Government of Ghana
Ministry of Environment, Science, Technology and Innvation
Ministry of Local Government and Rural Development

City STRENGTH
RESILIENT CITIES PROGRAM

ENHANCING URBAN RESILIENCE IN THE GREATER ACCRA METROPOLITAN AREA

MAY 2017

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Foreword

Ghana is making important strides toward fostering resilient cities that ensure the safety of citizens and create thriving and vibrant communities. It is estimated that 65 percent of the Ghanaian population will live in urban areas by 2030. Cities are places where people, assets, economic activities and connections to other countries and cities come together. The process of urbanization in Ghana has contributed to economic growth and human prosperity, and remains an opportunity to create cities that may lift many people out of poverty and establish Ghana as the gateway to West Africa. At the same time, however, Ghana's rapid urbanization and the creation of new urban settlements also pose unique challenges in relation to planning, service provision and management, and hence requires sustained policy effort and attention. If not attended, the development gains associated with urbanization can be gradually reversed.

The Greater Accra Metropolitan Area (GAMA), along with Kumasi, continues to be a dominant urban center. GAMA has a population of 4.6 million people (more than 16 percent of Ghana's population), and is also acknowledged as one of the fastest-growing city regions in West Africa, with a large concentration of people, investments and economic activities. Nonetheless, GAMA is exposed to recurrent shocks and stresses on top of numerous developmental challenges and climate change issues that threaten development gains. The deadly floods of June 2015 are a reminder that creating a resilient and inclusive city must be a priority at all government levels.

As a first step, the Government of Ghana approached the World Bank in 2015 to undertake the CityStrength Diagnostic. The objective of the CityStrength Diagnostic was to engage a wide range of

stakeholders across Metropolitan, Municipal and District Assemblies (MMDAs) in GAMA and other government agencies to jointly identify the root causes of the many shocks and stresses confronting the GAMA region and identify priority actions and investment to address them.

This report summarizes the outcomes of the process and outlines the recommendations that were identified jointly by national and local stakeholders in Ghana and World Bank specialists. Furthermore, the report provides evidence that can be leveraged by the Government to request further support from the World Bank and other development partners to implement follow-up actions.

The overarching message of this report is that actions are needed now to better manage and mitigate the risks and exposure of Accra to climate change and the associated shocks and stresses, gravely affecting the economy, key sectors, and the lives of households and families. Without any action, Accra remains exposed to significant and recurrent hazards, with a risk of diminishing the development gains made over the last decades. Therefore, as Government moves forward to take action on this challenge, this report provides a concrete and detailed forward-looking strategy that may guide and inform policy and budget decisions, and thus eventually leading to a thriving, inclusive and more resilient Greater Accra Metropolitan Area.

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Abbreviations

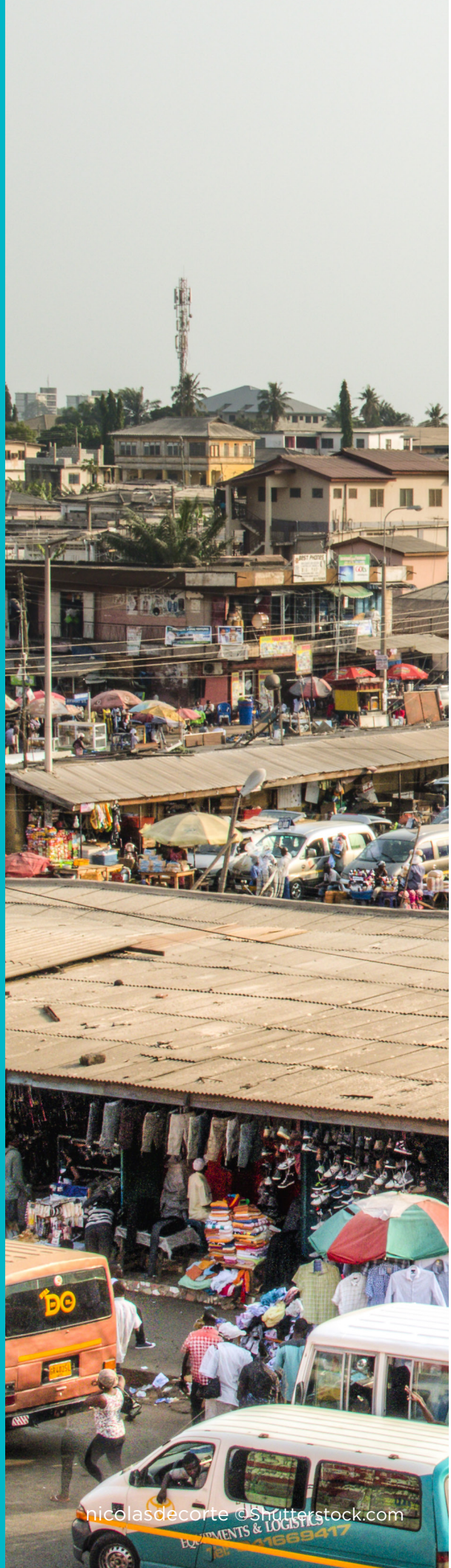
ACARP	Accra Compost and Recycling Plant
AdMA	Adentan Municipal Assembly
AEDA	Ada East District Assembly
AFD	Agence Française de Développement
AfDB	African Development Bank
AMA	Accra Metropolitan Assembly
AshMA	Ashaiman Municipal Assembly
AWDA	Ada West District Assembly
CCA	Climate Change Adaptation
CERSGIS	Center for Remote Sensing and Geographic Information Systems
CREW	Community Resilience through Early Warning Systems
CWSA	Community Water and Sanitation Agency
DACF	District Assemblies Common Fund
DDF	District Development Facility
DESSAP	District Environmental Sanitation Strategy and Action Plan
DFR	Department of Feeder Roads
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DUR	Department of Urban Roads
ESP	Environmental Sanitation Policy
E-SWMIP	Emergency Solid Waste Management Improvement Program
EWS	Early Warning Systems
FOAT	Functional Organizational Assessment Tool
GAMA	Greater Accra Metropolitan Area
GAPTE	Greater Accra Passenger Transport Executive
GCMA	Ga Central Municipal Assembly
GDP	Gross Domestic Product
GELIS	Ghana Enterprise Land Information System
GEMA	Ga East Municipal Assembly

GFDRR	Global Facility for Disaster Reduction and Recovery
GHA	Ghana Highways Authority
GHS	Ghanaian Cedi
GIS	Geographical Information System
GIZ	Deutsche Gesellschaft fur Internationale Zusammenarbeit (German Agency for International Cooperation)
GLSS	Ghana Living Standards Survey
GoG	Government of Ghana
GRDA	Ghana Railway Development Authority
GSGDA	Ghana Shared Growth and Development Agenda
GSMA	Ga South Municipal Assembly
GSS	Ghana Statistical Service
GWCL	Ghana Water Company Limited
GWMA	Ga West Municipal Assembly
HSD	Hydrological Service Department
IDA	International Development Association
IFRC	International Federation of Red Cross and Red Crescent Societies
IGF	Internally Generated Fund
JDPA	Joint Development Planning Area
JDBP	Joint Development Planning Board
KfW	KfW Development Bank
KKDA	Kpone-Katamanso District Assembly
KVIP	Kumasi Ventilated Improved Pit
LaDMA	La Dade-Kotopon Municipal Assembly
LaNMMA	La Nkwantanang-Madina Municipal Assembly
LAP	Land Administration Project
LC	Land Commission
LEAP	Livelihood Empowerment Against Poverty
LED	Local Economic Development

