30m resolution, ASTER Global Digital Elevation Model, Global Positioning System and Precipitation Data.

Table 2: Climate and disaster risk financing and insurance activities in Nigeria

Please see table below.

⁸ E.g., <https://ndlink.org/nigerias-annual-flood-outlook-report-for-2023nihsa/> and nihsa.gov.ng/publications/

⁹ Bello A. A., Abua M. A., Yelwa S. A., Undiyaundeye F. A., Iwara A. I., Abutunghe M. A., Basse B. J., Egbonyi D. E., Owalom S. O., "Geospatial Mapping of Areas at Risk to flood Along Sokoto-Rima River Basin, Sokoto Nigeria," Environment and Ecology Research, Vol. 10, No. 6, pp. 806 - 823, 2022.

Project / Implementor	Target sectors, hazards, focus areas	CDRFI activities	Contact person / document
Tripartite Agreement: UNDP, BMZ, IDF	<ul style="list-style-type: none"> Lagos State Flood risk Urban 	<ul style="list-style-type: none"> Project leverages parametric insurance solution to protect 8.5 mio. people and to ensure quick pay-outs based on magnitude of flood event Funds are released to Lagos State Govt. that contribute to emergency disaster relief and rapid (re)construction of critical network infrastructure The insurance product expected to be integrated into the existing flood risk management framework 	TPA Lagos Flood
World Bank	<ul style="list-style-type: none"> Emergency preparedness & response Perennial floods 	<ul style="list-style-type: none"> Preparedness assessment and 'Lessons Learned' Exercises ongoing, focusing on 2022 flood events Analytics and climate resilience part of all projects. Seeks to identify right systems and resources required even at community level 	
African Risk Capacity (ARC)	<ul style="list-style-type: none"> National/regional Agriculture Topical cyclone and epidemics 	<ul style="list-style-type: none"> Approach: Adoption of innovative insurance risk pooling approach towards CRF and DRM Focuses on parametric insurance, but advocates for integration with mechanisms such as Cat DDO for comprehensive risk management Planning to launch a flood project by year end - currently no insurance policy in place, although ARC works closely with the TPA project 	Contact person: Underwriting Manager Ms. Gloria Womitso
Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL Plc.) Est. 2013	<ul style="list-style-type: none"> Agriculture Agribusiness credit De-risking the agriculture & agribusiness finance value chain Cooperation with FMARD 	<ul style="list-style-type: none"> US\$500 mio. NBFi owned by Central Bank, created to redefine, dimension, measure, re-price & share credit risks Mandate: stimulate flow of affordable finance and investments by fixing agri. value chains, building long-term capacity, and institutionalizing incentives for agrilending through Risk Sharing, Insurance, Technical Assistance, Incentives and Rating Ongoing projects: promoting climate smart approaches to animal rearing, development of an agricultural risk management strategy for primary crop production, and integrated commercial use project 	https://www.undp.org/africa/sahel-resilience-project
NEMA / UNDP – Sahel Resilience Project	<ul style="list-style-type: none"> Community-based disaster risk reduction 	<ul style="list-style-type: none"> CRA focus: project is taking inventory of the various climate risk reduction assessments with multi-hazard focus in Nigeria 	
IFAD	<ul style="list-style-type: none"> Adaptation and agribusiness support Value Chain development (cassava) Flood 	<ul style="list-style-type: none"> Provide grants to rural agrarian populations Promote sustainable agriculture on the ground Reached 5 million beneficiaries, mainly women. Supporting rural producers organisations and community development associations, as well as finance groups. 	Priscilla Achakpa https://www.ifad.org/en/w/member/nigeria

