



Gap Analysis Report

Contribution to the
Global Shield against Climate Risks
&
Global Risk Modelling Alliance
In-Country Process in Ghana



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Abbreviations

ARC	African Risk Capacity
CDRFI	Climate and Disaster Risk Finance and Insurance
DRM	Disaster Risk Management
EPA	Environmental Protection Agency
GAIP	Ghana Agricultural insurance Pool
GIA	Ghana Insurers Association
GCA	Global Center on Adaptation
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Development Cooperation)
GMet	Ghana Meteorological Agency
GRMA	Global Risk Modelling Alliance
GS	Global Shield
GSFF	Global Shield Financing Facility (managed by World Bank)
GSSP	Global Shield Solutions Platform (managed by Frankfurt School)
ICC	In-Country Coordination (Global Shield)
ICP	In-Country Process
IDA	International Development Association
IDF	Insurance Development Forum
IIF	InsuResilience Investment Fund
ISF	InsuResilience Solutions Fund
MESTI	Ministry of Environment, Science, Technology, and Innovation
MMDA	Metropolitan, Municipal and District Assemblies
MoF	Ministry of Finance
MoFA	Ministry of Food and Agriculture
NADMO	National Disaster Management Organization
MSME	Micro, Small and Medium-sized Enterprises
NDC	Nationally Determined Contribution
NIC	National Insurance Commission
SDG	Sustainable Development Goals
TAG	Technical Advisory Group (Global Shield)
UNDP	United Nations Development Programme
UNOPS	United Nations Office for Project Services
V20	The Vulnerable Group Of 20 Ministers Of Finance
WB	World Bank Group



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1. Introduction

Launched at COP27 by the Vulnerable Twenty (V20) Group and the Group of Seven (G7), the Global Shield (GS) against Climate Risks aims to increase protection for climate vulnerable economies and communities by providing and facilitating substantially more and better pre-arranged finance against disasters and climate risks. Enhanced financial protection, along with faster and more reliable disaster preparedness and response, will effectively address losses and damages exacerbated by climate change. The GS promotes a demand-driven process that is owned and led by the governments of participating countries.

The Global Risk Modelling Alliance (GRMA) result 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 sovereigns' autonomous capability in climate and disaster risk insight, support strategic decision-making and help unlock risk finance for public good. Uniquely, it combines the expertise and resources of both public and private sectors in risk modelling, working side by side with officials and local experts in ministries and their agencies, it offers open risk management tools, technical assistance and funding for open models and data.

Ghana's Ministry of Finance (MoF) has formally requested support from the GS and GRMA to set up risk-informed pre-arranged finance linked to climate change adaptation efforts. These connected programmes help to strengthen locally owned risk insight and access to a choice of financial instruments that would provide rapid funds when disasters hit. The Director of the Economic Strategy and Research Division, Dr. Alhassan Iddrisu, has been nominated as the official focal point for the implementation of the GS and GRMA.

As part of the implementation, a joint multi-stakeholder In-Country Process (ICP) for the Global Shield (GS) and Global Risk Modelling Alliance (GRMA) was established, commencing with a kick-off workshop held on July 5-6, 2023. As a result of this workshop, **the Ministry of Finance (MoF) identified and prioritized three areas for further risk analytics and potential interventions in the field of Climate and Disaster Risk Finance and Insurance (CDRFI):**

1. Climate risk impacts on agriculture, including effects on food/staple crops critical for food security, and on cash crops relevant for Ghana's economy and livelihoods;
2. Coastal flooding and erosion related to tropical storms and its impacts on vulnerable coastal communities; and
3. Urban flooding (riverine, flash floods, etc.) and its impacts on critical infrastructure and vulnerable communities.



Building on these priorities, the GS Secretariat and GRMA under the leadership of MoF, conducted further desk research and technical consultations with key stakeholders to: i) collect relevant risk information and ii) to take stock of existing financial protection (planned and already in place) in these priority areas. **The insights gathered have been compiled into the following Gap Analysis. Its objective is to facilitate informed decision-making by the Ghanaian Government on major projected climate risks and gaps in financial protection.** This is established by comparing results from existing risk assessments with the levels of financial protection identified in the stocktaking. The Gap Analysis provides a basis for Ghana's request for CDRFI support as well as for the design of operational projects on risk analytics by GRMA.

This Gap Analysis was conducted entirely on the basis of existing risk assessments and a first overview on existing CDRFI solutions. More granular and tailored risk modelling, assessment on the regulatory and institutional framework and existing solutions will be necessary to structure a detailed support package to deliver on strengthening financial protection and to design the best fit CDRFI solutions for Ghana. GRMA's further support on risk analytics is expected to provide a key contribution to the development and support for implementation of financial protection by the GS. Furthermore, any **potential areas of intervention derived as a result of identified gaps are separate from Ghana's formal Request for CDRFI Support to the GS**, which will be drafted by MoF and submitted separately to the GS Secretariat.

Country Context Ghana

The following section provides a general country profile of Ghana, encompassing key economic and demographic metrics, debt sustainability, key commodities, the characteristics of the vulnerable population, and insight into the local Micro, Small, and Medium-sized Enterprise (MSME) sector. It lays the foundation for more detailed insights into climate risks and resulting vulnerabilities in the following chapter.

Macroeconomic:

Overview

Ghana is a country located in Western Africa, and shares borders with Côte d'Ivoire, Togo, and Burkina Faso. In 2022, Ghana had a Gross National Income (GNI) of \$71,48bn (current USD)¹. The population of Ghana is 33,475,870². GDP per capita was \$5,504 (purchasing power parity at constant 2017 \$)³.

¹ World Bank (n.d.). Gross National Income (current US\$). URL: <https://data.worldbank.org/indicator/NY.GNP.MKTP.CD?locations=GH>

² World Bank (2022). Population, total – Ghana. URL: <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=GH>

³ World Bank (2022). GDP per capita, PPP (constant 2017 international \$) - Ghana.



Debt Sustainability

A joint analysis of Ghana's public debt conducted by the World Bank (WB) and International Monetary Fund (IMF) in 2020 outlined that **external and overall debt are at high risk of debt distress but remain sustainable**⁴. In 2022, Ghana experienced a reduction in growth mainly caused by the consequences of the Russia-Ukraine war, which led to increased interest rates, higher inflation, and the depreciation of the national currency. In the 2022 Annual Public Debt Report of Ghana, the Ministry of Finance considered the creditworthiness of the country to be deteriorating. This is reflected by the assessment of the three largest rating agencies, which considered Ghanaian bonds as highly speculative. Further, the current debt crisis is expected to be deeper and more severe than the economic crises of the past⁵. As of 2022, the country has a debt ratio of 83.95%^{6 7}.

Key Characteristics:

Economic Structure

The level of economic complexity in Ghana is relatively low, exporting mainly services (information and communications technology (ICT), insurance, and finance), precious metals (gold), mineral products (oil and manganese), and agriculture (cocoa and cashews)⁸. ICT, gold, and crude petroleum oils make up more than 60% of the country's exports.

Agriculture remains a dominant economic sector, employing 39.49% of the Ghanaian population.

The majority of farms in Ghana are smallholder with low levels of mechanisation and irrigation systems. Therefore, smallholder farmers are mostly dependent on rainfall for irrigation, which is relatively volatile. **Climate change increases this volatility and the risk of damages from pests and diseases that attack different forms of crops**⁹. Livelihoods based on agriculture are thus highly vulnerable. The crops cultivated in Ghana can be divided into food/staple crops and cash crops. The main cash crops are **cocoa, oil palm, and cashew**. Cocoa production represents a significant part of the Ghanaian GDP and exports and is particularly vulnerable to pests and diseases, which are exacerbated by increasing drought and flood risk. While oil palm is threatened by rainfall volatility, pests and diseases, cashew production is only vulnerable to rainfall volatility. **Maize and rice** are the most important food crops and the most vulnerable to climate risks. Another central food crop, **cassava**, is exposed to climate and pest risks. A significant shock to any of these three crops has the

⁴ International Development Association & International Monetary Fund (2020) – Joint World Bank-IMF Debt Sustainability Analysis. p. 2. URL: <https://documents1.worldbank.org/curated/en/707381592860938004/pdf/Ghana-Joint-World-Bank-IMF-Debt-Sustainability-Analysis.pdf>

⁵ <https://www.nytimes.com/2023/09/18/business/economy/ghana-debt-imf.html>

⁶ International Monetary Fund (n.d.). Economic Outlook Database – Ghana.

⁷ The debt ratio indicates the percentage of a total debts to a countries GDP.

⁸ The Atlas of Economic Complexity (n.d.). Ghana. URL: <https://atlas.cid.harvard.edu/explore?country=83>

⁹ Climate Risk Profile: Ghana (2017). USAID. URL: <https://www.climatelinks.org/resources/climate-risk-profile-ghana>



potential to undermine food security in Ghana¹⁰. Livestock is a key contributor to Ghana's food security, nutrition and GDP. This sector is also threatened as climate change affects the core source of nutrition for livestock, which is usually not supplemented with additional food.

Other economic sectors playing an important role in Ghana's economy are services and the industrial sector, currently employing 41.38% and 19.13% of the population, respectively ¹¹. In 2022, unemployment was at a level of 3.9% ¹².

Ghana lies adjacent to the Atlantic Ocean. Approximately **6.5% of Ghana's land mass is considered a coastal zone**, housing more than 25% of the Ghanaian population. Several larger cities including the capital, Accra, lie in the coastal region. The entire coastal area is vulnerable to coastal erosion and coastal flooding, while several cities, mainly those in the South of the country, are vulnerable to urban flooding. **Agriculture** remains an important economic sector in coastal regions. In the past years, yields have decreased, partially due to reduced soil fertility and perennial floods of farmland. Another industry that is experiencing adverse effects of coastal erosion and flooding is the **fishing industry**, including the entire value chain. A reduction in catch has already been experienced and is expected to continue. Another industry affected by coastal erosion and flooding, and also contributing to the problem, is the **extractive industry** (sand and gravel extraction). In cities such as Accra, the services sector is the dominant economic sector and is consequently affected by flooding. Lastly, the economic infrastructure in the coastal region is affected by coastal erosion and flooding which might lead to consequences for other, non-coastal regions in the country.

Vulnerable Population characteristics

In 2016, approximately 49% of the population lived with less than \$3.65 (PPP, 2017)¹³. In the same year, the poverty gap was measured at 21 (\$3.65)¹⁴, highlighting the severity of poverty in the country. This is supported by the multidimensional poverty index, which was measured at 0,111¹⁵.

¹⁰ Climate Risk Profile: Ghana (2017). USAID. URL: <https://www.climatelinks.org/resources/climate-risk-profile-ghana>

¹¹ Statista (2023). Ghana: Distribution of employment by economic sector. URL: <https://www.statista.com/statistics/447530/employment-by-economic-sector-in-ghana/>

¹² World Bank (2023). Unemployment, total – Ghana. URL: <https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS?locations=GH>

¹³ World Bank (2016). Poverty headcount ratio at \$3.65 a day – Ghana. URL: <https://data.worldbank.org/indicator/SI.POV.LMIC?locations=GH>

¹⁴ The poverty gap measures the intensity of poverty in a country by displaying the average shortfall of the total population from the poverty line at \$3.65. It is expressed as a percentage of the average shortfall to the poverty line. Source: World Bank (2016). Poverty gap at \$3.65 a day – Ghana. URL: <https://data.worldbank.org/indicator/SI.POV.LMIC.GP?locations=GH>

¹⁵ The multidimensional poverty index is an index that uses health, education, and standard of living indicators to determine the intensity of poverty. The MPI, using 10 different indicators to assess poverty, is generally considered to be a more holistic approach to assessing poverty. Values range from 0 (very low) to 1 (very high).



Furthermore, the country has a high GINI coefficient at 43.5¹⁶. The situation of people living in poverty in Ghana is adversely affected by high rates of inflation which exacerbates the challenges for the poor population¹⁷. Lastly, the richer parts of society have benefited more from recent growth than the poorer parts of society, thus increasing inequality. People in rural areas are more often in poverty than the urban population.

The main climate and disaster risks for vulnerable communities in Ghana are the increase in both frequency and intensity of water scarcity and drought, as well as heavy rainfall events¹⁸. Both drought and heavy rainfall are a threat to the agricultural sector which continues to be an important sector of the Ghanaian economy, employing ~40% of the country's workforce.

MSME characteristics

More than 90% of all businesses in Ghana can be considered as MSMEs¹⁹. The sector employs more than 60% of all workers. These MSMEs are highly exposed to various types of risks from droughts to floods. Ghanaian MSMEs are currently characterised by low levels of resilience due to differing factors. The main risks that Ghanaian MSMEs face are poor access to finance, business interruption, pandemics, climate and disaster risk, such as droughts, floods and fires. All these risks have been exacerbated in light of the COVID-19 pandemic. Poor risk assessments, informality, low levels of trust and awareness adversely impact the resilience of MSMEs and decrease the impact of support systems. Female-owned MSMEs face larger challenges due to limited access to land and capital²⁰.

2. Risk Assessment

Ghana's Fourth Communication to the UNFCCC²¹ in November 2021 summarises the climate risks faced by the country, citing the impacts of historical disasters – including 22 major hydrometeorological events (floods and droughts) in the last five decades which affected 16 million people and killed at least 400 people. While individual extreme events (rare and severe) can be

¹⁶ The GINI coefficient is a commonly used indicator to assess the level of income inequality in a country. The values range from 0 (perfect equality) to 1 (perfect inequality).

Source: World Bank (2016). GINI index – Ghana. URL: <https://data.worldbank.org/indicator/SI.POV.GINI?locations=GH>

¹⁷ World Bank (2022). Inflation, consumer prices (annual %) – Ghana. URL:

<https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=GH>

¹⁸ World Bank (2021). Climate Risk Profile: Ghana.

¹⁹ cenfri & GIZ (2021). Ghanaian MSME Resilience in the Face of COVID-19. URL:

<https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=GH>

²⁰ World Bank (08.12.2022). Ghana: Supporting Small and Medium Enterprises to Recover from the COVID-19 Pandemic. URL: <https://www.worldbank.org/en/results/2022/12/08/ghana-supporting-small-and-medium-enterprises-to-recover-from-the-covid-19-pandemic>

²¹ EPA, 2020. Ghana's Fourth National Communication to the United Nations Framework Convention on Climate Change, May 2020, Environmental Protection Agency (EPA), pp 378.



extremely damaging, frequent events (extensive risk) can also disrupt people's livelihoods and the economy due to the disruption caused by frequent, low severity events. High climate risk is already a reality in Ghana, but based on downscaled climate analysis presented in the Fourth Communication:

- Rainfall variability will be higher in the forest regions than the rest of the country.
- the country will continue to be warm and even get worse by 2080.
- Temperatures are likely to increase by at least 3 C by 2080 nationwide.
- The savanna regions are likely to record temperatures above 30 C.
- The high likelihood of wet spells may lead to more floods across the country.
- The projected increases in dry spells may exacerbate drought conditions, especially in the savanna.