Abbreviations

LeKMA	Ledzokuku-Krowor Municipal Assembly
LUPMIS	Land Use Planning and Management Information System
LUSPA	Land Use and Spatial Planning Authority
MDAs	Ministries, Departments and Agencies
MDGs	Millennium Development Goals
MESSAP	Metropolitan/Municipal Environmental Sanitation Strategy and Action Plan
MESTI	Ministry of Environment, Science, Technology and Innovation
MGD	Million Gallons per Day
MLGRD	Ministry of Local Government and Rural Development
MLNR	Ministry of Lands and Natural Resources
MMA	Metropolitan and Municipal Assemblies
MMDAs	Metropolitan, Municipal and District Assemblies
MoF	Ministry of Finance
MGCSP	Ministry of Gender, Children and Social Protection
MoH	Ministry of Health
MoT	Ministry of Transport
MRH	Ministry of Roads and Highways
MTDEF	Medium Term Development Expenditure Framework
MWRWH	Ministry of Water Resources, Works and Housing
NADMO	National Disaster Management Organization
NDMC	National Disaster Management Committee
NDPC	National Development Planning Commission
NESSAP	National Environmental Sanitation Strategy and Action Plan
NGOs	Non-Governmental Organizations
NHIA	National Health Insurance Authority
NiPDA	Ningo-Prampram District Assembly
NMT	Non-Motorized Transport
OCHA	Office for the Coordination of Humanitarian Affairs
PPP	Public-Private Partnership

RCC	Regional Coordinating Council
SECO	Stasstssekretariat fur Wirtschaft (State Secretariat for Economic Affairs)
SODA	Shai-Osudoku District Assembly
SWM	Solid Waste Management
TCPD	Town and Country Planning Department
TMA	Tema Metropolitan Assembly
UNDP	United Nations Development Programme
VIPs	Ventilated Improved Pit-Latrines
VRA	Volta River Authority
WCs	Water Closets



Executive Summary

A. SHIFT IN STRATEGY: Investing in Urban Resilience

The Greater Accra Metropolitan Area (GAMA) is one of the fastest-growing city regions in West Africa. The metro area is home to 4.6 million people; more than 16 percent of Ghana's 2016 total population. The regional economy accounts for about 25 percent of the national Gross Domestic Product (GDP), dominates formal and informal urban employment (32 and 28 percent, respectively), [1] and is the least poor region in the country, with the incidence of poverty (5.6 percent) lower than the national average (24 percent). [2]

However, the unprecedented population growth and unplanned spatial expansion have exceeded the capacity of the city to keep up. GAMA faces housing shortages, urban sprawl, and informal settlements unconnected to essential city services and infrastructure; traffic congestion can slow the city to a halt. These challenges make the city susceptible to natural and man-made disasters including floods, sea-level rise, fire, disease outbreaks, and building collapse. The effects of climate change will exacerbate these vulnerabilities, increasing the frequency and intensity of floods and driving rural-urban migration because of drought in the northern parts of the country.

The June 2015 floods demonstrated the urgent need for urban resilience in the Accra region. Continuous rainfall led to a devasting flood, also reported as among the ten deadliest disasters worldwide in 2015.[3] The floods affected 52,622 people and also caused leakage at a filling station, resulting in an explosion that left 150 casualties.[4] Beyond the toll on human life, damages to housing, transport, water and sanitation totaled US$55 million, while the rebuilding costs were estimated at US$105 million.[5] As a result, the Ministry of Environment, Science and Technology (MESTI) and the Ministry of Local Governments and Rural Development (MLGRD)

[1] Data Production Unit, Ghana Statistical Service, 16th September, 2016.
[2] Ghana Statistical Service, 2014. Ghana Living Standards Survey Round 6 (GLSS - 6) – Main Report
[3] Munich Re, 2016
[4] MESTI, 2016. June 3 2015 Floods in Accra: Assessment Summary (Draft Report)
[5] ibid

requested support from the World Bank to better understand the risks facing GAMA and to develop a strategic action plan for resilience in the metropolitan area.

The World Bank and the Ghanaian Government jointly implemented the CityStrength methodology to understand GAMA's exposure to risks, level of resilience, and the performance of urban systems. The process featured strong dialogue among key stakeholders—including different levels of government, civil society, residents, and the private sector—to evaluate the region's level of resilience. The methodology first identifies the main shocks and stresses, including their spatial distribution patterns, and evaluates their impact on key sectors. Then, taking a holistic approach, it uses those findings to determine cross-sectoral linkages and the region's resilience. This process results in a prioritized list of structural and non-structural actions to enhance the overall resilience of the city as well as to increase the resilience-building potential of planned and aspirational projects. [6]

Rather than focusing exclusively on Accra Metropolitan Assembly, which is home to the largest population of the region and has the highest concentration of economic activites, the Government expanded the scope of the exercise to include the 16 Metropolitan, Municipal and

Box 1: MMDAs and Sectors Included In the Citystrength Diagnostic and Actions Undertaken

The final list of participating local government entities included: Accra Metropolitan Assembly (AMA); Tema Metropolitan Assembly (TMA); Ga West Municipal (GaWMA); Ga East Municipal Assembly (GaEMA); Ga Central Municipal Assembly (GaCMA); Ga South Municipal Assembly (GaSMA); Ledzokuku-Krowor Municipal Assembly (LeKMA); Adentan Municipal Assembly (AdMA); Ashiaman Municipal Assembly (AshMA); La Nkwantanang-Madina Municipal Assembly (LaNMA); La Dade-Kotopon Municipal Assembly (LaDMA); Ada West District Assembly (AWDA); Ada East District Assembly (AEDA); Kpone Katamanso District Assembly (KKDA); Ningo-Prampram District Assembly (NiPDA); and Shai-Osudoku District Assembly (SODA).

The Government formed a steering committee of agencies in the GAMA region to guide the exercise according to nine priority sectors. These include: Urban Development, Land Management and Housing; Disaster Risk Management; Urban Finance; Transport and Roads; Water Supply and Sanitation; Solid Waste Management; Drainage and Coastal Zone Management; Community Development and Social Protection; and Food Security and Agriculture. Urban Development and Housing; Disaster Risk Management and Climate Change; Social and Community Development; Solid Waste and Basic Sanitation; Transport; Water and Sewerage; Urban/Municipal Risk Finance; Drainage and Coastal Zone Management. The process consisted of: data collection; consultation workshops with representatives from key Ministries, the 16 MMDAs, and development partners; and field visits and hazard mapping. Facilitated by a team from theWorld Bank, city stakeholders identified the key shocks and stresses that most affect GAMA as well as key actions to address them.