Project / Implementor	Target sectors, hazards, focus areas	CDRFI activities	Contact person / document
	<ul style="list-style-type: none"> • Crop loss from fire, flood, excessive rain, drought • Focus: women, youth, smallholders 	<ul style="list-style-type: none"> • Provide capacity building on precision agriculture and water management directly to farmer organisations. Implement financial services and (weather crop) insurance, partnered with local insurance companies, and provide TA to communities to adopt improved practices (to reduce exposure risk). Have overseen payouts but issues remain with amount. 	
Capacity Building - NCPWA	<ul style="list-style-type: none"> • Disaster preparedness and response 	<ul style="list-style-type: none"> • Aim: Increase capacity of Emergency Respondents towards mitigating impact on and recovery for people with disabilities in the aftermath of disaster/emergency 	
Sahel Consulting	<ul style="list-style-type: none"> • Flood and drought • Agri value chains 	<ul style="list-style-type: none"> • Conducts studies, advisory (e.g., on market entry), implementation, enhancing public private partnerships. One approach is to build stations for data collection to diversify/reduce dependence on government data sources • Sahel Food Systems Changemakers Programme (crop value chain project) • Agricultural Systems Resilience Enhancement project • Early Warning Systems project currently in design phase; aims: increase analytical capacity of current EWS, increase weather stations, align national action across EWS system, and enhance operational governance. Key challenge: lack of coordination across stakeholders and sectors. 	https://sahelconsult.com/
Royal Exchange	<ul style="list-style-type: none"> • Crops/agriculture 	<ul style="list-style-type: none"> • Working with NAICOM and government stakeholders • Crop insurance products – hybrid indemnity product for climate related agri risks on the market 	Abdulazeez Ajibola
Anticipatory Action to Climate Change – IFRC	<ul style="list-style-type: none"> • Building adaptive capacity of communities • Drought 	<ul style="list-style-type: none"> • Works closely with the MoE and relies strongly on building research and community engagement. • Developing national climate strategy to support risk assessments; pilot has been launched in Jigawa state focusing on drought 	
Nigeria Agro-Climatic Resilience in Semi-Arid Landscapes (ACReSAL) Project 2021-2027	<ul style="list-style-type: none"> • Northern Nigeria • Multi-sectoral convergence (across environment, agriculture and water) 	<ul style="list-style-type: none"> • Implemented with MoE, MoA, MoWR, with US\$700 million credit from IDA. • Aim: increase implementation and strengthen enabling environment for sustainable landscape management practices, technology modernization, and improved use of data, analytics, and connectivity • Actions: Dryland Management, Community Climate Resilience, Institutional Strengthening and Project Management, and Contingent Emergency Response. 	
Multi-Sector Investment Planning for Coastal Resilience in Nigeria	<ul style="list-style-type: none"> • Coastal flooding and resilience • Resilient infrastructure solutions 	<ul style="list-style-type: none"> • US\$300,000 grant funded by Japan-World Bank Program for Mainstreaming DRM seeks to develop a comprehensive investment plan for resilience needs in coastal Nigeria. 	

Project / Implementor	Target sectors, hazards, focus areas	CDRFI activities	Contact person / document
(Second Phase – 2021-2024)		<ul style="list-style-type: none"> Identifying communities and infrastructure most at risk to coastal erosion and flooding, and developing potential solutions for adaptation (at pre-feasibility level). Will also address issues of governance and policy related to resilient coastal zone management. 	
Closed projects			
Nigeria Erosion and Watershed Management (NEWMAP) – closed in 2021	<ul style="list-style-type: none"> 23 states in Nigeria Erosion Land restoration through tree planting across northern states of Bauchi, Jigawa and Sokoto 	<ul style="list-style-type: none"> Aim: rehabilitate degraded lands and reduce erosion and climate vulnerability 4 streams: Investing in erosion and watershed management infrastructure, Developing information services to strengthen erosion and watershed monitoring and DRM, Strengthening strategic framework for climate action to promote low carbon development, and Supporting project management at federal and state levels with safeguards and oversight, outreach, and project M&E. 35,000 direct and over 100,000 indirect beneficiaries (the latter achieved through small grants to community interest groups). Other outcomes: testing of remote sensing, geographic information system techniques, and 360-degree cameras and drones, as well as the launch of over a hundred automated hydrology and meteorology and flood EWS across the country. 	
Action Against Desertification Project	<ul style="list-style-type: none"> Drought, desertification Degraded land management & restoration Sokoto, Bauchi, Jigawa states 	<ul style="list-style-type: none"> Financing and technical assistance of adaptation measures. Across Africa: 12,000 ha land restored in 2015-17 and 18,000 ha in 2018; 1,500,000 seedlings used in 2015-17; 569,361 beneficiaries in Nigeria On CRA: completion of baseline assessments, development and assessment of biophysical and socio-economic indicators using FAO's open source Collect Earth and use of "5 capitals" household surveys 	<ul style="list-style-type: none"> https://www.fao.org/in-action/action-against-desertification/countries/africa/nigeria/zh/
CCA and Agric. Business Support Programme (IFAD Donor Assisted)	<ul style="list-style-type: none"> Seven States of the Savanna Belt Agriculture and climate change adaptation 	<ul style="list-style-type: none"> On CRA: Implemented by MoA across all northern states bordering Niger 2013 - 2021 	