Sea level rise is expected to increase by 20 cm by 2050 under Representative Concentration Pathway (RCP) 6 scenario, compared to sea level since the year 2000. This threatens Ghana's coastal communities and may cause saline intrusion in coastal waterways and groundwater reservoirs.

'Climate change is expected to increase the risk and intensity of water scarcity and drought across the country. The primary sectors affected are water, agriculture and forestry, and human health. As extreme rainfall events become more common, river bank over flow and flash flooding is likely. This may also result in soil erosion and water logging of crops, thus decreasing yields with the potential to increase food insecurity; particularly for subsistence farmers. The frequency and complexity of some of these disaster events are also increasing, especially flooding.'

World Bank Climate Risk Country Profile summary for Ghana - key trends in climate impacts.

Several climate and disaster risk profiles with national coverage have been published for Ghana. They provide information about the climate in the country, estimations of risk from several hazards, and propose potential adaptation options. This section outlines the approach and scope of previous risk studies, summarises published risk estimates to highlight key risks, and identifies gaps in risk analytics and information for Ghana.

2.1 Risk information with national coverage

Climate Change Risk Profile for Ghana, USAID, 2017²²

The climate change risk profile for Ghana, published by USAID in 2017, provides projections of temperature, precipitation and sea level rise, along with sector level climate impacts for agriculture, fisheries, water resources, energy, and human health. Original risk analysis has not been conducted

²² USAID (2017). Climate Change Risk Profile – Ghana. URL: climatelinks.org/sites/default/files/asset/document/2017_USAID_Climate%20Change%20Risk%20Profile%20-%20Ghana.pdf. Last accessed 3 November 2023.



for this fact sheet, but refers to previous analyses by the FAO, Ghana's third National Communication Report to the UNFCCC, University of Ghana papers on managing coastal impact of sea level rise, and previous USAID climate vulnerability profiles for Ghana published in 2011 and 2012.

National Disaster Risk Profile, UNDRR, 2019²³

In 2019, UNDRR published a national disaster risk profile which used probabilistic modelling of river flood and droughts to estimate losses for multiple sectors of the economy, and the number of people affected was estimated. The study estimated the risk for current conditions and for the 2060s and 2080s using the RCP 8.5 climate scenario (worst case). The analysis was conducted using Cima Foundation global flood hazard maps and drought modelling approaches, with publicly available data to represent exposure.

Climate Risk Profile for Ghana, GIZ²⁴

The Climate Risk Profile for Ghana, published by GIZ provides projected climate parameters and sector impacts until 2080 under different climate change scenarios: low emissions using RCP 2.6 and medium to high emissions scenarios (RCP 6.0) excluding the effect of socioeconomic impacts. The climate parameters covered are temperature, very hot days, sea level rise, precipitation, heavy precipitation events, soil moisture, and potential evapotranspiration. Sector impacts consider water resources, agriculture (including drought affected crop yield projections for cassava, maize, millet, groundnut and field peas), infrastructure (exposure of urban areas and roads to flood), ecosystems (tree cover and animal species loss), and human health (exposure to heat waves and associated mortality).

Ghana's Fourth National Communication to the UNFCCC, 2021

Downscale climate analysis presented in the Fourth Communication to UNFCCC shows annual rainfall trends and projected average temperature for the country for three 20-year time periods to 2080 as well as for the historical average (1980-2014). Chapter 5 also shows decadal trends in temperature and rainfall for six different ecological / zones.

Highlighted in the report is the increasing attention on climate modelling impact assessment and adaptation in the research community of Ghana, in the last eight years. The report highlights that thousands of research articles have been published in a single year on the topic and that the academic community continues to invest in and deepen this area of research. The report describes the assessment of spatial climate change vulnerability, in which a district level vulnerability index has

²³ UNDRR (2019). United Nations Office for Disaster Risk Reduction and Cima Foundation, Disaster risk profile - Ghana. [URL: undrr.org/publication/disaster-risk-profile-ghana](https://undrr.org/publication/disaster-risk-profile-ghana). Last accessed 3 November 2023.

²⁴ GIZ (no date). Climate Risk Profile – Ghana. URL: <https://www.pik-potsdam.de/members/gornott/climate-risk-profile-ghana.pdf>. Last accessed 3 November 2023.



been developed, which is described later in this section. That assessment finds the Upper West, Northern and Upper East regions to be most vulnerable to climate risks. Greater Accra and Ashanti are estimated to be the least vulnerable regions.

Climate Risk Country Profile, World Bank, 2021²⁵

World Bank Climate Risk Country Profiles (CRCP) are designed to facilitate policy dialogue and strategic planning by presenting a climate baseline of trends and projected changes in key climate parameters, with sector-specific effects and priorities. A large amount of data is summarised from the World Bank's Climate Change Knowledge Portal (CCKP²⁶).

CMIP5 projections are presented, indicating that by 2040-2059, the annual temperature is estimated to be 1.2 to 2.7 °C (with a mean of 1.7 °C) warmer than the historical annual average. Estimates of change in annual precipitation is highly uncertain, with CMIP5 ensembles projecting a range of 22.2 mm *reduction* in annual precipitation to 30.4 mm *increase*, with a mean estimate of +0.3 mm. The report highlights though that *'more erratic and intense rainfall during the wet season is expected, along with lower precipitation levels during the dry season; larger decreases in the southern regions.'*

Sector impacts presented in the CRCP are largely drawn from other diagnostic reports, including USAID (2017 and 2018), IFPRI (2012), Republic of Ghana (2015), and WHO (2015). One of the research gaps identified in the CRCP relevant to risk information is to *'Conduct a comprehensive national assessment of climate change impacts and existing vulnerabilities for Ghana's population health and the health sector's capability to respond and adapt to climate change impacts'*.

How climate-vulnerable countries can have the best in understanding risk, GRMA, 2021²⁷

A fast-track climate analysis was conducted for Ghana using the CLIMADA open-source risk model and freely available global data. The analysis provides estimates of current risk at the national and subnational levels, and projection of risk to 2050 including climate change and socio-economic development. The study also appraises four types of adaptation measures in different areas of the country and illustrates the complementary nature of adaptation and climate and disaster risk financing and insurance (CDRFI) in managing risk.

²⁵ World Bank (2021) Ghana Country Risk Climate Profile. URL: climateknowledgeportal.worldbank.org/sites/default/files/2021-06/15857-WB_Ghana%20Country%20Profile-WEB.pdf. Last accessed 3 November 2023.

²⁶ World Bank Climate Change Knowledge Portal. URL: climateknowledgeportal.worldbank.org/country/ghana. Last accessed 3 November 2023.

²⁷ GRMA (2021). GRMA Report: Global and local, public and private – How climate-vulnerable countries can have the best in understanding risk. URL: https://grma.global/wp-content/uploads/2022/07/GRMA_Report_Summary_pg_v3.1.pdf. Last accessed 3 November 2023.



UNDP Inclusive insurance and risk financing in Ghana, 2021²⁸

The UNDP 'Diagnostic Report For Inclusive Insurance And Risk Financing In Ghana' (Abaidoo, 2021)²⁹ highlights 'notable' hazards in Ghana as 'perennial floods, fires, droughts, pest infestation, industrial and domestic accidents, and diseases'. The diagnostic report was not able to use data held on risk assessment by NADMO, so relied on desk review to summarize the risk profile of Ghana. The report includes a short history of floods with a brief description of 26 floods between 1964 and 2020. A general hazard profile with the regions affected by each type of hazard is provided, excerpted in Table 1. The diagnostic report notes that an agricultural sector risk assessment by the World Bank's Agriculture and Environment Services Department indicated a relatively low impact on agricultural output and growth. In particular, the 'diversity of agro-climatic conditions in Ghana's production systems and crops and seeds used within those systems lowers the aggregate risk level for the agricultural sector'.

Regarding pests, the Fall Army Worm is cited specifically, occurring from 2016 in the Eastern region, then spreading to all parts of Ghana, threatening food security. Abaidoo cites significant losses due to Fall Army Worm, totalling over 29,307 hectares of maize (a loss of GH¢ 40 million) destroyed between 2017 and 2019. Analysis presented in the diagnostic report is limited to four years of crop yield data from SRID / Ministry of Food and Agriculture. It does not appear that any quantitative long-term risk analysis of Fall Army Worm impacts on agricultural crops has been conducted.

²⁸ UNDP, 2021. Inclusive insurance and risk financing in Ghana Snapshot and way forward 2022, pp21. URL: irff.undp.org/sites/default/files/2022-09/summary-country-diagnostic-ghana_0.pdf. Last accessed 3 November 2023.

²⁹ Abaidoo, G., 2021. Diagnostic Report for Inclusive Insurance and Risk Financing in Ghana. Pp94.



Table 1 Hazards and areas of Ghana affected, adapted from Abaidoo, 2021.

Hazards	Type	Area	Impact
Hydro-meteorological	Floods Windstorm Tidal Waves Lightning Droughts	Accra/Kumasi/northern Sector Accra /Eastern Region Northern and Middle Belt Nation-wide	Severe Minor Moderate Moderate Severe
Fires	Bush/Wildfires, Domestic and Industrial fires, and Lightning	Nation-wide	Moderate to Severe
Geological/ Nuclear Radiological Disasters	Earthquakes, Landslide	Coastal Belt	Moderate
Diseases/Epidemics	Yellow Fever Cerebro -Spinal Meningitis (CSM) Pandemic Influenza, Covid 19	Northern Belt Coaster Belt Nation-wide	Severe Severe Severe
Pests and diseases	Fall Army Worm Pest infestation Anthrax, Blackfly, Locust, Larger Grain Borer, etc.	Northern/Middle Belt and Coastal	Severe Severe

Ghana: Roadmap for resilient infrastructure in a changing climate, 2022³⁰

The 'Ghana: Roadmap for resilient infrastructure in a changing climate' report was a collaboration between the Government of Ghana (MESTI), the Global Center for Adaptation (GCA), the University of Oxford, the United Nations Office for Project Services (UNOPS) and the United Nations Environment Programme (UNEP). It provides an assessment of climate risk on national infrastructure systems and proposes a roadmap to address those risks through targeted adaptation options. Modelling is performed for inland floods and droughts using the Height-Above-Nearest-Drainage (HAND) approach to estimate inland flood hazard, cumulative rainfall deficit as drought hazard, and landslide susceptibility data from a NADMO hazard assessment. Climate risks are projected using river discharge projections from CORDEX Africa RCP4.5 and 8.5, and the IPCC AB1 scenario, which NADMO uses.

Once the sector impacts of climate risk are estimated, enabling environment needs are defined for adaptation options, including: design, planning, and operation/maintenance needs (common to all sectors). Needs were identified for 35 assets/locations/risks and five adaptation project types were

³⁰ Adsheed, D., Thacker, S., Fuldauer, L.I., et al. 2022. Ghana: Roadmap for resilient infrastructure in a changing climate. Ministry of Environment, Science, Technology & Innovation, Accra, Ghana. URL: <https://gca.org/reports/ghana-roadmap-for-resilient-infrastructure-in-a-changing-climate/>. Last accessed 3 November 2023.



mapped to each project/area. These options were traditionally built environment; nature-based solutions; urban resilience; enabling environments; and gender and inclusivity. Adaptation project sheets were prepared, outlining project concepts, and a UNOPS fund analysis tool (SIFT) was used to identify possible funding for these projects.

Country Climate and Development Report (CCDR), World Bank, 2022³¹

This is a wide-range report examining climate risks, the enabling environment, and pathways to climate resilience and low-carbon development. Generally, the climate risk estimates used in the CCDR are drawn from existing resources, including historical disaster catalogues (EM-DAT and Desinventar), the World Bank's global analysis of exposure to floods, Adsheed et al. (2022), and UNDRR (2019). The report includes a macroeconomic analysis of the impact of climate damages under RCP4.5 and RCP8.5, on GDP due to air pollution, crop loss, labour productivity, flooding, energy and tourism (at 2030, 3040, and 2050).

Ghana Climate Change Report, USDA and GAIN, 2023³²

The United States Department of Agriculture (USDA), Foreign Agricultural Service, and the Global Agricultural Information Network (GAIN) published a short report in 2023, highlighting Ghana's vulnerability sea level rise, droughts, increasing temperatures, and erratic rainfall, with adverse impacts on infrastructure, hydropower production, food security, and coastal and agricultural livelihoods. The climate impacts referenced in this report was derived from the World Bank CCDR (2023), USAID (2017), UNDRR (2019, though they reference the 2018 version) and IFPRI (2012).

National Disaster Preparedness Baseline Assessment, NADMO, forthcoming

NADMO, in collaboration with the University of Hawaii Pacific Disaster Center (PDC) are preparing analytics for geophysical hazards in Ghana. This was not available for inclusion in this summary, but the GRMA program would take account of work completed in this assessment in project development.

Ghana Climate Risk Atlas and Impact-based forecasting, GMET, forthcoming

Bilateral discussion with GMET in October 2022 highlighted two important programs of work being undertaken. The development of a Climate Risk Atlas would present downscaled climate projections

³¹ World Bank Group (2022). Ghana Country Climate and Development Report. CCDR Series. URL: openknowledge.worldbank.org/handle/10986/38209. Last accessed 3 November 2023.

³² USDA and GAIN (2023). Ghana Climate Change Report. URL: apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Ghana%20Climate%20Change%20Report%20Accra_Ghana_GH2023-0008.pdf. Last accessed 3 November 2023.



for the whole country and should provide a definitive source of climate projection information for subsequent risk analytics. Impact-based forecasting is an area under development by GMET, to communicate early warning in terms of impacts, instead of in terms of what the conditions will be like. While relatively limited information is available on the ultimate content and outputs of these programs, they address key gaps in information and capability.