[6] "World Bank Group. 2015. City Strength Diagnostic: Methodological Guidebook.

District Assemblies (MMDAs) that form the Greater Accra Region (Box 1). This was done in recognition of the close connections between the different local government entities which contribute to the overall resilience of the city.

B. DIAGNOSTIC: Shocks and Stresses

Challenges of unplanned urban expansion and climate change impacts are inextricably linked to shocks and stresses to which GAMA is exposed. Shocks refer to sudden events that impact the performance of the city's sectors, structure, infrastructure and institutions as well as residents. Stresses refer to longer-term trends that undermine the performance of the city's systems and increase the vulnerability of actors within it. Shocks and stresses coupled with limited performance of urban systems threaten development gains. Main shocks identified by the local stakeholders during the CityStrength consultations were flooding, fire, cholera outbreaks, and coastal erosion. Secondary shocks were tidal surge, building collapse, windstorm, drought, and earthquake. Flooding is a dominant shock in all MMDAs because of its frequency and heavy impact on lives and property. Other shocks vary by location; for example, fire is a high risk in heavily urbanized localities. The stresses of high-density and informal settlements across the city, combined with the lack of basic services and infrastructure, also lead to public health crises such as outbreaks of cholera. Coastal MMDAs are highly vulnerable to coastal erosion and tidal surge, coupled with sea level rise related to climate change. A few mostly rural MMDAs reported water scarcity, land degradation, fire outbreaks, and lack of connectivity to markets as their main concerns. The list of shocks includes both predictable and unpredictable events, reinforcing the need for resilient urban systems able to withstand and respond to a range of risks.

Shocks are made worse by underlying stresses, many of them man-made. Participants in the CityStrength exercise determined that primary stresses in the region include poor sanitation, rapid urbanization, proliferation of informal settlements, excessive unemployment, and land and chieftaincy conflicts. Secondary stresses include water scarcity, land and

environmental degradation, and weaknesses in governance and institutional coordination. In general, the pressure of rapid urban expansion on land, housing, the environment and infrastructure and basic services makes GAMA more vulnerable to various shocks. Flooding—one of the most common shocks—results from a series of related problems, including lagging and poorly built infrastructure, insufficient drainage capacity and clogged drains, silted lagoon outlets, inadequate waste collection and disposal, and encroachment of settlements along water-courses. Similarly, informal settlements constitute 40 percent of the built-up area in GAMA because of the lack of integrated land use planning, an informal land market, and a backlog of housing. Embedded fragmentation of jurisdictions and lack of coordination among MMDAs and MDAs undermine equitable delivery of basic services and coherent land use planning.

These stresses occur unevenly across the MMDAs, but they disproportionately affect the poor and vulnerable. Urban areas have relatively better access to services and infrastructure than peri-urban and rural areas. High-income households can afford access to formal services, while low-income households often have no choice but to use informal private vendors, usually at a high cost.

C. KEY FINDINGS

Implementation bottlenecks and challenges in coordination

GAMA has good policies and institutions in place but implementation remains a challenge. Ghana's National Urban Policy (2012–2017) guides urban development at the national level and includes climate change adaptation and mitigation mechanisms. Other policies give authority to MMDAs and require the integration of disaster risk reduction and climate change adaptation considerations in the medium-term development plans of MMDAs. However, inadequate metropolitan governance is an obstacle to creating resilience. Many policies enacted at the national level require MMDAs to implement them but without associated funding or technical capacity. Coordination among the 16 MMDAs also should be improved. Currently, there are no clear mechanisms to coordinate land use planning and risk

mitigation at the metropolitan level, despite the regional implications of service delivery. For example, drainage management is spread across the Hydrological Services Department for primary and secondary drains, the 16 MMDAs for some secondary drains, and the road sector agencies (Ghana Highways Autority (GHA), Department of Urban Roads (DUR), and Department of Feeder Roads (DFR) for tertiary or roadside drains. The result is weak coordination, planning, and enforcement. Flooding could be reduced, or even prevented, by increasing upstream retention capacity, but this would require action by an agency at the GAMA-wide level. Regional coordination is the responsibility of the Regional Coordinating Council (RCC), but it lacks capacity and clear mandate to undertake regular, comprehensive and binding coordination with the 16 MMDAs. The new legal instrument for Joint Development Planning (LI 2232) provides an opportunity for testing and implementing enhanced coordination between MMDAs in GAMA. Such improved coordination could help foster a long-term vision for the city-region with an emphasis on resilience, and it could help MMDAs implement their mandates.

Urbanization exceeds institutional capacity

The rate of urbanization has exceeded the provision of adequate housing and land use planning. As GAMA continues to urbanize, the metropolitan region needs plans for housing and infrastructure to accommodate the growing population. MMDAs have planning processes but do not implement them properly. Because planning continually lags behind urban growth, plans need to be updated constantly to reflect reality. Urban planning also does often not take risks into account, leaving many people exposed to shocks and stresses. With demand for housing far exceeding existing supply, informal areas with poor-quality housing have proliferated. The region has no comprehensive cadaster, which leads to informal land transactions and many disputes. Land use plans are outdated and enforcement of building codes and regulations is weak. Fires result from improper electrical wiring and unsafe cooking practices, and the impact of fires is worsened by the density and congestion of informal settlements. Many informal markets are also at risk of fire because of inadequate construction materials and faulty electrical wiring. Fire outbreaks in markets affect the poor disproportionately since many depend on commercial activity for their livelihood.

Backlog of basic services and infrastructure

Basic services and infrastructure in GAMA are inadequate and highly susceptible to shocks and stresses. The large influx of people into the region puts pressure on basic services and infrastructure that are already strained. The coverage of services varies across sectors but is largely inadequate. For example, only about 54 percent of the residents have adequate access to improved toilet facilities (a flush toilet or the KVIP toilet). [7] This lack of sanitation intensifies outbreaks of cholera.[8] About 67.7 percent of solid waste generated in GAMA is collected, while the rest is discarded in open areas and drainage channels which further exacerbates floods.[9] While the road network has seen considerable expansion in the last 10 years, mobility and access to transportation suffer from a lack of flood-resistant roads, coupled with poor road conditions, traffic congestion, and limited public transport. There is a lack of equipment

[7] Ghana Statistical Service, 2014. Ghana Living Standards Survey Round 6 (GLSS - 6) – Main Report

[8] Centers for Disease Prevention (CDC) Cholera. General Information. https://www.cdc.gov/cholera/general/index.html

[9] Ghana Statistical Service, 2014. Ghana Living Standards Survey Round 6 (GLSS - 6) – Main Report

to respond to fires or take fire safety measures, especially in tall buildings and informal markets. And yet, GAMA has made progress in other sectors, including in expanding access to electricity, increasing access to education and health care. Access to improved water in urban areas is over 96 percent of the population[10] and access to electricity is at 93.1 percent. [11] Nonetheless, challenges in services persist as the city grows, with people in high-density, low-income communities having the least access to public services.