3.3 Major gaps and needs of key stakeholders and proposed scope of GRMA support

On Day 1 of the workshop, participants formed three discussion groups, with members of the same institution requested to remain together. This was done to avoid duplication of results, in response to questions about institutional activities, capacities and gaps. On Day 2 of the workshop, participants were again asked to form four discussion groups, this time taking care to distribute members of the same institution across these groups, to ensure that proposals on areas for GRMA support would be truly cross-sectoral.

Day 1: Group Work (Major gaps/needs of key stakeholders)

Stakeholders highlighted various ongoing projects and programmes (see Chapter 3) and presented an overview of gaps / potential areas or entry points for GRMA support. These are summarised below.

Capability development related to risk assessment and data.

- Develop capability of NEMA to move from post-disaster interventions to prevention and DRR management, including:
 - ability to identify its own risk assessment needs and appropriate assessment approaches/methodologies to use, and
 - develop a national risk assessment – and are interested to develop capability among its practitioners.
- Develop capability of NCPWD to
 - identify location and characteristics of disabled people especially in climate risk areas, e.g. by undertaking a needs survey,
 - to coordinate/lobby for adequate social protection, and
 - enhance early response, preparedness and outreach efforts.
- Development of consolidated and reliable data and disaggregated datasets

Assessments.

- Vulnerability mapping
 - of select states – Lagos state as pilot project.
 - on charcoal production also proposed in one state, to map deforestation. Challenge – did not occur due to lack of funds.

Support to improve data and models.

- Climate models:
 - Support Nigeria to develop, access, and use climate data and models that allow assessment of future risk - existing Nigerian climate models rely strongly on historic data, which, although useful to identify possible risks, is limited in the context of the changing patterns of climate events. The sharp increases in climate events in Nigeria and more unpredictable weather patterns indicate that historical data alone will likely underestimate the likelihood of future extreme climate events significantly.
- Support NiMet to invest in:

- better forecasting, e.g., technology for numerical weather prediction models,
- improving its network of observing stations across Nigeria; mainly the north (this is outside GRMA scope).

Risk management activities.

- Support Transport Ministry to improve their river dredging efforts for flood management (support needed to improve monitoring e.g., at gauging stations, potentially analytics)
- Support FMWR to improve capacity for transboundary water management/collaboration, improve dam management (ensuring appropriate level of dam utilisation and avoid siltation), improved irrigation technology.
- Training needed on CSA and retrofitting infrastructure, afforestation/reforestation areas.
- Better access to NBS data for all other ministries and departments.
- CDRFI – Nigeria has annual budget for CDRI solutions. There is an ongoing project to develop comprehensive insurance for vulnerable communities. Could GRMA support this further.

Cross-cutting needs in funding, governance.

- Capacity/funding for a survey or collection of disaggregated data – to be coordinated by the country itself, specifically run by an organisation like NCPWD or NBS,
- Funding for effective implementation of projects/programmes,
- Institutional capacity/ coordination and collaboration in governance,
- Awareness and outreach at local levels (community/downstream community/ smallholder farmer level)
 - For example, ICLP – project done but adoption by sub-government level is slow – lack of awareness and consolidated data.
- Include state and local government representatives and include a focus on sub-national levels as part of GRMA work.