2.2 Risk information with subnational coverage/focus

Enhancing multi-sector planning and capacity for effective adaptation in Ghana, EPA, 2023

In support of National Adaptation Planning, the EPA funded by the Green Climate Fund is conducting Climate Change Risk Assessments (CCRAs) in 10 MMDAs as a pilot. The selected areas represent a range of ecosystems and involve district-level risk assessment and adaptation planning for forestry/agriculture, water energy and transport infrastructure, private sector, disaster risk management and cities, and health. This work will also establish a national climate vulnerability portal.

These assessments review economic vulnerability, physical and environmental vulnerability, social vulnerability, and adaptive capacity, uses national and subnational socio-economic development scenarios, and subnational climate trends. District level flood hazard mapping has been conducted to assess annual expected damage, which may form the basis of further flood risk assessment, but GRMA has to date been unable to review the methodologies used in these risk assessments.

The results of the assessment completed so far have not yet been published, so they are not summarised in this report.

World Bank West Africa Coastal Adaptation (WACA) program

The objective of this program is to strengthen the resilience of targeted communities and areas in coastal Western Africa. The project aims to achieve this by strengthening regional and national coordination on climate resilience of coastal areas in West Africa, including Ghana. The technical support under the program is wide-ranging and includes capacity building, operationalising coastal observation and monitoring, and use of sustainable management including marine protection and ecotourism. Following bilateral meetings and the in-country workshop, It remains unclear what elements of coastal risk analysis including scenario or probabilistic assessment of damage and loss from coastal flooding in the future given, coastal erosion and sea level rise, will be conducted under the WACA program.



IDF-UNDP Tripartite Project - A (sub-) sovereign parametric insurance solution for the poor & vulnerable in Ghana/Accra

This public-private partnership project³³ seeks to implement parametric flood cover to quickly provide disaster relief in low-income areas and enhance response capacity of NADMO and government in flood events. The risk analytics include analysis of excess rainfall, using 1-day maximum rainfall from ground station observations, and satellite-based estimation of flood extent. Both approaches can be used to trigger parametric pay-outs, with varying degrees of basis risk and scaling capabilities. A decision is yet to be made on which approach will be taken up, but the methods should be replicable if needed to other parts of Ghana.

Climate Risk Analysis for Identifying and Weighing Adaptation Strategies in Ghana's Agricultural Sector in Northern Ghana, GIZ, 2021³⁴

This study seeks to deliver the base data for risk-informed and economically sound adaptation decisions for the agricultural sector in the Upper West Region (UWR) of Ghana. It provides information on climate impacts and recommendations for adaptation strategies. To establish current climate conditions at the subnational scale, weather station observation data are used with downscaled climate model data. Recent trends were established and projected into the future, showing a continuation of recent trends: increasing mean annual temperature, increasing number of very hot days and tropical nights, and increasing heavy precipitation intensity and frequency. The analysis showed no trend in mean annual precipitation, rainy season onset, number of dry spells within rainy seasons, and year to year variability of annual precipitation total. Two different crop production models were used to assess the impact of changing climate on agricultural production of cowpeas, groundnut, maize and sorghum. All crops were estimated to slightly decrease or decrease, with medium to very high certainty depending on the crop type and district.

A sample of academic studies

Given the number of academic papers mentioned in the Fourth Communication to the UNFCCC, a thorough literature review of academic studies pertaining to disaster and climate risk in Ghana is not possible here. However, an effort has been to include samples of those that present specific impacts or risk analysis, which have been cited during bilateral meetings and the in-country workshops. Further studies are available in the V20 Climate Vulnerability Monitor scientific coverage dataset³⁵.

³³ URL: insdevforum.org/press-release-public-private-partnership-to-develop-flood-insurance-and-build-financial-resilience-in-ghana/. Last accessed 3 November 2023.

³⁴ URL: agricultural.de/wp-content/uploads/2021/09/Scientific-Report_Northern-Ghana.pdf. Last accessed 3 November 2023.

³⁵ <https://climatevulnerabilitymonitor.org/biophysical/gha/scientific-coverage/>



Critical infrastructure network modelling for flood risk analyses: Approach and proof of concept in Accra, Ghana³⁶

This paper models critical infrastructure networks for catchment-wide flood risk analyses. It analyses direct and cascading impacts and indirect disruption of services triggered by flood scenarios, quantifying impact as number of disrupted users and disruption time in Accra, as a proof of concept.

The Poverty Impacts of Labor Heat Stress in West Africa Under a Warming Climate³⁷

This paper assesses the implications of heat stress-related labour capacity losses by sector and region on poverty, using a global general equilibrium economic model. This is a regional study for West Africa, including Ghana, to estimate changes in real incomes of households near the poverty line. Findings include that unskilled agricultural wages could increase, as loss of productivity and sustained demand for food results in increased labour demand. Neglecting potential increases in mortality and morbidity, poverty increases in Ghana could be around 7%.

Vulnerability of Ghana's Accra Coast to Sea Level Rise³⁸

This paper estimates the historical rate of coastal erosion for the coastline of Ghana, at 1.13 metres per year, with the Western section of coastline experiencing 1.86 metres per year. The impact over a 20-year period is likely to be over 13,000 people displaced, while over 50-years, this could increase to over 33,000 people. By 2100, over 157,000 people and almost 850 buildings are likely to be vulnerable to permanent inundation. It should be noted these estimates may have increased since 2015.

2.3 Available models and data for risk analysis

African Risk Capacity (ARC) models

To support the development and operation of the African Risk Capacity (ARC) risk pool, risk understanding across the continent was required. ARC developed Africa RiskView³⁹ – its core product for risk analysis. Africa RiskView provides decision-makers with expected and probable maximum costs of drought-related responses before and during agricultural seasons at administrative level 1, for every country in sub-Saharan Africa. The risk estimates can also help countries plan drought response actions and food security investments. The drought model combines operational rainfall-based agricultural drought early warning models with data on vulnerable populations to estimate food insecurity response costs.

³⁶ Schotten, R., & Bachmann, D. (2023). Critical infrastructure network modelling for flood risk analyses: Approach and proof of concept in Accra, Ghana. *Journal of Flood Risk Management*, 16(3), e12913. <https://doi.org/10.1111/jfr3.12913>

³⁷ Saeed, W., Haqiqi, I., Kong, Q., Huber, M., Buzan, J. R., Chonabayashi, S., et al. (2022). The poverty impacts of labor heat stress in West Africa under a warming climate. *Earth's Future*, 10, e2022EF002777. <https://doi.org/10.1029/2022EF002777>

³⁸ Appeaning Addo, K. 2015. Vulnerability of Ghana's Accra Coast to Sea Level Rise. *Coastal Resilience Workshop*. 3. URL: scholarworks.uno.edu/cgi/viewcontent.cgi?article=1003&context=resilience

³⁹ <https://www.arc.int/africa-riskview>



ARC have also developed epidemic modelling, a flood hazard product in Africa *RiskView*, which uses earth observation to assess daily extent of standing water, indicating the extent and duration of floods, to trigger parametric insurance. Historical flood extent data is available back to 1992 and is useful for assessing flood-prone areas. Access to the Africa RiskView software is free and can be requested on the software pages.

District level flood models

Flood hazard models have been employed in the climate risk assessments at MMDA level for EPA. Further information is required to assess the methodology of these models and the availability of the model and hazard data to support further work under the GRMA and Global Shield.

V20 Climate Vulnerability Monitor⁴⁰

The Climate Vulnerability Monitor is an online dashboard containing climate parameters, crop yield data, social vulnerability indicators and relevant scientific studies. It is a useful source of some input data for risk assessment, but does not provide risk information directly, in the form of exposure, hazard and vulnerability for risk modelling.

Exposure data

The Ghana Statistical Service (GSS)⁴¹ holds official census data from 2021, containing information on population demographics, household size, and number and types of residential buildings present at district level with national coverage. A bilateral meeting was held with GSS in October 2022 to understand the availability of official information for GRMA projects. The online data portal Statsbank⁴² provides open access to an increasing amount of data from GSS, at district level but in future this will be available at 1 km grids under a 'Ghana Gridded Data' program and tool. Progress is being made to include education and healthcare facility data. For limited areas, GSS analysis of mobile phone activity has revealed diurnal trends in population movements. This data is updated quarterly, used by NADMO for their operations and is intended to be expanded to more areas in the future.

Adshead et al. (2022) collated, through a project technical working group and stakeholder consultation, asset data comprising: 29 power plants, 76 substations, 24 dams, 137,047 km of roads, nine airports, and 18 ports (including 14 Volta River ports), 25 land use classes and 86 sub-catchment areas and 297 forest areas. The district level vulnerability index was calculated as the inverse of adaptive capacity from the 4th National Communication. Modelling of future risk uses the current distribution of infrastructure indicating an absence of asset projection data.

⁴⁰ <https://climatevulnerabilitymonitor.org/biophysical/gha/>

⁴¹ <https://statsghana.gov.gh/>

⁴² <https://statsbank.statsghana.gov.gh/index.html>



A bilateral meeting was held with the lead for OpenStreetMap (OSM) Ghana in Accra during October 2022 to understand the availability of official information for GRMA projects. OpenStreetMap Ghana has an active community of volunteer mappers, with chapters with each university. Through the World Bank Greater Accra Resilient and Integrated Development (GARID) Project and the GFDRR Open Cities Africa program, OSM Ghana has mapped flood-prone neighbourhoods of Accra including the neighbourhood of Nima. The resulting detailed maps of those areas include many individual buildings, their usage and construction materials, while collaborating with GSS, OSM Ghana does not appear to work closely with other government agencies. OSM Ghana has a ready and able body of volunteers capable of adding to high-resolution mapping of assets in Ghana should the need arise.

Additional information is available from global datasets, to complement and address gaps in local exposure information. Such data include, for example, WorldPop or VIIRS night-time lights distribution, World Settlement Footprint, Global Human Settlement Layers (GHSL, JRC), OpenStreetMap, global roads datasets, and global energy database.

Hazard data

NADMO holds earth observation-based flood maps, flood data based on the Height-Above-Nearest-Drainage (HAND) method which indicates areas with a medium or high likelihood of flooding, based on topography and proximity to the river network. These data were used by Adshead et al. (2022) and used to project flood susceptibility to 2050. The flood scenario data are non-probabilistic: no value is given for depth, time, or duration of the hazard; for thorough assessment of flood risk (including frequency and severity of impacts), a more comprehensive flood hazard assessment would be required. Additionally, NADMO data on landslide susceptibility defines areas of medium and high susceptibility under current conditions. Further information is required on the resolution and approach taken to develop the landslide susceptibility dataset.

Additional hazard information is available from global datasets, to complement and address gaps in local hazard information. Such data include commercially available flood hazard maps from e.g., JBA Risk or Fathom, which provide 30m-resolution inland (river and surface) and coastal flood for current and future climate. Global 1-km landslide hazard data (combining susceptibility with annual potential for landslide triggering by precipitation and seismic activity) are available from NASA and GFDRR. Global extreme heat and wildfire (fire weather index) data via GFDRR and coastal flood via VU Amsterdam are also available and could support risk screening but for more comprehensive risk analysis, national scale modelling of these hazards should be undertaken. Regional earthquake risk models are available from the Global Earthquake Model Foundation⁴³.

⁴³ <https://www.globalquakemodel.org/africa-model-release>

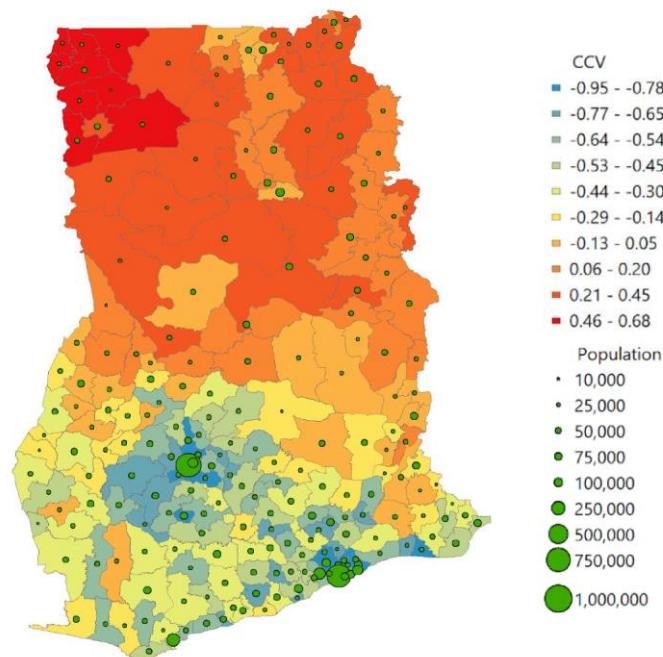
Vulnerability data

Ghana's Fourth National Communication to the UNFCCC (2020) includes a Climate Change Vulnerability Assessment (CCVA). The method uses a spatial assessment of exposure, sensitivity to climate change and adaptive capacity to assess vulnerability of each district: $CCV = (Exposure \times Sensitivity) - Adaptive\ Capacity$. Exposure is assessed based on current mean annual rainfall and seasonal temperature variability. Sensitivity is measured by the proportion of people employed in agriculture in the district. Adaptive capacity includes data on poverty levels, economic activity (night-time lights data) and district governance capacity.

An assessment was conducted to calculate CCV for the administrative districts of Ghana quantitatively. The assessment was built on the workflow and data generated from the study on climate-resilient landscapes for sustainable livelihoods in Northern Ghana. Data for the assessment was obtained from national institutions that have the mandate to publish government data, literature, and inter-governmental bodies. The data was processed and used to generate parameters to quantify the variables for exposure, adaptive capacity and sensitivity components of CCV. The resulting distribution of vulnerability is presented in *Figure 1*.

*Figure SEQ Figure *ARABIC 1*

Climate change vulnerability scores for Ghana's 216 districts (Source: Ghana's Fourth National Communication to the UNFCCC, 2020).



Adshead et al. (2022) used this to derive a district level social vulnerability index for the analysis of risk to people, and this would be an appropriate source of information for further analyses, albeit with updates to reflect the 2021 national census results.

There is no information to suggest that physical vulnerability data (to estimate risk to built assets) has been developed or is available for Ghana, whether originating from post-event damage surveys,



or analytical methods. In the absence of such information, probabilistic risk assessment would need to rely on existing physical vulnerability relationships that are assessed as being suitable for application to the types of buildings and infrastructure present in Ghana's building stock. This is the usual approach where country-specific vulnerability relationships are not available, though a long-term goal would be to develop such data.