Reactive response vs Proactive planning

GAMA's response to acute shocks has been primarily reactive. Whenever a shock occurs, agencies such as the National Disaster Management Organization (NADMO), and individual MMDAs respond with emergency and relief services. However, a lack of proactive efforts on prevention and early warning makes the region constantly susceptible to a wide range of shocks and stresses. This includes a lack of contingency funding and risk insurance to deal with disasters, forcing MMDAs to divert funding from other sectors into the response. The long-term result is detrimental when funds are diverted from maintenance of city infrastructure.

Lack of Long Term Planning and Data Collection

The poor condition of infrastructure continues, leaving the city vulnerable to a vicious circle. Roads remain damaged, drainage is not cleaned on a regular basis, and solid and liquid wastes are not discarded properly. NADMO's mandate to manage disasters and develop community response capacity still focuses strongly on responding to disasters rather than fostering resilience. A systematic collection of data on multi-hazards at the MMDA or GAMA level is lacking, which further limits the capacity to promote a strategy that includes preparedness to shocks and stresses, including the effects of climate change. For example, sea-level rise has led to increased erosion and inundation of vulnerable areas in Accra. About 80 percent of the GAMA's 225 kilometer shoreline is threatened by erosion. Significant numbers of houses have vanished due to coastal erosion and the trend continues in some coastal areas.

D. RECOMMENDATIONS TO ADDRESS SHOCKS AND STRESSES AND ENHANCE RESILIENCE

The CityStrength diagnostic helped stakeholders to prioritize follow-up actions and develop a list of cross-sectoral recommendations to enhance resilience in GAMA. The Ministry of Environment, Technology, and Science (MESTI), which commissioned the exercise, confirmed the final list, which also was endorsed by the Ministry of Local Governments and Rural Development (MLGRD). The recommendations cut across infrastructure needs as well as institutional interventions and behavioral change:

1. Improve Metropolitan Planning and Coordination. Effective metropolitan governance will engender a long term vision for the region with effective urban and land use planning, including risk management. Emphasis should be given to key factors for urban resilience such as land management, information systems, and provision of infrastructure. Based on the findings of Metropolitan Management in Greater Accra Technical Assistance, the National Development Planning (System) Act, 1994 (Act 480) endorses the establishment of a designated contiguous area as a Joint Development Planning Area (JDPA) with a Joint Development Planning

[10] Ibid

[11] Ghana Statistical Service, 2014. Ghana Living Standards Survey Round 6 (GLSS - 6) – Main Report

Board (JDPB) to formulate and supervise the implementation of development plans for that area. Therefore, the designation of a JDPA encompassing the GAMA, and the establishment of a JDPB, are urgent preconditions to enhance planning and coordination as well as to create a Joint Development Plan. The Government should also expedite implementation of the new Land Use and Spatial Planning Act, 2016 (Act 925) and new three-tier Planning Model. The Model provides a framework and process for preparation of comprehensive spatial development and structural plans for all MMDAs, sub-regions, and regions in Ghana. The Act also requires upgrading of existing community development plans and can leverage current efforts, such as the preparation of a Greater Accra Regional Spatial Development Framework and an Integrated Sanitation and Drainage Master Plan. Increased coordination will be key, along with capacity-building of staff responsible for designing and implementing strategic plans.

2. Integrate Urban Flood and Coastal Zone Management. GAMA needs urban systems that can withstand floods and sea level rise in the context of climate change. Quick wins include finalizing the GAMA-wide Drainage and Flood Control Master Plan and updating existing plans for incorporation into current spatial development strategies and land use plans. In medium to long term drainage and flood control infrastructure and management systems should be improved. This can be done by:

1) mapping and demarcating floodplains and buffer zones of all drainage ways and enforcing existing regulations;

2) improving coordination between agencies (HSD, Ghana Highway Authority, Department of Urban Roads, and Department of Feeder Roads) and the 16 MMDAs in GAMA that are responsible for drainage works, operation, and maintenance; and

3) a substantial increase in the daily operation and maintenance budgets for the drainage system and hydraulic infrastructure at MMDA level, and not just on an emergency basis.

On the preparedness side, GAMA should identify and secure areas to increase water retention capacity and reduce runoff as well as develop green areas on floodplains. Adequate collection and disposal of solid waste, especially in densely-populated areas, will prevent clogged drains that worsen flooding. This includes closer coordination between the private and informal sectors to reach all areas of the city and educating the public about proper solid waste disposal. Moreover, urgent and significant investment is needed to address the shortfall in engineered and appropriately operated waste transfer and disposal capacity.

3. Enhance Resilience in Vulnerable Communities. Disasters have the greatest impact on vulnerable communities, which also have the least access to urban services and infrastructure. Many vulnerable communities are located in low-lying areas particularly susceptible to floods, or are more exposed than other areas to cholera and malaria, or to crime and violence. Because the entire region is so closely linked, these problems often spread beyond the vulnerable communities, and thus are of region-wide concern. As a priority, GAMA needs to identify vulnerable settlements so investment can be focused in the most exposed places. This key information can feed into a comprehensive urban upgrading and redevelopment strategy, which needs to be integrated with local economic development initiatives and any existing development plans. Close coordination with the Regional Coordinating Council and social protection agencies will enable the collection of important information about conditions on the ground.

4. Improve Disaster Preparedness and Response to multi-hazards. A good understanding of the risks facing the GAMA region, including future climate change impacts such as sea level rise, is essential for fulfilling the MMDAs' mandate to plan, mainstream, and implement evidence-based disaster and climate risk management actions. Thus, a priority must be to conduct comprehensive and detailed risk assessments for the region. The MMDAs should regularly collect data to ensure that strategies are up-to-date and effective. For example, the current sea defense wall intended to remediate tidal surges is having negative effects in some MMDAs. The information gathered in the assessment can guide preparedness actions, including stronger early warning systems, especially for the poorest and most vulnerable part of the population. A disaster risk management and climate change adaptation coordinating entity at the metropolitan (GAMA-wide) level can work jointly with NADMO to help implement policies and mandates at the MMDA level. Dedicated resources and adequate staff and equipment will be key to implementing these preparedness and response recommendations.

E. MOVING FORWARD

GAMA is well positioned to enhance resilience at the metropolitan level. Leading ministries and the MMDAs are committed to addressing the many hazards that can set back development gains. Rapid urbanization should be seen as an opportunity rather than a challenge because it highlights the pull of the region as an engine of economic growth and an important gateway into West Africa.

The findings and recommendations of this report will help GAMA address urban problems, but most importantly, they highlight the need for a long-term vision for the region that includes projected population increase and necessary adaptations to climate change. Maintaining a business-as-usual approach will leave GAMA dangerously exposed to the same hazards that are experienced every year. Instead, the forward-looking strategy for resilience, based on these recommendations, will lead to a thriving, competitive, and inclusive city region.