Day 2: Results of Group Work Activity (Proposed GRMA project proposals)

The following table presents an overview of the Operational Projects or general areas for GRMA support that were proposed by participants during the workshop.

Table 3: Overview of Day 2 Group Work Proposals

No.	Project	Purpose	Region	Outcome
1.	Community-based disaster response	Strengthen capacities of coastal communities, enhance understanding of risk in the region, identify adaptation measures (alternate livelihoods), open door to financing mechanisms and enhance PPP	Northern Nigeria	Frameworks and structures developed (creation of disaster management platform and early warning infrastructure), implementation of vulnerability & capacity assessment, development of a contingency and response plan (including developing data on vulnerable groups, identifying/creating safe response spaces, enhancing WASH facilities)
2.	Desilting of rivers and old dams	Reduce flood risk for frontline/riverine communities	Flood prone areas	Data generation, modelling of rivers and dams
3.	Construction of pedestrian bridge	Increase accessibility – mobility and development	Guyi Village, Kuje, FCT Abuja	Improved livelihoods for farming communities
4.	Survey on flood impact on disabled people	Improve preparedness, understand livelihood impacts	National	Disability inclusive disaster response, enhancing of financial mechanisms (social protection or insurance)

The following potential activities were also discussed in the group session:

- Assessing flood damage to agriculture sector (crop and livestock production, as well as impacts across the value chain) to address food insecurity
 - From literature: alarmingly high levels of food insecurity have been reported particularly in north and northeastern states – the food basket – of Nigeria, e.g., Sokoto, Bauchi and Jigawa. Per a survey done as part of the AAD desertification project, nearly 90% of respondents said they had experienced anxiety and uncertainty about food in the previous four weeks (nearly 74% of households had experienced such anxiety and uncertainty 3–10 times in that period)¹⁰
- Modelling the fluvial flood risk across flood/river basins,
 - the Ogun-Osun River Basin highlighted as being very prone to flooding
 - accounting for inadequate land/water management and transboundary issues such as release of dam water from Cameroon/Lake Chad Basin
 - Understand the benefits and costs of physical infrastructure for flood protection
 - Potential areas of focus: flood prone areas/communities along Niger and Benue rivers; Niger River Delta in Bayelsa and Delta states (also vulnerable to upstream dam releases)

¹⁰ <https://www.fao.org/3/ca0390en/CA0390EN.pdf#page=47>

- Develop capability of NCPWD to develop and implement their Disability-Inclusive Toolkit – support to develop/implement survey and needs assessment activities, build/collate disaggregated datasets

3.4 Priorities for further information

The workshop was successful in mapping resources at various levels in the country, however, due to lack of time and resources, some open questions remain. Some of the limitations to our understanding of risk insight and financing in the country could be attributed to the following.

1. During the first workshop, we were unable to establish significant connections at a policy level with the Ministry of Finance or the Ministry of Budget and Planning. Given the general interest of stakeholders in the Global Shield process, and the centrality of these two ministries to the success of a potential GS application (and the resultant development of a sovereign risk finance strategy and CDRFI solutions), we plan to work further on these relationships in the early stages of the GRMA programme.
2. Lack of full knowledge and understanding of the engagements existing within Nigeria before the workshop and thus an incomplete mapping of resources existing in-country.
3. Absence of our knowledge on the role and understanding of the risk assessment and financing at the state level. The workshop eventually focused on national level stakeholders and could not engage much on the state level and this is something the team would work on.
4. Lack of connections with the private sector and regulators in country and understanding of their interests in physical climate risk. We have since established contact with the regulator, and plan to build connections with the domestic insurance sector, which is largely based in Lagos.
5. Continue bilateral discussion with NCPWD to define disabilities collated in data and elaborate the scope of potential support on assessment of risk to disabled people.