2.4 Summarised quantitative risk estimates.

This section summarises available quantitative risk estimates, including those from the several climate risk reports introduced above, which quantify risk in terms of population affected or fatalities, economic loss, sector-specific loss, and disruption. Changes in climate parameters (rather than risk estimates) are not included in the scope of this section.

Inland flood

UNDRR (2019) estimated that each year 45,000 people are affected by flooding in Ghana, with the majority being those in southwestern and coastal regions. The annual average GDP affected by floods is 100 million USD, or 0.23% of the total GDP of Ghana. Using projections of climate and socio-economic development, GDP affected is estimated to increase to around 550 million USD per year (with climate change alone, it would be expected to decrease compared to today).

Direct economic loss estimates currently exceed 80 million USD per year, with the main contribution coming from the service and housing sector. In a future climate, these estimates are expected to reduce in all sectors to less than 60 million USD overall (UNDRR, 2019). In comparison, an extreme event with a return period of 100-200 years could result in direct economic losses of almost 500 million USD in today's climate.

GRMA (2021) estimated annual average flood loss due to the building stock in Ghana at 28 million USD but did not analyse the contribution of different sectors to this loss, and this was performed using coarse resolution flood data as an initial diagnostic exercise. It was also estimated that 9,000 people per year are affected by floods. Annual loss to the building stock is projected to increase by 24 times for a 1.5C warming scenario and 28 times under 3C warming - in the same scenarios, the number of people affected is expected to increase by 8-9 times.

Adshead et al. (2022) estimated that 35% of districts in Ghana are exposed to high flood hazards in a future climate, however, potential losses have not been quantified. Districts in the Volta region are highly exposed and also most affected by future deficits in river discharge due to droughts. Central, Ashanti, and Volta regions have the greatest areas of high landslide hazards. The study also quantified the km of roads exposed to high flood hazard by 2050, and a large number of ports and airports are



also exposed to flood and drought but again, monetary losses and risk to these assets and sectors have not been quantified.

Drought

Greater Accra, Northern, Central and Eastern regions have the most people affected by drought currently - 13% of the national population affected. This is expected to increase to 30% in 2060s, with the greatest increases in Northern and Volta under future climate (UNDRR, 2019).

An increase in crop land exposure to drought is expected in the future, and with almost all crops being rainfed and the agricultural sector providing employment to 40% of Ghana's active labour force, this is of huge importance for food security and the economy. Yields of heat- and drought-sensitive crops such as maize (a staple crop) projected to decline. GIZ (2021) estimated that in the Northern region, cowpea yield could decrease by up to 20% under RCP 2.6 and 30% under RCP 8.5, while maize yield could decrease by 15% and 25%, respectively. These estimates are for a limited number of farming scenarios in one region, and analysis by GIZ (no date) suggests that yield loss nationally may not reduce by this proportion even for maize (which showed the largest decrease) by 2080; the same analysis also indicates the wide range of uncertainty in these projections. Conversely, less heat/drought sensitive crops such as cassava (also a staple) are projected to benefit from CO₂ fertilisation.

UNDRR (2019) estimated that yield loss is presently greatest for yam and cassava (ton/yr), and that the increase in crop loss relative to the economy will be minor due to climate change (1% of GDP to 1.3% of GDP). The greatest impacts of drought appear to be on livestock, with 13% of livestock units in the current climate affected by drought, increasing to 39% in future climate. Neither the GIZ or UNDRR studies estimate losses to the country's leading cash crop cocoa or look at the impacts of climate on cocoa production, labour force or exports.

Losses in the hydropower sector have also been estimated; low river discharge can prevent energy generation, and annual losses to this sector are expected to increase from 1.6% to 16.3%, or 240mn USD (UNDRR, 2019). IWMI (2012)⁴⁴ estimates that drought could lead to up to half of 74% of the total annual irrigation demand and 53% of the average annual hydroelectric potential could be delivered by 2050. Further, water availability per capita could halve by the 2050s. Adshead et al., (2022) assessed the exposure of each of Ghana's dams to drought as well as flood; the East Gonja dam, for instance, is exposed to a 70% reduction in river discharge.

⁴⁴ IWMI. 2012. The Water Resource Implications of Changing Climate in the Volta River Basin. URL: Last accessed 6 November 2023



Coastal flood

The impact of coastal flooding over a 20-year period is likely to be over 13,000 people displaced, while over 50-years this could increase to over 33,000 people (Appeaning Addo, 2015). By 2100, over 157,000 people and almost 850 buildings are likely to be vulnerable to permanent inundation.

Ghana's densely populated coastal zone is home to 25% of the population and 80% of industrial activities, including oil and gas production, port operations, thermal hydroelectric power generation, as well as agriculture and fishing⁴⁵. Coastal erosion is causing the coastline to recede at about two metres per year on average, with localised coastline recession of up to seventeen metres in a single year. The eastern coastline (Aflao to Prampram) is most vulnerable due to the dynamics of the Volta delta, with strong waves and currents. UNESCO cites face the need for effective monitoring of erosion and risks for early warning of coastal flooding, and prevention of erosion through a comprehensive coastal erosion management strategy comprising coastal protection and adaptation of human activities and coastal ecosystem restoration.

Extreme heat and human health

Heat-related mortality is expected to increase as more people are exposed annually to heatwaves. Under RCP 6.0, 19% of the population will be exposed annually by 2080, compared to 5% in 2000 (GIZ). Further, it is expected that there would be a 5-fold increase in mortality in that time, but only a doubling in mortality through the century under a less extreme climate change scenario of RCP 2.6.

Pests

Estimates of the risk of pest infestations such as Fall Army Worm (including estimates of long-term frequency and severity of losses, projected in future climate conditions as well as for present conditions) are not available.

Several years of crop data show a reduction in yield where Fall Army Worm have affected crops (Abaidoo, 2021 and Bariw, et al., 2020⁴⁶), and this data appears to be the basis for understanding the effect of pests and for strategic planning and policy development. The short duration of data on this risk may not be sufficient for robust decision-making.

⁴⁵ The UNESCO Courier. Ghana's coastline, swallowed by the sea. [URL: en.unesco.org/courier/2021-1/qhanas-coastline-swallowed-sea#:~:text=Currently%2C%20the%20country%27s%20coastline%20is,identified%20as%20the%20most%20vulnerable..](https://en.unesco.org/courier/2021-1/qhanas-coastline-swallowed-sea#:~:text=Currently%2C%20the%20country%27s%20coastline%20is,identified%20as%20the%20most%20vulnerable..) Last accessed 3 November 2022.

⁴⁶ Bariw, S.A, Kudadze, S. and Adzawla, W., Prevalence, effects and management of fall army worm in the Nkoranza South Municipality, Bono East region of Ghana, Cogent Food & Agriculture, vol. 6, No. 1 (August 2020). URL: tandfonline.com/doi/full/10.1080/23311932.2020.1800239



2.5 Priority Risks

Based on a literature review of previous analyses and information shared in bilateral meetings and country workshops, the priority hazards for Ghana are:

- Coastal flooding and sea level rise in coastal areas,
- Inland flooding, affecting urban and rural areas nationally,
- Agricultural drought, especially in northern regions,
- Wildfire in the savannah and dry forested areas of northern Ghana,
- Pest infestation, especially Fall Army Worm and a warming climate.

Priority impacts are:

- Food insecurity, and commercial/export crop loss (especially Cocoa),
- Failure of infrastructure, including healthcare, water supply, transport, energy and telecommunications.
- Mortality, loss of homes and livelihoods on the coast due to storms and sea level rise,
- Loss of biodiversity, linked to the introduction of new pathogens of concern to human health (zoonosis) and new invasive pest species,
- Internal migration due to, for example, impact of drought on agricultural livelihoods (crop and livestock) and lack of water ultimately causing rural to urban migration, which can have long-term effects.

2.6 Identified gaps in data, models, and analyses

Probabilistic risk modelling

There is a lack of detailed probabilistic modelling to quantify the frequency and severity of direct and indirect losses and risks to specific sectors and the population. Event-based modelling (rather than modelling relying on hazard maps) is needed to support risk financing, especially transfer of risk to international markets. Global models have been used to provide national scale risk estimates including annual average and probable maximum losses at a sector level (UNDRR, 2019). Urban scale flood models (from consultants HKV) have been used to inform urban scale DRM / adaptation interventions and parametric flood insurance in Accra, but not in other areas of the country. Other national scale analysis uses hazard maps (GCA-UNOPS) and qualitative approaches (EPA risk assessments for MMDAs), insufficient to support analysis of risk layering considering specific events such as event correlation across large areas. There is a need for high resolution probabilistic event-based modelling incorporating national information on hazard, exposure and vulnerability for sector level risk analysis.



Socio-economic projections in quantitative risk analysis

Aside from UNDRR (2019), no quantitative risk analytics have integrated socio-economic projections to project the frequency and severity of losses (risk). The UNDRR approach used publicly available information, which could likely be improved with updated and official data curated by the Ghana Statistical Service.

Access to risk analytics

Existing probabilistic risk analysis is not currently accessible to ministries and technical agencies of the Government of Ghana or to academics in the country. Clearly, there is a strong and growing base of expert practitioners and academics working in the fields of climate modelling, impact assessment and adaptation, who have contributed to climate vulnerability assessments to date. Experts in Ghana should be able to access quantitative risk models, which is possible through open-source risk modelling such as Oasis for risk financing focussed applications and CLIMADA for assessment of adaptation options. Capability development in this area to raise awareness of such tools and approaches could help to address this gap.

Risk of agricultural pests in a future climate

Understanding of the impact of Fall Army Worm on agricultural crops seems limited to crop yield statistics since about 2016, with no indication that quantitative risk analysis has been conducted to understand long-term risk under current or future climate conditions. Further modelling on their potential impact in a warming climate would be prudent.

Risk to cocoa crop

While several climate risk profiles included here report on the expected reduction in crop yield for major staple crops, including maize, millet, and groundnut, there is an apparent gap in risk assessment for the major export crop, cocoa. Bilateral meetings and the in-country workshops highlighted the importance of this crop to the economy and the potential climate risk faced by the cocoa sector, and a sector-focussed assessment of risk would appear beneficial.

Risk quantification for coastal hazards

While the coastal inundation (temporary and permanent) hazard posed by the combined effects of sea level rise, coastal erosion, and storms are well recognised, there is an absence of comprehensive risk analysis to estimate the frequency and severity of damage and loss of land. This is well within the reach of existing modelling platforms, and academic research on this topic in Ghana shows that data on sea level rise and erosion are available to support risk analysis that can consider future localised conditions. This type of risk analysis could support recommendations on resilience measures as well



as financial risk transfer, but an understanding of similar work that may be undertaken in the WACA project needs to be confirmed.

2.7 Impacts on vulnerable people

The following provides insight into specific vulnerability drivers and dimensions that were identified and raised in existing research. It expands on the general profile of vulnerable people included in the previous chapter. In line with the GS ambition to implement gender-sensitive CDRFI, particular emphasis was given to gender-differential vulnerabilities.

Human Mobility and Displacement

The consequences of climate change have had widespread effects in Ghana, but the consequences of climate disasters are felt more acutely by members of vulnerable communities. Among the factors that make communities more vulnerable in the face of climate risk is that of human mobility⁴⁷. Human mobility influenced by climate change ranges from internal and international migration to displacement and planned relocations. **In Ghana, the most common types of climate-prompted human mobility are internal rural-urban migration, rural-rural agricultural migration, and displacement along the coastal belt.** In an attempt to compensate for these losses, many able-bodied youth from rural areas move to urban areas (such as Ashanti, Greater Accra, and the Eastern and Central regions) in the hope for alternative livelihoods. This internal rural-urban migration has resulted in family separation, insufficient housing, low wages, precarious work, and exploitation. Low agricultural productivity has also resulted in rural-rural agricultural migration. In Ghana it is common for farmers to move from less fertile regions to others to farm cocoa and other cash crops in rural areas such as Eastern, Ashanti, Ahafo, Bono East, Brong Ahafo, and Western North. Constant relocation results in lack of reliable income and disconnect with communities. It is not only agricultural regions being affected but also coastal communities such as the Chorkor-Dansoman beach Stretch in Accra, which are vulnerable to climate risk and the effects of climate change. Coastal erosion has resulted in community members being unable to continue fishing and accessing basic services such as healthcare, education, and clean water. As a result, many families are becoming displaced, often without safety nets to rely on.

⁴⁷ SYLCAN Trust. 2023. Case Study Brief: Climate – Induced Loss and Damage and Internal Human Mobility in Ghana. Reference: [Case Study Brief: Climate-Induced Loss and Damage and Internal Human Mobility in Ghana - Knowledge Hub \(slycantrust.org\)](https://slycantrust.org)



Financial Inclusion Levels of Men and Women

Climate disasters impact everyone, but the effects can be different due to the realities of men and women in Ghana. Efforts to expand financial protection will need to consider that **only 63% of adult women in Ghana have an account at a bank or similar financial institutions, compared to 74% of men**⁴⁸. As a result, only about 6% of women borrow from formal financial institutions, and 16% save their money in such institutions⁴⁹. Mobile banking, a potential delivery (money out) channel for pay-outs during extreme weather and disaster events, also suffers from inequality in access, with only 55% of Ghanaian women having access to mobile banking, compared to 65% of men⁵⁰. There is also a discrepancy in overall mobile banking usage, with 59% of women making use of these services, unlike 79% of men.

According to the UNESCO Institute for Statistics, 80% of the adult population in Ghana “can both read and write, with the ability to understand a short, simple statement about their everyday life”. A driver for gender differences in financial inclusion is the gender gap in literacy rates: 76% of adult women are considered literate, compared to 84% of men⁵¹. This gender gap is however, almost non-existent amongst youth (ages 15-24) where 93% of young women and 94% of young men are considered to be literate.

Gender-differential vulnerabilities in the Agricultural Sector

Beyond financial inclusion, women face specific vulnerabilities related to climate risk. The 2018 Ghana Living Standard Survey found that the proportion of females that own or operate a farm in the country is 46.4%, with most regions fluctuating between 40 and 50%⁵². Despite the number of women having some leadership role in farms, the 2017/2018 Ghana Census of Agriculture found that only 24.7 of land parcels are owned by women, with trusteeship and squatting where the parcel is used by women making up 32.7% and 33.8 percent, respectively⁵³. In general, the percentage of women that are formally engaged in the agricultural sector is 34.2 percent, which is significantly lower than men who make up the remaining 65.8 percent⁵⁴. **Differences in presence between men and women in the agricultural sector can lead to difficulties in accessing benefits.** For example, a lower

⁴⁸ World Bank. 2021. Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19. Available at: <https://www.worldbank.org/en/publication/globalfindex>

⁴⁹ Ibid.