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I. THE CASE FOR INVESTING IN URBAN RESILIENCE IN GHANA

Ghana has been undergoing a significant structural transformation over the past nearly 30 years. From 1984 to 2013, Ghana's national population more than doubled, while its urban population more than tripled, from under 4 million to nearly 14 million people.[12] Urbanization has yielded many positive outcomes associated with increased productivity and economies of scale, helping to create jobs, increase human capital, decrease poverty, and expand opportunities, in the process improving living conditions for millions of Ghanaians. However, Ghana now faces key challenges to ensure that urbanization continues to complement growth by strengthening resilience, rather than loosing development gains to natural and man-made disasters. Many emerging problems are related to urbanization, natural and man-made disasters, and climate change, especially in the context of urban areas. In this context, Ghana finds itself in need to enhance its urban resilience.

1. What is Urban Resilience?

Resilience [13] is the capacity of individuals, communities, institutions, businesses, and systems to survive, adapt, and grow regardless of the changes and challenges they experience. A resilient city is capable of adapting to a variety of chronic stresses and acute shocks while still providing essential services to its residents, especially the poor and vulnerable. Resilience works toward long-term sustainability objectives—meeting the needs of the present without compromising the ability of future generations to meet their own needs.[14] Resilience is also about learning to live within the spectrum of risks that exist at the interface between people, the economy, and the environment. Where sustainability aims to put the world back into balance, resilience looks for ways to manage in an imbalanced world. [15]

Thriving cities can drive national economic growth and innovation and act as cultural and creative centers. However, urbanization, especially when rapid and unplanned, also brings challenges. The concentration of people, assets, and infrastructure in urban areas means that an increasingly complex range of shocks and stresses can jeopardize the well-being of large numbers of people and hard-won development gains. In addition to

[12] World Bank, 2015: Rising through Cities in Ghana: Ghana Urbanization Review Overview Report.
[13] World Bank. 2015. CityStrength Diagnostic: Methodological Guidebook.
[14] Brundtland Commission, 1987
[15] Zolli, 2012

exposure to natural hazards like storms, drought, and earthquakes, cities are also vulnerable to economic downturns, crime and violence, public health epidemics, and infrastructure failure. These shocks and stresses can have devastating effects, bringing some or all of an urban system to a halt, and possibly causing asset damage and loss of life. Disaster losses are often linked with, or exacerbated by, poverty and vulnerability of the poor stemming from socio-economic and environmental imbalances.

At its core, the resilience of a city depends on the overall performance and capacity of its systems, not solely on its ability to cope with specific natural hazards or to adapt targeted areas to the impacts of climate change.[16] Cities are interdependent systems, and, like all systems, depend on the smooth functioning of its constituent elements and the larger organization in which it is nested. Disruptions to the basic services a city provides can have cascading impacts well beyond the city itself. Their complexity also makes resilience building especially challenging. Focusing on one policy goal, such as climate protection, without considering others can lead to ineffective or undesirable outcomes. These decisions may come as explicit trade-offs, unintended consequences, or some combination of the two. Building a resilient city therefore requires urban development to be informed by the identification and deep understanding of shocks and stresses to be addressed in a holistic, multisectoral, and flexible approach.

2. The Need for Investing in Urban Resilience in Ghana

2.1 Urbanization Trend in Ghana

Ghana's total population more than doubled from 1984 to 2013. [17] Over this period, urban population growth – from less than 4 million to nearly 14 million people – outpaced rural population growth, and the proportion of people living in urban areas grew from 31 percent to 51 percent. [18] Moreover, the urban population is projected to grow further by an average of 2.8 percent per year over the next 20 years, leading to an expected urban population of 22.6 million people (representing 65 percent of the national population) by 2030.[19]

Accra, the capital city, has traditionally dominated Ghana's urban landscape. Nonetheless, since 2000, all regions of Ghana have experienced steady urbanization.[20] The number of medium (20,000–50,000 people) and medium-large (50,000–100,000) sized towns has quadrupled and tripled, respectively. In the process, though Accra also continues to grow, its urban primacy has diminished, reflecting a more balanced urban growth that includes Kumasi, Tema, Sekondi-Takoradi, Tamale and smaller cities and towns.[21] However, the rapid growth of Accra has resulted in the creation of a metropolitan area, far beyond the boundaries of what constituted the old urban center of the Accra Metropolitan Assembly (AMA) and the neighboring Metropolitan, Municipal and District assemblies (MMDAs). This conglomeration of

[16] Brugmann, 2012

[17] The World Bank, 2015: Rising through Cities in Ghana: Ghana Urbanization Review Overview Report.

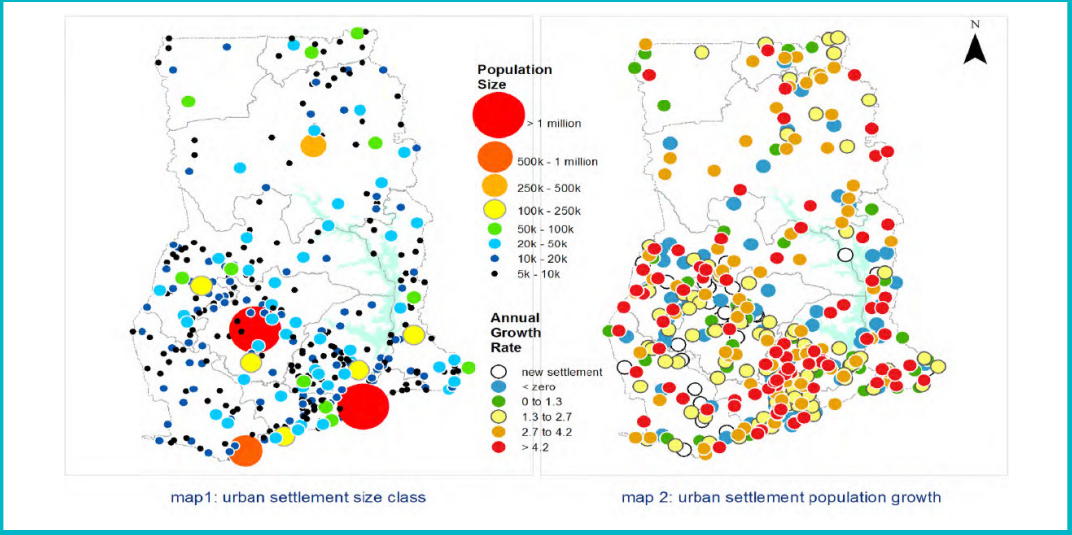
[18] ibid

[19] Ghana Statistical Service, 2012: 2010 Population and Housing Census: Summary Report of Final Result. MLGRD, 2012. National Urban Policy Framework and Action Plan (2012-2017)kat UN-Habitat 2012: State of the World's Cities 2012/2013: Prosperity of Cities.

[20] The World Bank, 2015: Rising through Cities in Ghana: Ghana Urbanization Review Overview Report.