4 Proposed GRMA activities

Based on the discussions and areas of support proposed at the scoping workshop, GRMA proposes below a selection of projects that could be achieved within the 12-18 months and available budget. The NCCC, together with its partners, is also invited to propose additional options or amend the options below. Any new or amended options will then be considered by GRMA.

4.1 Strategic risk assessment

GRMA typically offers to undertake a strategic risk assessment for multiple hazards at national scale, including projecting risk in a future climate and considering projected socio-economic change. Strategic projects will usually inform policy instruments or are fundamental for further risk understanding. If no strategic project is required, the resource will be reallocated to Operational Projects. The project could entail one of the following options:

- New, joint modelling project for climate and geo-hazards
- Informs national policy instruments (e.g., NAP), or strategic risk capability
- Limited work to fill gaps in current strategic risk understanding, e.g., to add probabilistic views of future climate or exposure or add unmodelled hazards
- Sovereign level, sector-specific focus (e.g., Infrastructure, Health, Agriculture...) covering multiple hazards under current and future conditions

According to expressed NCCC interest, in Nigeria GRMA proposes that a strategic project could comprise fluvial flood hazard modelling with national coverage, and risk assessment for an aggregated view of residential, commercial and industrial building stock, and agricultural sector exposure. Results would be expressed in terms of capital stock damaged by flooding annually and for extreme events. This quantification of potential losses would inform risk prioritisation across geographies, which can be used for climate adaptation (including decisions on Climate Smart Agriculture), investment in flood protection, and dam and river channel management. The risk assessment would use an event-based approach, such that the results could be applied to CDRFI planning.

Co-development of this strategic risk assessment would develop technical capability of local partners in the development of national scale exposure and flood hazard models, and the application of existing open source risk modelling frameworks. The local experts would be guided to understand the process sufficiently to be able to replicate the flood modelling for other types of assets of interest, for example education and healthcare facilities.

This work would seek to complement work being planned and undertaken by UNDP on risk profiling, via open dialogue with and coordination with UNDP Nigeria in project planning and implementation.

4.2 Proposed operational projects

Two operational projects are proposed, through which the GRMA and collaborating stakeholders will:

1. Develop ownership for roles, key dependencies, and formulation of research questions, resource catalogues, milestones to be achieved within the projects.
2. Maximise the opportunity for 'side by side' learning in these projects, for ministry or state officials performing the analysis alongside GRMA team members.
3. Establish credible climate risk models, granular datasets, and knowledge platform that would enable the stakeholders to conduct subsequent CRAs and to become more self-reliant in risk understanding for disaster risk finance and investment in adaptation.
4. Embed and document best practices and standards in procurement of models and data for shared use on open risk modelling platforms, using interoperable data standards.

4.3.1 Operational project 1: Modelling the flood risk to vulnerable communities and disabled population

Incorporating flood hazard modelling developed under the strategic project for initial prioritisation, this operational project would assess at higher hazard resolution, the flood hazard and risk to disabled people in 1-2 selected urban or rural areas, using official data from NCPWD. There is potential to incorporate limited dam flood scenarios into this operational project, to understand this risk to disabled people, as well as more typical rainfall-triggered fluvial flooding.

Applications could include assessing the cost of responding to assist disabled and non-disabled vulnerable people, under current and future conditions. This would inform assessment of CDRFI and social protection requirements to support vulnerable communities in flood-prone areas. Co-development of this project with NCPWD to enhance efforts to support disabled people in the face of climate risk and would be directly designed to support inclusive early response and preparedness activities. With NEMA it would be designed to support their desire to identify their own risk assessment needs and have greater understanding of available data and methods to achieve their goals.

4.3.2 Operational project 2: Agricultural drought modelling for food security

Moving beyond national scale climate risk assessments, which have previously estimated the potential change in national crop production, this operational project would estimate crop losses (as suggested by Ministry of Agriculture) at a suitable scale to provide agricultural loss estimates at state level in response to droughts in the region. We would focus on the current and future risk presented by droughts in the crop cycle and would also perform benefit-cost analysis of adaptation measures to reduce the impacts on crop and eventual food security.