⁵⁰ Ibid

⁵¹ World Bank 2020. Literacy Rates. Available at: [Literacy rate, adult total \(% of people ages 15 and above\) - Ghana | Data \(worldbank.org\)](#) Ibid.

World Bank 2020. Literacy Rates. Available at: [Literacy rate, adult total \(% of people ages 15 and above\) - Ghana | Data \(worldbank.org\)](#)

⁵² Ghana Living Standard Survey. 2018. Available at: [GLSS7 MAIN REPORT FINAL.pdf \(statsghana.gov.gh\)](#)

⁵³ Ghana Statistical Service. 2019. 2017/2018 Ghana Census of Agriculture National Report. Source: [GCA_National Report_2020.pdf \(statsghana.gov.gh\)](#)

⁵⁴ Ghana Census of Agriculture National Report 2019; Available at: [GCA_National Report_2020.pdf \(statsghana.gov.gh\)](#)



percentage of women owning agricultural land may result in limited decision-making influence, lack of community support, and unequal access to productive resources⁵⁵. Absence of community keeps women farmers from accessing information and extension services and trainings that men are informed on or have better access to⁵⁶.

Gender dimensions in access to water

Climate impacts can have severe effects on access to clean water, and limit resilience. One out of every ten people in Ghana are reported to spend more than 30 minutes trying to access a reliable source of clean water, with 11 percent of the population relying mainly on surface water and other unsafe sources⁵⁷. Due to their role in the household, women and girls take on majority of the responsibility for water collection. The Ghana Statistical Survey of 2018 found women and girls spend about 4.5 hours every week collecting and carrying water⁵⁸. In cases where water is absent in the premises, 21% of women spend somewhere between 1 to 3 hours a day collecting water compared to 17 percent of men⁵⁹. These numbers indicate that when flash floods and droughts that obstruct access to clean water take place, it is women's and girls' workload that increases. Women spend more time collecting drinking water and performing more household chores due to their role as primary caregivers⁶⁰. If their water source is affected by floods or droughts, women's and girl's safety is also put at greater risk. In order to collect clean water, women at times have to travel further distances, through unfamiliar territory without protection, making them vulnerable to harassment, sexual violence, among others⁶¹. It is thus imperative that products which address water accessibility immediately after a disaster keep the safety of girls and women in mind.

Flash flooding also presents an obstacle to women's resilience, as they threaten retailers, the majority of which are owned by women⁶². In Ghana, market centers and trading stalls are often located in sites that are prone to flooding, destroying the livelihoods of women⁶³. Addressing the needs of retailers could then help build the economic resilience of women when faced with climate disasters.

⁵⁵ UNDP Climate Change Ghana Gender Action Plan. 2021. Source: [Climate Change: Gender Action Plan | United Nations Development Programme \(undp.org\)](#)

⁵⁶ UNDP. 2021

⁵⁷ UNICEF, Ghana Water Programme. Source: [Water | UNICEF Ghana](#)

⁵⁸ Ghana Statistical Service (GSS). 2018. Multiple Indicator Cluster Survey (2017/18), Survey Findings Report. Accra, Ghana: GSS

⁵⁹ Ibid

⁶⁰ UN WomenWatch. Women, gender Equality and Climate Change. Available at: [Women and Climate Change Factsheet.pdf \(un.org\)](#)

⁶¹ UNDP. 2021

⁶² UNDP. 2021

⁶³ UNDP. 2021



3. Country Priorities and Strategies

This chapter examines Ghana’s policy-level priorities, strategic plans, and actions to address vulnerabilities to climate risk, as outlined in the previous chapter. It draws from an analysis of relevant policy frameworks, country plans, and other policy-related documents that are relevant to Ghana’s disaster risk management, climate change adaptation, and implementation of CDRFI. The following table summarizes all documents reviewed and includes strategy documents that are not yet in place.

Document Title	Status (Timeframe)	Responsible Institution
National Disaster Management Organisation Act 517, amended to Act 927	1996 2016 (amended)	NADMO
<i>National Disaster Management Strategy</i>	<i>Not yet in place (tbc)</i>	<i>NADMO</i>
Risk Financing Framework <i>(e.g. Disaster Risk Finance Strategy)</i>	Not yet in place	N/A
Ghana National Climate Change Policy	2013	MESTI
Ghana National Climate Change Master Plan Action Programmes for Implementation	2015-2020	MESTI
Nationally Determined Contributions (NDC) under the Paris Agreement	Updated September 2021 (for 2020 - 2030)	EPA, MESTI
Ghana’s Adaptation Communication to the UNFCCC	November 2021	EPA, MESTI
National Adaptation Plan	In development	EPA, NDPC, MoF, MESTI
National Medium-Term Development Policy Framework 2022-2025	December 2021	NDPC
Climate Prosperity Plan	Waiting for ratification	V20
Sector specific strategies/policies		
Investing for Food and Jobs (IFJ): An Agenda for Transforming Ghana’s Agriculture	January 2018 (For 2018 - 2021)	MoFA
National Financial Inclusion and Development Strategy (NFIDS)	2018 (for 2018 – 2023)	MoF
Insurance Act (Act 1061)	2021	NIC



A review of the previously listed government documents indicates that **four overarching priorities** are consistently highlighted to address Ghana's protection gap and enhance adaptation. The priorities include:

1. Institutional risk transfer schemes in agriculture,
2. Climate data collection and management, e.g. on modelling coastal flooding
3. Climate-resilient cropping and livestock systems, and climate-resilient standards for key coastal infrastructure and protection of coastal communities,
4. Enhanced multi-hazard early warning systems.

This **demonstrates a governmental commitment to deploying measures across the risk management spectrum**, including enhanced risk data, investments in risk reduction, and greater preparedness through early warning systems and financial protection.

Overall, the documents emphasize the need for resilience-building in the agricultural sector. The strategic documents aim to tackle Ghana's economic reliance on the agriculture sector through multiple policy actions. Across a range of documents, including but not limited to 'Ghana's National Climate Change Policy', the 'National Climate Change Master Plan Action Programmes for Implementation', and 'Investing for Food and Jobs (IFJ): An Agenda for Transforming Ghana's Agriculture', the **need to develop and establish risk transfer schemes is emphasized**, particularly in the agriculture sector. To bring about such schemes, Ghana's strategies underline how public and private investments in the respective area of the capital market are necessary, such as agriculture risk sharing markets, subsidizing interest rates, promoting agricultural insurance instruments, and setting up public mutual funds for residual risks. To address the residual climate risks Ghana is facing, such as flooding and droughts, insurance coverage for local supply fluctuations, crop failures, and for weather-related risks should be expanded. Furthermore, the documents reviewed call for using regional schemes such as the African Risk Capacity Initiative to prearrange finance against drought at the sovereign level.

In addition to risk transfer, **climate data-sourcing and management** to inform decisions at a technical and policy level is a common focus area among multiple documents. Ghana's NDC puts emphasis on agricultural data management systems, but also recognizes and expresses the need to collect relevant data on coastal zone geomorphology, surface water flows, and groundwater for **modelling coastal flooding**. Moreover, as outlined in the IFJ, climate data collection could be reinforced through cross-cutting institutional capacity building activities.

The reviewed documents further call for developing **climate-resilient cropping and livestock systems**, as well as crop varieties and livestock breeds tolerant to flooding, drought, and salinity. Lastly, the documents consistently advocate for enhancing **early warning systems**, especially those capable of addressing multiple hazards.



4. Enabling Environment

The following investigate the existing enabling environment in Ghana, starting by presenting the existing institutions, followed by the shortcomings of the legal and regulatory framework. Subsequently, the capabilities of the domestic private sector and market relevant characteristics will be introduced before presenting the gaps that limit the success of financial protection.

Existing institutions

The Ministry of Finance sets the policy within which the financial sector regulators supervise the financial sector. The Ministry is responsible for financial sector policy. It is also responsible, with assistance from regulators and experts, for drafting legislation. Furthermore, the Ministry has now tasked its Financial Sector Division (FSD) with aligning the financial sector with international best practices. The FSD is responsible for engaging and collaborating with regulators and industry stakeholders in the formulation of financial policies and strategies. The Ministry is increasingly focused on financial inclusion and has taken on a bigger role in this domain than in the past⁶⁴. Overall, five financial sector authorities are directly relevant to the insurance market: the National Insurance Commission (NIC), the Bank of Ghana, the National Pensions Regulatory Authority, the Securities and Exchange Commission (capital market sector), and the National Health Insurance Authority.

The most important is the **National Insurance Commission (NIC)**. As set out in the Insurance Act 2021 (Act 1061) the NIC's mandate is to promote a fair, safe, efficient and stable insurance market and the development of a sustainable insurance market in Ghana. To do this, it has been assigned various competencies, including regulatory competencies, the ability to issue licences, influence the minimum premium and maximum commissions, and enforce action against unlicensed issuers.

In 2011, the **Ghana Agricultural Insurance Pool (GAIP)** was established under the NIC. Since then, GAIP has become a relevant stakeholder in the promotion and distribution of agricultural insurance. It was established as an insurance pool seeking to provide coverage and financial protection to farmers in Ghana, specifically for extreme weather events, pest infestations, and crop disease. GAIP was operating under some constraints including insufficient capital. The uptake of agricultural insurance products by farmers was limited, e.g. due to high premium rates among others, which led to unsustainable operations. Therefore, GAIP is currently in the process of transitioning into a technical service provider, supporting the implementation of agricultural insurance in Ghana. GAIP's longstanding experience and expertise will continue to serve the development of Ghana's insurance market and products in the agricultural sector.

⁶⁴ cenfri (2018). Ghana Insurance Diagnostic Stakeholder Presentation. URL: https://cenfri.org/wp-content/uploads/2018/10/28.10.2018_Cenfri-Ghana-stakeholder-presentation.pdf



The **Ghana Agricultural Insurance Fund (AIF)** is also hosted by NIC and was formally created in January 2023 based on the Insurance Act, 2021 (Act 1061). Its operational and governance plan is currently being developed. The AIF, a national fund, has the key objective of offering premium subsidies for agricultural insurance to support national food security, sustainable agriculture, and provide financial protection to farmers affected by climate change. The fund's main objectives further include enhancing data generation for agricultural insurance product development and investing in technology to educate farmers about agricultural insurance. These efforts aim to ultimately strengthen the Ghanaian agricultural insurance market. The overall objectives stated are:

1. To subsidize agriculture insurance premiums.
2. To train agricultural extension officers and other persons who are required to disseminate information on agricultural insurance to farmers.
3. For the acquisition of equipment for relevant agencies that may generate the data required in the development of agricultural insurance products.
4. To build the capacity of state institutions to provide consistent and reliable data on the development of insurance products.
5. To invest in technology to disseminate information on agricultural insurance to farmers.
6. For any other activity related to the development of agricultural insurance

For climate risk insurance there are additional regulatory authorities that should be considered. For example, the **National Hydrology Authority** focuses on coastal and urban flooding. The National Hydrology Authority was initiated in 2022 and is currently being set up to become a relevant governmental stakeholder seeking to increase the resilience to floods through designing and maintaining flood control mechanisms and coastal engineering.

An important non-governmental stakeholder is the **Ghana Insurers Association**. The Ghana Insurers Association is the trade association for all companies registered and licensed to transact insurance business in Ghana. It serves as the collective voice and representative body for insurance companies, reinsurers, and other entities operating in the insurance sector. Established to promote the growth, development, and regulation of the insurance industry, GIA plays a crucial role in shaping policies, fostering collaboration, and advocating for the interests of its members.

Legal and regulatory framework

The **Insurance Act 2021 (Act 1061)** was enacted in 2021. It replaces the previous Insurance Act of 2006, Act 724 seeks to bring the regulation of the insurance industry into conformity with the international framework and supervisory standards and to increase its competitiveness on the international market. The new Act aims at strengthening corporate governance, deepening insurance penetration, and increasing access to insurance for the population. The Act also established the



Agricultural Insurance Fund to help support the development of agricultural insurance in the country (see above). The Act has also added a new category of licence known as the innovative insurance licence and added new rules governing the issuance of index insurance contracts. The NIC is expected to issue further directives and guidelines to support the implementation of the law.

A **National Agricultural Insurance Policy** is also being developed.

Capabilities of the domestic private sector for insurance

A significant share of the risk assumed by Ghanaian insurance companies is reinsured offshore⁶⁵. In the past, consumers mentioned bad claims experience as a factor against buying insurance⁶⁶. While the business insurance market is the most important form of insurance in Ghana, it only plays a limited role in the risk management of Ghanaian companies. Another form of insurance that is available in Ghana is household insurance. Household insurance plays a limited role and is dominated by micro- and mobile insurance. This is mainly caused by low levels of trust in the insurance market as well as the bad image that insurance has, which is mainly caused by bad claims experience. While household insurance has grown significantly in the past years, it is still considered small and limited in access as more than 10.000.000 Ghanaians (74% of which are in rural areas) are not reached by insurance. Another factor that is important for the development of a domestic insurance sector is the capital market. The Ghanaian capital market is limited in its development, offering mainly small and short-term products and lacking long-term products for investment. This limits the potential role of institutional investors that could play in the insurance sector.

Market relevant characteristics

The main distribution channels for insurance in Ghana are brokers and agents⁶⁷. The operational costs of brokers and agents do not justify operations in rural areas, therefore, insurance remains inaccessible to more than 10.000.000 people. Therefore, new distribution channels such as mobile distribution and associations, which are considered to be the distribution channels with the highest potential to reach people that are traditionally difficult to reach for insurance, must be expanded to reach people in rural areas and those interested in smaller insurance policies.