[21] ibid

Figure 1: Urbanization in Ghana



Source: National Spatial Development Framework 2015–35, Town & Country Planning Department

MMDAs has grown to form a large scale and extended settlement, merging towards MMDAs in the neighboring regions (Central and Eastern).

Rapid urbanization has coincided with stable and rapid economic growth. From 1961 to 1983, growth of Ghana's annual Gross Domestic Product (GDP) averaged 0.9 percent, 5.7 percent from 1984 to 2013, and 7.8 percent from 2005 to 2013.[22] This rapid growth has resulted in a reduction in poverty in both rural and urban areas, with the total poverty incidence dropping below 25 percent in 2013 and below 11 percent in urban areas.[23] Despite these gains, urbanization does not always have positive effects and also brings about challenges.

Ghana's rapid urbanization is characterized by a concentration of population, investments, economic activities and services around a few large urban settlements, especially in and around Greater Accra, Greater Kumasi and the twin settlements of Sekondi-Takoradi. The three metropolitan areas constitute more than 50 percent of the total urban population. They have physically surpassed their administrative boundaries and spilled into adjacent areas that include other MMDAs, engulfing smaller cities and towns and absorbing semi-urban areas and rural hinterlands. These metropolitan areas have dense urban cores and a sizable number of other urban settlements. Challenges associated with this type of urbanization include: rapid, low-density expansion at peripheries reaching towns and villages that are up to 100 kilometers from the center; ribbon development along feeder and trunk roads, and in cluster patterns that lack basic services and social amenities; as well as lack of affordable housing. The pace and scale

[22] ibid
[23] ibid

of unplanned change also puts expanding urban populations at risk from natural and man-made shocks and stresses. These challenges call for proactive measures to improve the resilience of Ghana's major urban centers.[24]

The Government has a number of policies that already require MMDAs to incorporate disaster risk management and climate change adaptation into land use and structural planning. This includes Ghana's National Urban Policy (2012–2017) which aims to guide the country's urban development. However, the implementation of the policy has been slow, with limited success in tackling the challenges in Ghana's urban sector.[25] The new Housing Policy (2015) also includes similar requirements of risk considerations, but implementation has remained an issue.

2.2 Disasters in Ghana

Ghana has witnessed a number of major disasters in the past 40 years. Table 1 below provides an overview of the deadliest disasters and those which affected the most people in the country. In terms of number of people affected, the 1983 drought is the most severe disaster in Ghana's recent history. The floods of 1991, 1995, 1999, 2001, 2007, and 2009 each affected more than 100,000 people. Furthermore, floods have affected nearly four million people in Ghana over the last 40 years, mostly related to river floods (primarily in the Volta River System) and in urban areas, notably Accra.

In more recent years, the 2007 floods affected more than 300,000 people. The greatest impact was felt in the three northern regions

Table 1: Top Ten Most Devastating Disasters since 1983

10 disasters in Ghana that affected the greatest number of people			10 deadliest disasters in Ghana that caused the greatest number of casualties		
Type	Year	Total affected	Type	Year	Totals deaths
Drought	1983	12,500,000	Epidemic	1984	103
Flood	1991	2,000,000	Flood	1995	145
Flood	1995	700,000	Epidemic	1996	411
Flood	1999	324,602	Epidemic	1998	67
Flood	2001	144,025	Flood	1999	52
Flood	2007	332,600	Flood	2007	56
Flood	2008	58,000	Flood	2010	45
Flood	2009	139,790	Epidemic	2011	101
Flood	2011	81,473	Epidemic	2014	249
Epidemic	2014	56,469	Epidemic	2015	85

Source: EM-DAT, 2016: The Emergency Events Database - Université catholique de Louvain (UCL) - CRED, D. Guha-Sapir - www.emdat.be, Brussels, Belgium

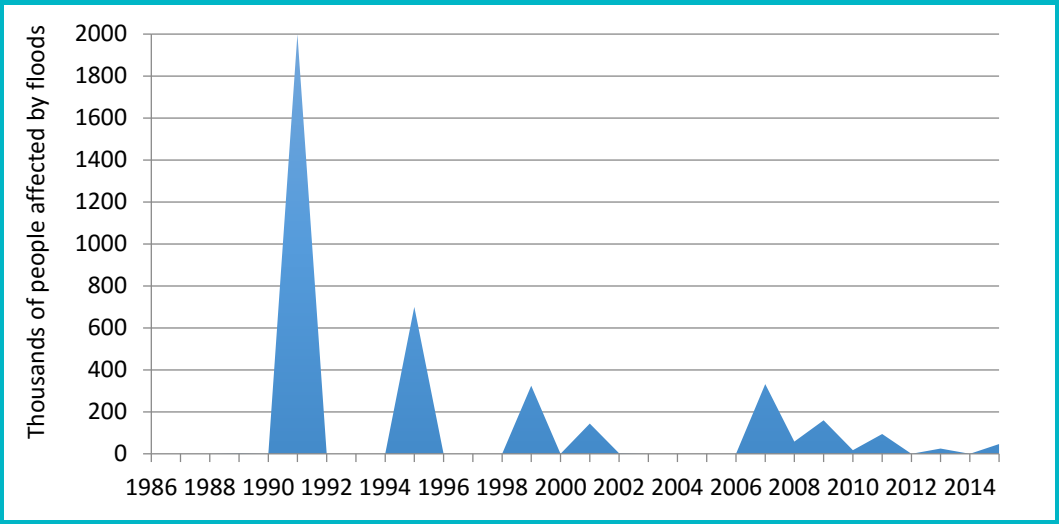
[24] Town and Country Planning Department, 2015: National Spatial Development Framework 2015–2035.
[25] ibid

of Upper East, Upper West and Northern Region due to extensive flooding of the Volta River, making it one of the most severe floods in the country (Figure 2). Similarly, in 2010, more than 95,000 people were affected by floods,[26] both in the Volta basin as well as in Accra. It should be noted that there are some discrepancies related to the way data is reported by different entities and international organizations, though not sufficiently to diminish the import of these disasters.

Figure 3 shows that particularly the low lying coastal areas, the mouth of the Volta River and the low lying areas of the Volta basin in the Northern and Upper East Regions are prone to flood hazards [27] . Notably, the built up areas in those areas, including Greater Accra, are particularly vulnerable to floods.