We will provide agriculture drought models using observations and output from global and regional climate models (GCMs/RCMs) for selected projections of climate conditions. The model would focus on projecting the response of selected crops in historical and future time scales (2020, 2050, and 2080) to droughts in a selected region of Nigeria (selection of crops and region to be agreed with NCCC). The results of this analysis would be used to propose suitable CDRFI solutions alongside climate adaptation strategies under different climate scenarios.

4.3 Relevant stakeholders

This section takes stock of the key stakeholders identified so far, in relation to the GRMA programme in development. Their activities and roles in the area of risk analytics are defined below; these include, but are not limited to the following, and will form entry points for discussion with these stakeholders at a next workshop, to be held in early 2024 (tentative).

- **NiMet:** active in the areas of seasonal climate prediction, early warning for weather and climate, as well as observations of weather in Nigeria.
- **Ministry of Water Resources:** Dam and reservoir construction, irrigation schemes, urban and rural water supply schemes, hydropower generation as well as WASH programmes.
- **Transport Ministry:** Construction of rail tracks for rural-urban connectivity, construction of marine water ways and river dredging towards flood impact mitigation.
- **Ministry of Agriculture:** FMNR-agroforestry and water harvesting structures'
- **Ministry Womens Affairs,** distribution of LPG cylinders to rural women; and social mobilisation and awareness raising on firewood, health and environment in all 36 states.
- **NCPWD:** Disability inclusive risk reduction and assistive devices
- **National Bureau of Statistics:** interested in potentially developing a common data and statistics platform to ease access to data for MDAs
- **Ministry of Finance, Budget and National Planning** is the coordinating organ of all government projects, programmes and policies, and was responsible for the revision and mainstreaming of the National Social Protection Policy across federal and subnational levels. The Budget and National Planning arm works closely with the Social Development department within the Ministry, and the Nigerian Institute of Social and Economic Research (NISER).
- **Nigerian Agriculture Insurance Corporation (NAIC)** is a government-owned insurance company set up in 1987 to provide insurance cover for agricultural risks to Nigerian farmers, amid a concern that commercial insurance companies were unwilling to underwrite agriculture risks.
- **Ministry of Humanitarian Affairs** – have published two key documents that contribute to CRA in Nigeria (2021 report on flood, and another in 2023)

4.4 Next steps

The GRMA team would now in coming weeks agree with NCCC what deliverables they would like to see in broadly under GRMA, such as:

1. The impact metrics of most value for decision-makers, e.g., economic loss; food security; loss of livelihoods/welfare impacts; and mortality.
2. The policy instruments that would be used to convey the information, e.g., National Adaptation Plan.
3. Where (regions, hazards, and exposures) data and model support should be focussed and what hosting arrangements might be possible.

4. How GRMA could be most beneficial in engaging in the taking the risk assessment and adaptation conversation.
5. Identify and agree of the scope and extent of conducting a multi-hazard climate risk assessment.
6. Identify the stakeholders that should be the beneficiaries of the capability development programme (to be defined), so that the research and resources originating from the programme could be used most sustainably. MDAs will be invited to nominate appropriate staff as beneficiaries of these activities.

The next steps include presenting the findings of the workshop and the proposals made in this scoping report, including an overview of the suggested operational projects, to NCCC. The report would be used as a basis for updating the GRMA application, which NCCC will submit for consideration. Contingent on receiving a 'no objection' from the GRMA Strategic Committee, another stakeholder workshop in Abuja and the development of a Call for Proposals would then follow, to develop and implement the defined operational projects and capability development needs. The GRMA team would secure agreement with ministries on priorities, e.g., through MoU along with establishment of networks at federal or state level to create the right conditions for the operational projects. The program would observe "learning side by side" approach with intention of building strong relationships with the involved stakeholders and eventual beneficiaries of the project.

ANNEXES

Annex 1: Participant list

Annex 2: Concept Note and Agenda

Annex 3: Notes from bilateral meetings

Annex 4: Workshop group discussion questions

Annex 5: Link to Global Shield