⁶⁵ Oxford Business Group (2022). What is Ghana doing to broaden insurance penetration? URL: <https://oxfordbusinessgroup.com/reports/ghana/2022-report/economy/expand-the-base-regulatory-reforms-and-the-introduction-of-new-products-and-technologies-are-broadening-insurance-penetration>

⁶⁶ cenfri (2018). Ghana Insurance Diagnostic Stakeholder Presentation. URL: https://cenfri.org/wp-content/uploads/2018/10/28.10.2018_Cenfri-Ghana-stakeholder-presentation.pdf

⁶⁷ cenfri (2018). Ghana Insurance Diagnostic Stakeholder Presentation. URL: https://cenfri.org/wp-content/uploads/2018/10/28.10.2018_Cenfri-Ghana-stakeholder-presentation.pdf



Identified Gaps

Various gaps limit the current success of insurance in Ghana. According to Cenfri, a significant limiting factor is the lack of consumer data ⁶⁸. This decreases the level of personalisation of the insurance policies, thus increasing prices and decreasing the attractiveness for consumers to buy insurance. One approach to reducing this limitation is to share government data which has successfully happened in Kenya. Additional limitations are seen with the technical capabilities of insurance companies. Cenfri expects that digitalisation could be a factor that reduces these limitations and could lead to a reduction in cost. Cenfri furthermore criticised a policy within the Ghanaian insurance sector. It identified that to strengthen the local insurance market, the government required insurers and reinsurers to initially concentrate on domestic offerings before considering foreign offerings. This leads to a situation where big and complex/niche risks are covered ineffectively. According to KPMG, the Ghanaian public is generally critical of insurances ⁶⁹. This is a significant barrier towards scaling up the insurance sector in Ghana.

5. Financial Protection Solutions and Linkages

5.1 Overview of solutions currently in place

The initial stocktaking carried out as part of the In-Country process in Ghana reveals that there are a number of financial protection solutions available in Ghana, however, the majority is still in development. These solutions encompass a spectrum of financial instruments, spanning from sovereign risk transfer to agricultural insurance at the farmer's level. They offer protection against a wide array of perils including floods, droughts, tropical cyclones, excessive rainfall, earthquakes, etc. The following table provides an overview of the financial protection solutions that are either operational or under development.

⁶⁸ cenfri (2018). Ghana Insurance Diagnostic Stakeholder Presentation. URL: https://cenfri.org/wp-content/uploads/2018/10/28.10.2018_Cenfri-Ghana-stakeholder-presentation.pdf

⁶⁹ Dzato, R. & Hlatshwayo, S. (2021). Insurance in the Land of Gold. The South African Insurance Industry Survey 2021. KPMG. URL: <https://assets.kpmg.com/content/dam/kpmg/za/pdf/2021/insurance-in-the-land-of-gold.pdf>



Agricultural Sector				
Implementing Organisation	Objectives	Instrument Type	Perils Covered	Status
Ghana Agricultural Insurance Pool (GAIP)	Agricultural insurance: Drought Index Insurance, Area Yield Insurance, Multiperil Crop Insurance, Poultry Insurance, Aquaculture Insurance	Parametric insurance	Multi-peril	GAIP is currently in transition
GLICO and PULA	Cocoa Revenue Protection Index Insurance (Price Index Insurance and the Area Yield Index Insurance) Agricultural Index Insurance for Planting for Food and Jobs farmers (Area Yield Index Insurance and Hybrid Index Insurance)	Parametric insurance	Drought, flood, pests and diseases, hail, animal attack, etc.	Launch planned for November 2023 Launch planned for March 2024
GLICO General Insurance Company Limited	Agricultural Insurance: (Area Yield Insurance, Aquaculture Insurance, Cattle and Livestock Insurance, Multiperil Crop Insurance, Plantation (Tree) Insurance, Poultry Insurance, Weather Index Insurance, Bundled Inputs Cover and Bundled Credit Cover	Parametric insurance	Multi-peril (excluding drought/dry spell for MPCl, and Plantation Insurance excludes drought and flood)	Awaiting NIC's approval
Vanguard Assurance	Weather index insurance product (sorghums, legumes and cereal grains)	Parametric insurance	Drought and flood	Awaiting NIC's approval
Quality Insurance Company Limited	Weather index insurance for crops	Parametric insurance	Drought and flood	Awaiting NIC's approval
Allianz Ghana	Weather index insurance	Parametric insurance	Unseasonal drought and excessive soil moisture	Awaiting NIC's approval



African Risk Capacity Ltd.	Prearranged finance for food security and immediate disaster response as a result of droughts and floods. Ongoing engagement between Ghana and ARC to develop and purchase a flood and drought sovereign insurance product.	Sovereign risk transfer	Drought, flood	Risk profile for Ghana to be finalised by March 2024 Drought Risk Profile already exists
Coastal Regions				
World Bank: West Africa Coastal Area Programme (WACA)	Building the resilience of coastal communities vulnerable to coastal erosion, flooding, and pollution, with a focus on multi-sectoral investment planning	Resilience building/cli mate finance	N/A	In development
Urban Flooding				
ISF, UNDP, Allianz and Swiss Re	The Tripartite project seeks to enhance the resilience of low-income communities in the Greater Accra Metropolitan Area against urban flooding and considers flood footprint and rainfall parameters as triggers.	Sub-sovereign risk transfer	Flood	First product placement for an Accra-focused product planned for end of Q2 2024
IIF/Letshego Ghana	Support the provision of climate risk insurance products to vulnerable households and MSMEs	Parametric insurance	Drought, flood	In development
Activa International Insurance Ghana	Offers property insurance against loss and damage caused by various hazards	Property insurance	Fire, lightning, and explosion, flood	Operational
SIC Insurance Company Ltd.	Offers financial protection for assets against various perils including fire	Property insurance	Fire and other perils	Operational
SUNU Assurances	Property insurance against multiple hazards	Property insurance	Fire, lightning, flood	Operational
Other Multi-Peril Solutions				
Natural Disaster Fund/Vision Fund	Insurance underwriting programme to the global VisionFund International microfinance group (27 countries including Ghana)	Risk transfer for microfinance institutions	Excess rain, tropical cyclone, drought, earthquake, flood	In development



Please note: Depending on the available information, the listed products are described further below in more detail. The indication on potential for scale-up and support is based on the consultations with stakeholders.

5.2 Agricultural Sector

In the agricultural sector, a variety of financial protection solutions are either operational or in development, ranging from solutions at the farmer's level to macro level solutions and offering protection against various perils impacting this sector. These solutions often rely on index-based approaches, using parameters related to agricultural yield/revenue or weather and targeting both cash and staple crops, including cocoa, rice, wheat, maize, beans, cotton, sorghum, groundnut, cassava, potato, yam, ginger, sesame, etc.

In terms of direct financial protection at the farmer's level, the Ghana Agricultural Insurance Pool (GAIP) has been offering five different products, but GAIP no longer underwrites them. Existing GAIP policies may be transferred to interested insurance companies. Independent from GAIP, five national insurance companies are about to launch their agricultural insurance products: Vanguard Assurance Company Limited, Allianz Insurance LTD, Glico General Insurance LTD, Quality Insurance Company Limited, and Enterprise Insurance LTD. The products are yet to be approved by the National Insurance Commission and are still going through regulatory review. More detailed information on some of these products is shared below. Once made available, further product information can still be added.

At the sovereign level, the African Risk Capacity has been collaborating with NADMO to set up risk transfer products (drought and flood) to strengthen disaster response and ensure food security. However, respective insurance policies were not yet purchased by Ghana. Potentially, a combined multi-peril product for flood and drought could be purchased in the future.

Overview of products for direct financial protection at farmer's level

Ghana Agricultural Insurance Pool (GAIP)

Product: Agricultural Insurance: Drought Index Insurance, Area Yield Insurance, Multiperil Crop Insurance, Poultry Insurance, Aquaculture Insurance

Focus region/area: No specific regional focus

Target beneficiaries: Smallholder and commercial farmers

Stakeholders (implementing organisation, partners): National Insurance Commission, members of the pool

Duration, status, further timeline: transitioning into a technical service provider

Further details: GAIP, a private sector-led insurance pool comprised of 16 members with SIC Insurance as the largest stakeholder. Hollard Insurance Company serves as the lead insurer, while Swiss Re acts as the primary reinsurer. GAIP offers five agricultural insurance products: Drought Index



Insurance, Area Yield Insurance, Multiperil Crop Insurance (MPCI), Poultry Insurance (PI) and Aquaculture Insurance, with MPCI and PI being their most recent additions. GAIP products have had limited reach with a coverage of 13,781 people in 2022 (in total Ghana has approximately 5 million farmers). GAIP was operating with a lot of constraints as it had limited capital. Currently, GAIP is in the process of transitioning into a technical service provider (TSP), supporting the implementation of agricultural insurance in Ghana. As a TSP, it will maintain its role in offering technical services to insurance companies, including product design and marketing. However, GAIP will no longer underwrite agricultural insurance. There have been some discussions on transferring existing GAIP policies to the insurance companies that have expressed interest in underwriting agricultural insurance.

Potential for requested Global Shield Support:

- Technical assistance in the process of transitioning to a TSP

Increasing smallholder farmer resilience to climate change through technology and innovation in climate risk insurance products and distribution channels

Product: Cocoa Revenue Protection Index Insurance (Price Index Insurance, Area Yield Index Insurance)

Focus region/area: Cocoa growing regions of Ghana (i.e., Western, Ashanti, Brong Ahafo, Volta, Eastern, Central)

Target beneficiaries: Smallholder farmers

Stakeholders (implementing organisation, partners): PULA, GAIP, COCOBOD, GLICO, African Speciality Risks, SCOR, Hannover Re, funded by InsuResilience Solutions Fund

Duration, status, further timeline: Launch planned for November 2023

Further details: This insurance solution is aimed at protecting against losses induced by climate change-related events, such as droughts, floods, cyclones, pests, and diseases. It specifically targets the cocoa sector and is composed of two essential components, the **Price Index Insurance and the Area Yield Index Insurance**. The **Price Index Insurance** offers protection against unpredictable and fluctuating commodity prices, ensuring stability for COCOBOD's earnings and cash flow and is sold during the annual harvest season. Complementing this, **the Area Yield Index Insurance** provides farmers with coverage against yield losses. This coverage is determined by a predetermined threshold based on historical yield data and covers production losses during the insurance period.

Potential for requested Global Shield Support:

- Premium subsidies: pre-financing of premiums or blended financing
- Potential to scale up – to cover up to 800,000 households
- Technical support in enhancing historical yield data

Product: Agricultural Index Insurance for Planting for Food and Jobs farmers

Focus region/area: No specific regional focus but particularly relevant for Central and Northern Ghana

Target beneficiaries: Smallholder farmers under the Planting for Food and Jobs programme

Stakeholders

Implementing organisation, partners: PULA, GLICO, Ministry of Food and Agriculture

Duration, status, further timeline: Launch planned for March 2024



Further details: This insurance product is designed to integrate agricultural insurance into the Planting for Food and Jobs program, which is being implemented by the Ministry of Food and Agriculture. The proposal includes two types of parametric insurance: **Area Yield Index Insurance (AYII)** and **Hybrid Index Insurance (HII)**. **Area Yield Index Insurance** provides coverage to farmers and/or aggregators against a predetermined historical yield threshold against perils such as drought, cyclone, windstorm, frost, excessive rainfall, heatwave, hail, flood pests and diseases. **Hybrid Index Insurance** combines elements of Weather Index Insurance (WII) and Area Yield Index Insurance (AYII), intending to offer comprehensive coverage for both weather-related and non-weather-related perils.

Potential for requested Global Shield Support:

- Premium Financing (MOFA has also requested premium financing for these products)

GLICO General Insurance Company Limited

Product: Agricultural Insurance (Area Yield Insurance, Aquaculture Insurance, Cattle and Livestock Insurance, Multiperil Crop Insurance, Plantation (Tree) Insurance, Poultry Insurance, Weather Index Insurance, Bundled Inputs Cover and Bundled Credit Cover)

Focus region/area: No specific regional focus

Target beneficiaries: cooperatives, smallholder farmers under aggregators or groups, input suppliers, NGOs, self-help groups, and others

Stakeholders (implementing organisation, partners): GLICO General Insurance Company Limited

Duration, status, further timeline: Awaiting approval from NIC

Further details: GLICO is one of five private insurance providers that have developed a range of agricultural insurance products, awaiting regulatory approval from NIC. GLICO's product pipeline includes nine solutions such as: Area Yield Insurance, Aquaculture Insurance, Cattle and Livestock Insurance, Multiperil Crop Insurance (MPCI), Plantation (Tree) Insurance, Poultry Insurance, Weather Index Insurance, Bundled Inputs Cover and Bundled Credit Cover. Notably, MPCI covers various risks but excludes drought or dry spells, while Plantation Insurance excludes both drought and floods, along with other perils.

The Bundled Inputs Cover is setup in partnership with the government, development agencies, and input providers and will provide farmers with the necessary agricultural inputs. The Bundled Credit Cover is integrated into the cost of credit facilities extended to farmers. This arrangement enables the lender to utilize insurance coverage as collateral for the credit facility.

Vanguard Assurance

Product: Weather index insurance product (sorghums, legumes and cereal grains)

Focus region/area: All regions

Target beneficiaries: Vulnerable smallholder farmers

Stakeholders (implementing organisation, partners): Vanguard Assurance, supported by InsuResilience Investment Fund (IIF)

Duration, status, further timeline: In development – awaiting approval from NIC

Further details: This project is a collaborative effort between IIF and Vanguard Assurance aimed at creating an insurance product against climate-related risks to improve access to financial protection for vulnerable people living in poverty in Ghana. Currently, efforts are in progress to introduce insurance solutions against climate-related risks to the Ghanaian market, with a primary focus on



agricultural insurance designed to mitigate the impact of extreme weather events. Vanguard has developed a **Weather Index Insurance** for smallholder farmers and currently awaiting approval from NIC. It will offer protection against **dry spell events** and **excessive rainfall** and covers both cash and subsistence crops including legumes and cereal grains.

Potential for requested Global Shield Support:

- Premium Financing

Quality Insurance Company Limited

Product: Weather index insurance for crops

Focus region/area: No specific regional focus

Target beneficiaries: cooperatives, smallholder farmers under aggregators or groups

Stakeholders (implementing organisation, partners): Quality Insurance Company (QIC) Limited, IBISA (Luxemburg –based InsuTech Company)

Duration, status, further timeline: Awaiting approval from NIC

Further details: QIC in partnership with IBISA, has developed a parametric crop insurance, which is awaiting approval from NIC. The product is an extreme weather index insurance providing coverage against drought and flood. It will use indices such as cumulative rainfall and daily observed rainfall both in millimetres (mm). The ERA5 dataset produced by the European Centre for Medium-Range Weather Forecasts (ECMWF) will be used. This product is a meso-level solution with cooperatives, smallholder farmers under aggregators or groups as target beneficiaries.