Major disasters, like the floods from 1991, 1995 and 2007 have resulted in increased humanitarian assistance provided to Ghana. Figure 4, below, indicates the humanitarian assistance provided since 1990 highlighting the years of major floods, where Ghana received US$ 18.2 million in 1995 and US$ 21.4 million in 2007.[28] With regard to the June 3, 2015 floods,

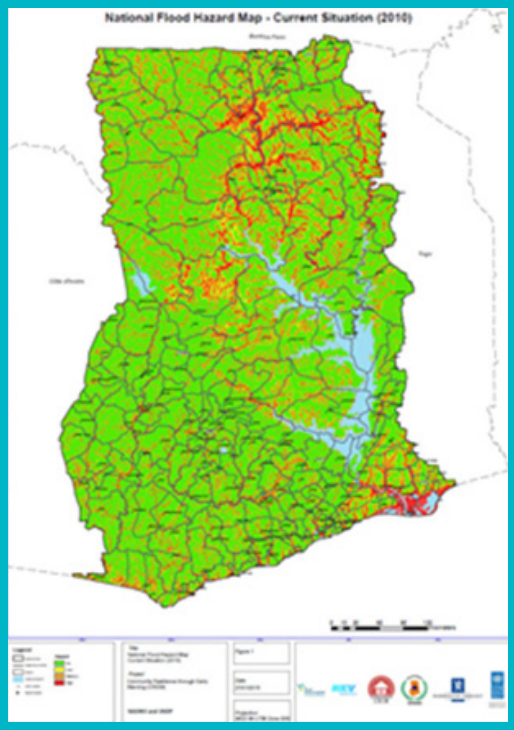
Figure 2: Number of People Affected by Floods in Ghana since 1986

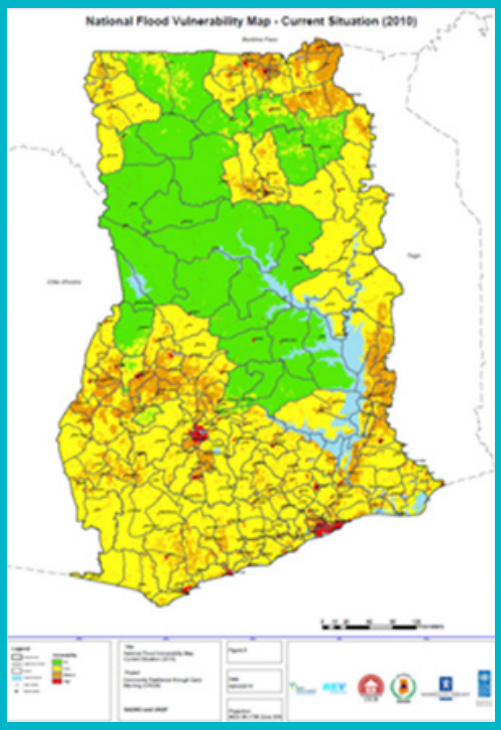


Source: EM-DAT, 2016: The Emergency Events Database - Université catholique de Louvain (UCL) - CRED, D. Guha-Sapir www.emdat.be, Brussels, Belgium

[26] OCHA, 2010.
[27] UNDP, 2015
[28] Development Initiatives, 2016

Figure 3: Flood Hazard Map and Flood Vulnerability Map





Source: UNDP, 2015

Figure 3 shows that particularly the low lying coastal areas, the mouth of the Volta River and the low lying areas of the Volta basin in the Northern and Upper East Regions are prone to flood hazards (UNDP, 2015). Notably, the built up areas in those areas, including Greater Accra, are particularly vulnerable to floods.

reports from the Ministry of Environment, Science, Technology & Innovation (MESTI) indicate that about 52,622 people were affected in Greater Accra Region.[29] Munich Re also reported that the floods of June 2015 are among the ten deadliest disasters of that year worldwide.[30] Table 2 provides a breakdown of the number of people affected by the floods in each of the MMDAs in Greater Accra.

2.3 Climate Change Impacts

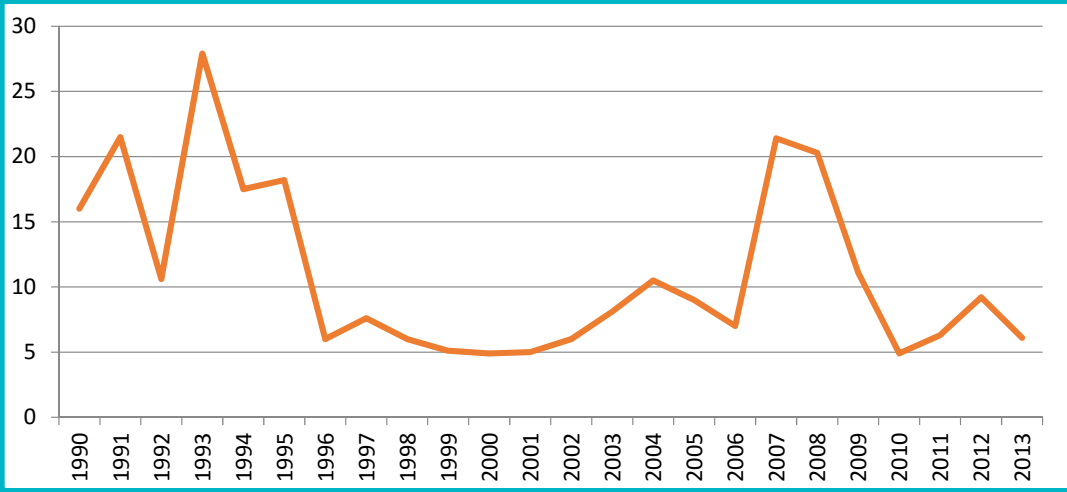
Climate change further exacerbates Ghana's vulnerability to shocks and stresses. Climate change effects on temperature and rainfall patterns will exacerbate the intensity and frequency of floods and drought, increasing the number of catastrophic events and drought-induced migration to expanding cities such as Accra and Kumasi, where already about have the population lives in slums. [31] Furthermore,

[29] MESTI, 2016. June 3 2015 Floods in Accra: Assessment Summary (Draft Report)

[30] Munich Re, 2016

[31] Arndt, 2015; GFDRR, 2011

Figure 4: Humanitarian Assistance provided to Ghana since 1990



Source: Development Initiatives, 2016

effects of climate change are reflected in sea level rise,[32] cyclonic storms, and storm surges. Factors that make Accra vulnerable to climate change include a mixture of biophysical factors related to the geographic location of the city, underlying infrastructure issues, as well as socio-demographic factors.[33]

Ghana's economy largely relies on climate-sensitive sectors, particularly agriculture, energy and forestry. Agriculture is currently the second biggest contributor to Ghana's GDP, with approximately 70 percent of the population depending directly or indirectly on agriculture (including fisheries).[34] Any climate-related disaster is, therefore, likely to affect the economy of Ghana, especially the more

Table 2: Populations affected by June 3, 2015 Flood

MMDA	Number of People Affected
Ga South	4,808
Ga Central	12,032
Ga West	920
Ga East	1,355
La Madina	532
AMA	15,000
LADMA	500
Adenta	1,718
LEKMA	8,234
Ashaima	757
Tema	6,593
Kpone	490
Shai Osu	75
Ningo	1,237
Ada East	490
Ada West	125
Total	52,622

Source: MESTI, 2016

[32] A World Bank report from 2009 (Dasgupta, et al.) estimated that about 400 square kilometers and 137,000 people in Ghana will be at direct risk of sea level rise. These numbers seem low compared to other regions of the world partially because of the geology of the continent. Africa lies on a plateau of Precambrian rocks without extensive mechanical weathering consequences. As a result, the coasts of Africa present few natural harbors and relatively straight coastlines with substantial coastal populations living several meters or more above sea level.