Allianz Ghana

Product: Weather Index Insurance for agricultural products

Focus region/area: No specific regional focus

Target beneficiaries: smallholder and/or commercial farmers

Stakeholders (implementing organisation, partners): Allianz Ghana

Duration, status, further timeline: Awaiting approval from NIC

Further details: Allianz Agric Insurance offers the Weather Index product to smallholder and commercial farmers in Ghana. This solution seeks to provide protection against economic losses resulting from unseasonal drought and excessive soil moisture during the planting-to-harvesting period. Unlike traditional insurance, pay-outs are triggered by predetermined thresholds, not actual losses.

Overview of sovereign risk transfer products under development

African Risk Capacity

Product: African Risk Capacity (ARC) Drought Sovereign Insurance

Focus region/area: Northern regions of Ghana

Target beneficiaries: smallholder farmers

Stakeholders (implementing organisation, partners): ARC, MoF, MoFA, NADMO

Duration, status, further timeline: Drought risk profile already in place, product development to follow



Further details:

ARC has been engaging with the Ghanaian government since 2017 on developing macro-level protection for drought, a risk that poses a significant threat in the northern part of the country. Ghana already has a risk profile for drought in place. The proposed solution focuses on enhancing livelihood and food security. This approach will prioritize staple crops over cash crops, like cocoa.

Potential for requested Global Shield Support:

- Premium Financing

Product: ARC Multi-Country Flood Protection (macro-level parametric flood insurance)

Focus region/area: Cote d'Ivoire, **Ghana**, Madagascar, Malawi, Mozambique, Togo

Target beneficiaries: poor and vulnerable people in these countries

Stakeholders (implementing organisation, partners): ARC, Hannover Re (tbc), NDF, NADMO, MoF

Duration, status, further timeline: Risk profile for Ghana to be finalised by March 2024

Further details: This product provides protection for these countries, which are highly exposed to frequent and destructive flood events triggered by increased rainfall due to climate change. By offering sovereign level flood protection, it extends the benefit of flood insurance allowing governments to respond to the impacts and damage in agriculture and other sectors for the public's benefit.

In addition, ARC is considering developing a product that covers multiple perils (flood and drought), with the intention of potentially maintaining an 80/20 ratio in favour of flood.

Potential for requested Global Shield Support:

- Premium Financing
- Technical assistance for further product development

5.3 Coastal Regions

For the coastal regions, no specifically targeted pre-arranged finance solutions were identified so far.

West Africa Coastal Area Programme (WACA)

Product: Resilience building

Focus region/area: Ghana's coastal areas, known priority sites where pre-feasibility studies are ongoing include communities in the (i) Pra River Estuary and (ii) left bank of Volta River Mouth including the stretch of coast of Anyanui-Agbledomi-Dzita

Target beneficiaries: Vulnerable communities in coastal areas

Stakeholders (implementing organisation, partners): World Bank, MESTI, Ministry of Land and Natural Resources, Ministry of Housing and Works, Civil Society Platform, Cape Coast University

Duration, status, further timeline: In implementation, studies ongoing

Further details: The WACA Program is a multi-country and regional response to enhance the resilience of coastal communities and assets in 17 west African countries particularly vulnerable to erosion, flooding, and pollution including Ghana. This programme primarily focuses on adaptation.



A Multisectoral Investment Plan is currently in the works for Ghana. This plan will encompass three key activities: first, a comprehensive risk assessment of coastal hazards, particularly focusing on flooding and erosion. Second, it will involve identifying intervention sites or hotspots in coastal areas. These hotspots will include communities, critical infrastructure, and economic activities that are highly vulnerable to flooding, erosion, and pollution. Lastly, the plan will outline the specific investment requirements necessary to enhance coastal resilience in these areas. WACA is expected to finance site-specific interventions for coastal protection to finance a mix of gray, green, and hybrid infrastructure solutions at multiple sites to reduce risks of flooding and erosion. Green solutions include submerged native aquatic vegetation, mangrove protection and reforestation to serve as a buffer to inundation and sea-level rise, and/or sand fill to restore shorelines between communities and the sea. Potential grey solutions include small-scale localized infrastructure such as groynes or breakwaters for erosion control/sediment management, while hybrid solutions incorporate both approaches depending on site-specific needs and characteristics. The project will also support interventions for social development and economic recovery based on the needs of affected coastal communities. Special attention will be given to ensure opportunities for marginalized groups, including women and indigenous peoples.

There is no investment into insurance or other pre-arranged finance solutions yet but there is openness for future consideration.

Potential for requested Global Shield Support:

- Once project has taken off, further exploring the combination with a pre-arranged finance solution

5.4 Urban Flooding

Flooding poses a significant risk in Ghana, resulting in extensive damage to assets, lives, and livelihoods. In response to this, various insurance solutions are either currently in operation or under development. While many of the existing insurance products are offered in the form of property insurance covering multiple perils, including flood, the Tripartite initiative's (sub-) sovereign risk transfer mechanism, currently in development, particularly focuses on urban flooding in Ghana, aiming to provide a macro-level solution.

(Sub-)Sovereign risk transfer scheme for urban floods in Ghana

CDRFI Tool / Product: Index-based emergency relief insurance product, (sub)-sovereign risk transfer

Focus region/area: Greater Accra Metropolitan Area

Target beneficiaries: 118000 urban vulnerable households (low-cost residential areas, informal settlements)

Stakeholders (implementing organisation, partners): UNDP, Allianz and Swiss Re, NADMO, the Ministry of Finance, the National Insurance Commission, the Ghana Meteorological Agency, local public entities, HKV (flood risk consultant), ICEYE (microsatellite operator), and Flood Tags (social media-based monitoring), supported by InsuResilience Solutions Fund

Duration, status, further timeline: 2nd/3rd Q of 2024 – First product placement for Accra

Further details: The Tripartite Project in Accra aims to boost Ghana's resilience to climate-related challenges by offering financial protection to vulnerable urban households. It works towards enhancing the government's financial resilience against extreme flooding by implementing specific



measures such as contingency planning, capacity building, and developing a regulatory framework. Through a collaborative effort between the public and private sectors, a customized index-based emergency response product for urban flood events has been created.

The primary focus is on finalizing product development and launching the product in the market, all while establishing trust within the market. Once this is achieved, opportunities for scaling the product to further urban areas in Ghana will be explored.

Potential for requested Global Shield Support:

- Premium support for first product placement
- Scaling-up opportunities to further urban areas in the medium term

Letshego Ghana

CDRFI Tool/Product: Parametric insurance

Focus region/area: No specific regional focus

Target beneficiaries: MSMEs and poor and vulnerable people

Stakeholders (implementing organisation, partners): IIF, Letshego Ghana

Duration, status, further timeline: 2021 – 2025 – currently in implementation

Further details: This program seeks to extend support for the provision of climate risk insurance products to poor and vulnerable and MSME clients of microfinance institutions. It offers protection against flood and drought.

Apart from the products listed above, several private sector companies, including **SUNU Assurances**, **SIC Insurance Company Ltd.**, and **Activia International Insurance Ghana**, are currently operating in the Ghanaian market. These companies provide property insurance against a range of risks including flood, fire, lightning, etc.

5.5 Multi-peril Solutions

Vision Fund International ARDIS Programme Ghana

CDRFI Tool/Product: Risk transfer for microfinance institutions

Focus region/area: No specific regional focus

Target beneficiaries: Microfinance institutions and their clients

Stakeholders (implementing organisation, partners): National Disaster Fund, Global Parametrics

Duration, status, further timeline: Implementation

Further details: Global Parametrics developed an insurance underwriting program for VisionFund International's microfinance group operating in 27 countries, including the Ghana affiliate and its clients. This program, facilitated by the NDF, serves as a risk-taking vehicle for parametric products designed to address the protection gap in low and middle-income countries. It provides coverage for perils such as excess rain, tropical cyclones, drought, earthquakes, and floods.



5.6 Social protection systems and their role to responding to climate shocks in Ghana

This section was provided by an expert team of the World Bank. Members of the GS Coordination Hub were asked to contribute to Ghana's gap analysis, reflecting the collaborative approach of the GS.

Social protection systems can be an effective tool to strengthen the resilience of the poor and vulnerable as well as enable effective responses to climate related shocks.⁷⁰ **For a country's social protection system to be considered adaptive or shock-responsive, it must have four key building blocks.**⁷¹ First, the system needs to comprise of *programs* that build resilience of beneficiaries before a shock happens, and that can rapidly expand benefits or absorb new beneficiaries during a shock (scaleability). Second, *data and information* on climate vulnerable households is necessary to inform targeting. Third, the system needs prepositioned *financing* and payment delivery systems that can reach affected people in a timely manner. Finally, *institutional arrangements and partnerships* between critical actors are necessary, detailing how they will work together in an emergency. The following section examines Ghana's existing social protection systems along these building blocks, with a view towards informing potential GS support for shock-responsive social protection.

i. Scaleability

Ghana's flagship social assistance programs increase resilience and can scale-up in response to shocks. The Livelihood Empowerment Against Poverty (LEAP) supports 350,000 of the poorest households (or 1.4 million people) with regular cash transfers. The Labor-Intensive Public Works (LIPW) program supports around 95,000 households over a four-year period with cash for work activities that create community assets, including afforestation and water harvesting, contributing to climate adaptation. The Complementary Livelihood and Asset Support Scheme (CLASS) program supports 60,000 households over a four-year period with productive grants, training and savings group support. Together, the programs increase incomes of the poorest and most vulnerable people, diversify livelihoods, and build resilience even before shocks happen⁷². Approximately 60% of beneficiaries of these programs are in the Guinea and Sudan Savannah agro-ecological zones, which

⁷⁰ See World Bank 2022. "Building Resilience in the Sahel – through Adaptive Social Protection."

<https://www.worldbank.org/en/programs/sahel-adaptive-social-protection-program-trust-fund/overview>;

UNICEF: <https://www.unicef.org/documents/programme-guidance-strengthening-shock-responsive-social-protection-systems>

⁷¹ Bowen, Thomas; del Ninno, Carlo; Andrews, Colin; Coll-Black, Sarah; Gentilini, Ugo; Johnson, Kelly; Kawasoe, Yasuhiro; Kryeziu, Adea; Maher, Barry; Williams, Asha. 2020. Adaptive Social Protection: Building Resilience to Shocks. International Development in Focus. © Washington, DC: World Bank.

⁷² Evidence from the Ghana LEAP Programme UNICEF, WP-2015-10|November 2015; and Davis and Handa 2014. - Osei-Akoto, Isaac, Simon Bawakyillenuo, George Owusu, Felix Essilfie, and Innocent Agbelie. 2016. Short Term Impact Evaluation Report - Labor- Intensive Public Works (LIPW) of Ghana Social Opportunities Project (GSOP). September 2016. ISSER (Institute of Statistical, Social and Economic Research) and Ministry of Local Government, Decentralization, and Rural Development. - Andrews, Colin; de Montesquiou, Aude; Arevalo Sanchez, Ines; Dutta, Puja Vasudeva; Paul, Boban Varghese; Samaranayake, Sadna; Heisey, Janet; Clay, Timothy; Chaudhary, Sarang. 2021. The State of Economic Inclusion Report 2021: The Potential to Scale. Washington, DC.



face extreme weather shocks due to climate change.⁷³ These programs could expand vertically (provide increased benefits) and horizontally (target newly affected people) during climate related shocks, but detailed procedures would still need to be developed and agreed on.

ii. Data and information

Ghana's social registry provides a strong entry point for data on the poor and vulnerable, but data gaps remain. Ghana's National Household Registry (GNHR) currently houses data on eight out of 16 regions of the country and data availability is strongest on the poorest, and most climate-affected, northern regions. Moreover, in response to the Covid-19 pandemic, GNHR adapted its data collection tool to facilitate rapid collection of individual-level data for rapid emergency targeting. However, an incomplete social registry and lack of linkages with meteorological early warning systems would currently hamper the rapid targeting of affected people based on agreed triggers for climate related shocks.

iii. Finance

Financing remains a challenge for the routine social assistance programs and pre-positioned financing for emergencies is nascent. Government has made commitments to safeguard and increase social spending to protect the poor and vulnerable. Yet, given recent fiscal challenges in Ghana, the release of payments for government-funded social protection programs have largely been delayed due to a lack of liquidity. For example, LEAP beneficiaries received several bi-monthly transfers with delays in 2022 and 2023, and World Bank financing was sought to fill liquidity gaps. In terms of pre-positioned financing, one of the only formal mechanisms currently is the Contingency Emergency Response Component (CERC) under the Ghana Productive Safety Net Project 2.⁷⁴ Once triggered in response to an officially declared emergency, the CERC allows for reallocation of financing from unspent project components towards emergency relief and recovery efforts through the social protection programs. Government has also made financing available for past emergency responses through ad hoc budget reallocations.⁷⁵ On the other hand, rapid payment delivery systems to beneficiaries are well developed in Ghana, given a major move to digital payments in recent years.

iv. Institutional arrangements and partnerships

Currently, social protection shock response is provided in an ad hoc manner after the emergency has occurred. The Ministry of Gender, Children and Social Protection (MoGCSP) is mandated to coordinate social protection programs including shock responses in Ghana. Such coordination

⁷³ Nxumalo, Mpumelo; and Raju, Dhushyanth. Shocks and Social Safety Net Program Participation in Ghana - Descriptive Evidence from Linking Climate Risk Maps to Programs Beneficiary Rolls (English). Washington, D.C. : World Bank Group. <http://documents.worldbank.org/curated/en/099111102032211447/P1766380f7bb30066086f60b11c43719035>

⁷⁴ <https://projects.worldbank.org/en/projects-operations/project-detail/P175588>

⁷⁵ See World Bank Group. Gender-Responsive and Inclusive Social Protection Shock Responsive Systems in Ghana, 2023 (unpublished report).



requires multi-agency collaboration and partnerships including with the National Disaster Management Organization (NADMO), private sector and non-governmental organizations. There is a legal basis for MoGCSP's mandate, given that the Social Protection Policy (2015) and NADMO Act (2016) identify social protection as critical in disaster risk management and response. However, response measures are currently developed after the shock has occurred and past responses were not guided by agreed Standard Operating Procedures. Data sharing on affected persons across agencies could also be considerably improved, leveraging the GNHR.⁷⁶

5.7 The status of financial protection: summary

The stocktaking reveals many ongoing initiatives and programmes in Ghana aimed at enhancing financial protection. These efforts underline the government's commitment to broaden insurance coverage among vulnerable parts of the population with concrete national programmes. They are a result of successful multi-stakeholder collaborations between government, private sector and development actors.

Nonetheless, the majority of products are still under development or in implementation, resulting in significant protection gaps in all three priority areas. In the agricultural sector, various products for a variety of cash and food crops are underway, but regulatory approval, distribution in remote rural areas, and affordability of premiums remain crucial barriers. At the sovereign level, engagement with ARC shows progress, but product uptake has been postponed as protection priorities have shifted, and funding of premiums remains challenging. With regards to urban flooding, the Tripartite project in Accra shows strong momentum in product development, with a placement likely for mid-2024. However, similar efforts for other urban areas have not been initiated yet. Finally, coastal flooding remains vastly unprotected to date, with customized protection for this type of flooding seemingly lacking in the market, and no sovereign or sub-sovereign arrangements in place. Across all risks and priority areas, existing social protection programmes show strong conditions for shock-responsiveness but would require targeted investments in data and clearly established links to prearranged finance at (sub)sovereign level.

⁷⁶ During COVID-19, the identification and validation of persons whose data was collected for targeting could have been relatively faster had systems of the relevant stakeholders been linked with the social registry. For example, verifying beneficiaries who had suffered the double shock of the pandemic's economic impact and floods was delayed because of absence of linkage between NADMO and GNHR systems; the verification of mobile money account details also was cumbersome due to absence of linkage between the GNRH and mobile network service providers.



6. Gaps Identified and Potential Areas of Intervention

The following chapter summarizes the main gaps identified and derives possible areas of interventions which could feed into the MoF's Request for Support to the Global Shield, including GRMA support. The potential areas of interventions thus build on the main findings in existing risk assessments, the reviewed key policy/strategic frameworks, an analysis of the enabling environment for financial protection, and comparison with project- and product-level data. They build on consultations with key stakeholders undertaken between July and October 2023 in the form of the kick-off workshop in July, online and hybrid technical consultations, and several bilateral conversations in person and online.

It is at the sole discretion of the Ministry of Finance to decide which areas of intervention, and which type of support will be requested from the GS in its Request for CDRFI support, in alignment with the key stakeholders involved. The section below is thus entirely separate from Ghana's actual request to the GS⁷⁷ and does not anticipate the decision of the Global Shield Financing Vehicles with respect to the final support granted as part of the country support package.

6.1 Agriculture

Smallholder farmers in Ghana are increasingly challenged by the uncertainty and variability of weather that climate change causes, particularly in the northern regions of Ghana.

An increase in crop land exposure to drought is expected, as almost all crops being rainfed. With the agricultural sector providing employment to 40 % of Ghana's active labour force, this is of vast importance for food security and the economy.

In the past years, yields have decreased, partially associated to reduced soil fertility and perennial floods of farmland. In addition, the majority of the rural population remains uninsured, leaving their agricultural livelihoods vulnerable to droughts and floods, and exacerbating the risk of widespread food insecurity if cash crops are damaged. Finally, as the Cocoa sector plays a vital role for Ghana's exports and overall economy, a lack of financial protection in this value chain can affect livelihoods, economic stability, and tax income at the fiscal level.

⁷⁷ Please note: The potential GS support ranges from technical assistance to the development of new financial protection solutions to financial assistance in the form of premium and capital support. Any premium support provided needs to adhere to the Principles on SMART Premium and Capital Support: <https://www.insuresilience.org/publication/smart-premium-and-capital-support-enhancing-climate-and-disaster-risk-finance-effectiveness-through-greater-affordability-and-sustainability/>. Also, the support of the GS Financing Structure follows the principle of subsidiarity, i.e. it will be assessed if the requested support can also be fulfilled by other support programme and/or if the GS support can be complementary.



6.1.1 Prearranged finance at the sovereign level

Gaps identified:

Currently, there is no finance prearranged at the sovereign level to address disaster response and strengthen food security if droughts or floods damage food crops. To develop such products, Ghana's government via NADMO has been in ongoing collaboration with the African Risk Capacity (ARC) regarding drought and flood risk. The drought product and the corresponding contingency plan were finalised with the objective to include Ghana as policyholder in the drought risk pool in 2020. However, limited fiscal space due to Covid-19 and an increased political attention on flood prevented the government from buying the policy back then. Since then, further work has been done on Ghana's flood risk profile, which is expected to be finalized in early 2024. This would pave the way for acquiring a multi-peril policy for the 2024/2025 risk period, with a focus on improved disaster response and food security. However, the ability to pay premiums remains impaired as the country's fiscal position remains weak.

Potential areas for requested Global Shield Support:

- Premium support for sovereign risk transfer, building on ongoing collaboration with African Risk Capacity (in cooperation with MoF, NADMO).
- Funding for product development, as needed, and technical assistance to further enhance Ghana's contingency plan. In particular, exploring how ARC's contingency plan could build on Ghana's social protection system as delivery channels to effectively reach the most vulnerable segments of the population (in cooperation with Ministry of Gender, Children and Social Protection, MoGCSP)
- Technical assistance to assess viability of complementary risk financing solutions at the sovereign level in addition to or instead of insurance (in cooperation with MoF, NADMO)

6.1.2 Agriculture insurance (at the farmer's level)

Gaps identified:

Expanding direct financial protection at the farmer's level is crucial to relieve the government from covering all risks at the sovereign level. Therefore, a combination of financial protection solutions at the different levels according to a risk-layered approach is recommended. The specific advantage of agricultural insurance at the farmer's level is that specific sectors (e.g., cocoa) and regions can be targeted, and products can be tailored to specific needs.



The national landscape of institutions in the field of agricultural insurance is currently being redefined under the auspices of the National Insurance Commission (NIC): the Ghana Agricultural Insurance Fund (GAIP) is in transition to a technical service provider and will continue to support agricultural insurance in Ghana. Meanwhile, the Agriculture Insurance Fund (AIF) is currently being set up but not yet operational to fulfil its functions, such as subsidizing agriculture insurance premiums.

With these schemes still under development, agricultural insurance has not yet reached its potential in Ghana. There are currently no active agricultural insurance products beyond those offered by GAIP, which have limited reach with a coverage of 13,781 people in 2022 (in total Ghana has approximately 5 million farmers). Five national insurance companies are about to launch their agricultural insurance products (Vanguard Assurance Company Limited, Allianz Insurance LTD, Glico General Insurance LTD, Quality Insurance Company Limited, Enterprise Insurance LTD). The products are yet to be approved by the National Insurance Commission and are still going through regulatory review.

Potential areas for requested Global Shield Support:

- Technical assistance for the institutional set-up related to agricultural insurance (in cooperation with NIC and potentially ILO), incl. operational and governance modalities of the AIF, principles for subsidizing agriculture insurance premiums, and support in the transition of GAIP into a technical service provider;
- Financial assistance: provision of funds for AIF's phase 2, interim co-financing of insurance premiums until AIF is operational, and potential premium co-financing once AIF is fully launched (in collaboration with NIC and Ministry for Food and Agriculture); and
- Technical assistance by GRMA to generate accurate data for agricultural insurance and building capacity to manage this data, in collaboration with NIC.

6.2 Coastal Regions

Ghana's coastal zone is housing more than 25% of the population and the entire coastal area is vulnerable to coastal erosion and coastal flooding, both of which are exacerbated by climate change.

Gaps identified:

For the coastal regions, no financial protection solutions under development or in place were identified. Property insurance covering floods is generally offered in the Ghanaian market, but this does not seem to cover coastal flooding (i.e. storm surge as a result of tropical storms). And damages or disruption of critical public infrastructure due to coastal flooding also remain entirely without prearranged finance. Some vulnerability assessments of specific locations were carried out but there is no data for the entire coastline related to the impacts of coastal flooding, e.g. on people that might need to be replaced, costs of restoring critical infrastructure, and corresponding financial impacts on



the government. One of the most relevant interventions is the World Bank's West Africa Coastal Area Programme (WACA) which enhances the resilience of coastal communities vulnerable to erosion, flooding, and pollution. In the framework of the WACA programme, a risk assessment of specific hot spots (coastal erosion and flooding) was carried out to identify intervention areas.

Potential areas for requested Global Shield Support:

- Clarifying exact need for risk analytics and provision of these analytics
- Technical assistance building upon the WACA programme (in cooperation with World Bank, MESTI, EPA, GHA):
 - Potential to complement their comprehensive risk assessment of coastal hazards, e.g. with modeling of impacts in different regions with more granular grid sizes, so as to enable the development of corresponding risk transfer products.
 - Exploring option to complement WACA with a financial protection solution, e.g. with an integrated approach combining risk reduction measures with risk transfer to cover the residual risks.
- Capacity building to support commercial insurance markets for coastal risks

6.3 Urban Areas

Accra experienced 17 major flood events since 1955, with the 2015 flood event affecting over 50,000 people with 150 casualties. Although infrastructure improvements were carried out, flood events continue to occur, and the risk is expected to increase due to projection of higher frequency of heavy rains because of climate change.

Gaps identified:

To financially protect the vulnerable urban population also in informal settlements, a new urban flood product for the Greater Accra Metropolitan Area is under development and expected to be launched in May 2024 under the Tripartite Agreement (UNDP in collaboration with Swiss Re and Allianz), the first of its kind in Ghana. However, premium payments are not covered yet, and similar efforts for other urban areas have not been initiated yet.

Potential areas for requested Global Shield Support:

- Co-financing premium support for urban flood parametric insurance in Accra to supporting the proof of concept of the product (in cooperation with MoF, NADMO and the Tripartite project)
- Assess potential of scale-up to other urban areas; concept and solutions development based on the experience of the product development for Greater Accra Metropolitan region (medium-term, to be explored after the launch of the product in 2024)



Further potential areas of interventions:

6.4 Country Strategies / Frameworks

Gaps identified:

Currently, there is no national Disaster Risk Finance (DRF) strategy in place. However, there has been a request by NADMO to UNDP to integrate disaster risk finance into the National Disaster Management (DRM) Strategy. This also entails generating the Ghana National Disaster Management and Risk Finance Strategy roadmap and implementation plan. Work on this is about to start. Funding for the implementation of the roadmap is still required.

Also, the National Adaptation Plan (NAP) is still under development. For the NAP, financial protection solutions are currently not yet considered. However, having these strategic frameworks in place can support Ghana in more effectively mitigating and addressing losses and damages exacerbated by climate change. A comprehensive approach is deemed most effective in terms of integrating adaptation approaches to reduce climate risks and financial protection solutions that cover the residual risks.

Potential areas for requested Global Shield Support:

- **Technical assistance to support the** implementation of a national disaster risk finance strategy (in cooperation with NADMO, UNDP)
- **For the NAP process:** exploring how financial protection solutions could be included and integrated with other adaptation measures (in cooperation with the Environmental Protection Agency)

6.5 Risk analytics specific interventions

Increasing understanding of risk analytics to quantify the frequency and severity of direct and indirect losses and risk to specific sectors and the population is crucial. One to two sector level applications of risk analytics should be proposed, which can then be co-developed through collaboration and capacity building exercises to familiarise practitioners and researchers in Ghana with risk analytics tools and approaches. Applications of those models should seek to include risk financing and benefit-cost assessment of climate adaptation, and to include climate change projections and socio-economic projections.



Such analysis could be high resolution and focussed on selected regions of Ghana, or national scale and strongly focussed towards one or two sectors – in either case, utilising local information to build a localised model and approach, rather than one relying on global data and assumptions. Any analyses should be conducted with open modelling frameworks (Oasis LMF and CLIMADA) to enable use of those tools beyond the GRMA project implementation period. Analyses should be developed to use projections consistent with the Climate Atlas, and seek to support development of impact-based forecasting in Ghana.

Focus of particular interest, which were explored by participants in the October 2023 technical consultation in Accra, include:

- the development of **risk assessment and improved data and monitoring of crop yield for cocoa**,
- quantitative estimation of **risk due to coastal inundation** in the face of coastal erosion and sea level rise, to support coastal management – any activity in this area should support, and not duplicate work proposed under the WACA project, and
- quantitative estimation of risk due to **inland flood especially in urban areas**.

6.6 Shock responsive social protection system

These key gaps were provided by an expert team of the World Bank.

- **Scalable social protection programs:** The need to develop a shock response strategy for Ghana's key social assistance programs, and the agreement of standard operating procedures for emergencies, particularly for cyclical droughts.
- **Data and information:** Important next steps will be to increase data coverage on all regions of the country and establish linkages with early warning systems on climate related data triggers.
- **Finance:** Undertaking a disaster risk financing assessment to identify new sources of financing for climate resilience and responding to climate-related emergencies through social protection programs.
- **Institutional arrangements and partnerships:** Finalization of social protection shock response strategy and standard operating procedures detailing roles and responsibilities of critical actors.



6.7 Considerations for financial protection solutions regarding climate-induced migration or displacement in Ghana

These points were provided by SLYCAN Trust based on their [case study](#) on climate-induced loss and damage and internal human mobility in Ghana.

- **Developing a robust and accessible database and data management system on loss and damage and human mobility** to make informed decisions about risk management, risk finance, and other interventions that connect to internal human mobility in Ghana.
 - Potential support to develop and maintain such a system by providing financial and technical assistance.
- **Developing tailored climate risk transfer and finance products** that are affordable, accessible, simplified, and able to be managed by those living in situations of displacement, informal migration, or informal settlements.
 - Potential support in developing such climate insurance products.
- **Establishing a risk-sharing mechanism** to spread the financial burden of climate-induced migration or displacement across a larger group of people or community.
- **Expanding social protection programmes** to better address the needs of people in situations of displacement, migration, or relocation, especially those without formal registration or residence. This could include financial assistance, capacity-building, improving risk and finance literacy, and providing access to skill development opportunities.
- **Integrating climate-related human mobility into budgetary planning and allocations:** This could ensure that migrants, displaced persons, and those affected by climate-induced loss and damage have access to the resources and support they need to rebuild their lives and to become more resilient to the impacts of climate change.
- **Developing and providing risk transfer and management solutions for small-scale entrepreneurship and economic diversification:** Migrants and displaced persons as well as those affected by climate-induced loss and damage (including youth) are often in need of a stable and resilient income and ways to build economic resilience and safety needs, for example through establishing micro- and small-sized enterprises or entrepreneurship. Risk management solutions such as flexible insurance or capacity-building on relevant skills (including risk, insurance, and finance literacy) could help them to achieve this.