[33] Ministry of Environment, Science, Technology and Innovation, 2015; Baxter, 2015

[34] Ghana Statistical Service, 2014. Ghana Living Standards Survey 6 – Main Report

vulnerable rural communities who depend on rain-fed agriculture and comprise the majority of the population.

Moreover, the concentration of economic activities and assets, and complex interrelatedness of people and services in cities makes shocks particularly damaging with significant detrimental economic and social impacts. This will put more pressure on a growing population which is already struggling with poverty, unemployment, precarious housing and weak governance.

2.4 The need for investing in Strengthening Urban Resilience in Ghana

Given the aforementioned challenges in the context of Ghana and its urban development, Ghana must strengthen the resilience of its systems, institutions, and protections at its urban core in order to achieve sustainable development. Associated with uncontrolled expansion of urban centers, Ghana's cities are struggling to meet the growing urban demand for services and infrastructure. They face challenges like underserviced and infrastructure-deficient communities, traffic congestion, high levels of pollution, limited employment accessibility and the development of slums.[35] Moreover, these deficits make people more vulnerable to both natural and man-made disasters. Natural disasters will also be adversely affected by climate change. Increases in the frequency and intensity of rainfall, floods and landslides, along with the occurrence of extended periods of drought and intense heat will bring about devastating consequences for Ghana's urban development, worsening the socio-economic circumstances for the people who live and work there.

There are pressing needs to address these urban development and resilience challenges. Proactive investment in urban resilience will reduce risks from recurrent disasters such as annual flooding, climate change impacts and other socio-economic deficits. This will help not only to mitigate future risks of disasters but also reduce poverty, protect existing infrastructure and housing, and promote investments and shared prosperity. Based on the clear need for enhanced resilience, MESTI and the Ministry of Local Governments and Rural Development (MLGRD) spearheaded a holistic initiative to look at resilience in the Greater Accra Metropolitan Area (GAMA) along with various sectoral ministeries, local governments and civil society.

3. CityStrength Participatory Methodology and Process in Ghana

3.1 CityStrength Participatory Methodology

Given the importance of urban resilience in the development agenda, the CityStrength Diagnostic exercise was supported by the World Bank to help facilitate a dialogue among stakeholders (e.g. government, civil society, residents, and the private sector) about risks, resilience, and the performance of urban systems. It is important to note that CityStrength is an engagement process, not an analytical study. The CityStrength Diagnostic results in the identification of priority actions and investments that will enhance the city's resilience as well as increase the resilience-building potential of planned or aspirational projects. It promotes a holistic and integrated approach that encourages cross-sectoral collaborations to more efficiently tackle existing issues and to unlock opportunities within the city.

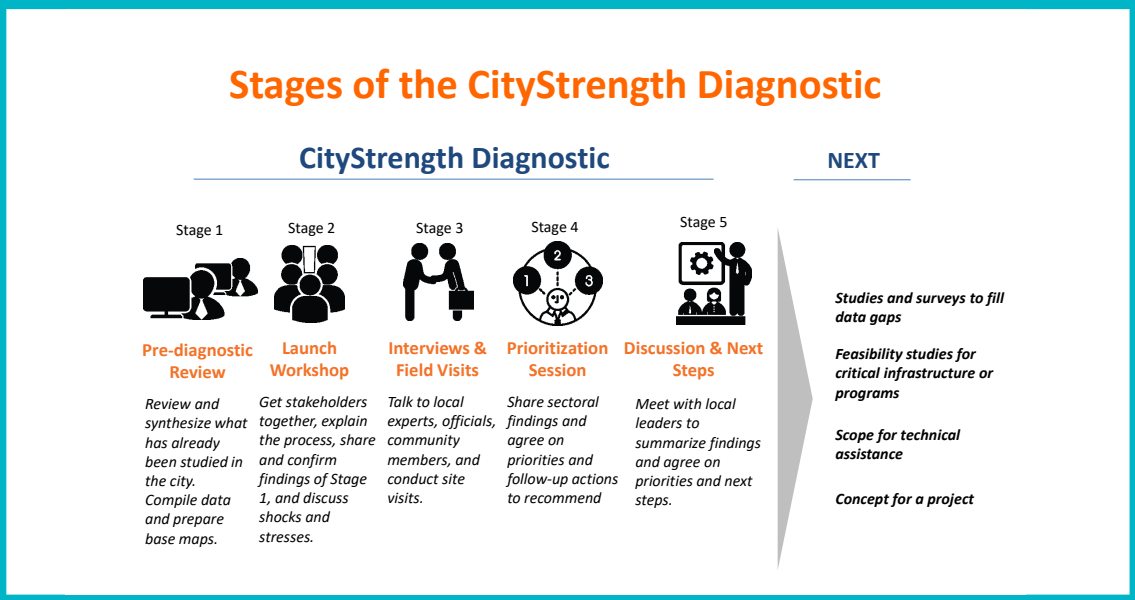
[35] World Bank, 2015: Rising through Cities in Ghana: Ghana Urbanization Review Overview Report.

The CityStrength Diagnostic consists of five stages, leading to leadership commitment for resilience on the front-end and a longer-term engagement with development partners through financing or technical assistance at the back-end. [36]

3.2 CityStrength Process in Greater Accra Metropolitan Area

The methodology was adapted [37] to the context in Ghana and Accra specifically on the basis of consultations with national and local stakeholders. Nine sectors were identified as key for the assessment, based on national and regional priorities: Urban Development, Land Management and Housing; Disaster Risk Management; Urban Finance; Transport and Roads; Water Supply and Sanitation; Solid Waste Management; Drainage and Coastal Zone Management; Community Development and Social Protection; and Food Security and Agriculture. Furthermore, a total of 16 MMDAs in GAMA were identified as participants: Accra Metropolitan Assembly (AMA); Tema Metropolitan Assembly (TMA); Ga West Municipal (GaWMA); Ga East Municipal Assembly (GaEMA); Ga Central Municipal Assembly (GaCMA); Ga South Municipal Assembly (GaSMA); Ledzokuku-Krowor Municipal Assembly (LeKMA); Adentan Municipal Assembly (AdMA); Ashiaman Municipal Assembly (AshMA); La Nkwantanang-Madina Municipal Assembly (LaNMA); La Dade-Kotopon Municipal Assembly (LaDMA); Ada West District Assembly (AWDA); Ada East District Assembly (AEDA); Kpone Katamanso District Assembly (KKDA); Ningo-Prampram District Assembly (NiPDA); and Shai-Osudoku District Assembly (SODA) (Figure 6). In addition, the exercise made a conscious effort to reach out to and engage other development partners and academia, e.g. UN-Habitat, United Nations Development

Figure 5: Stages of the CityStrength Diagnostic



Source: World Bank, 2015. CityStrength Diagnostic: Methodological Guidebook

[36] World Bank, 2015. CityStrength Diagnostic: Methodological Guidebook.
[37] ibid

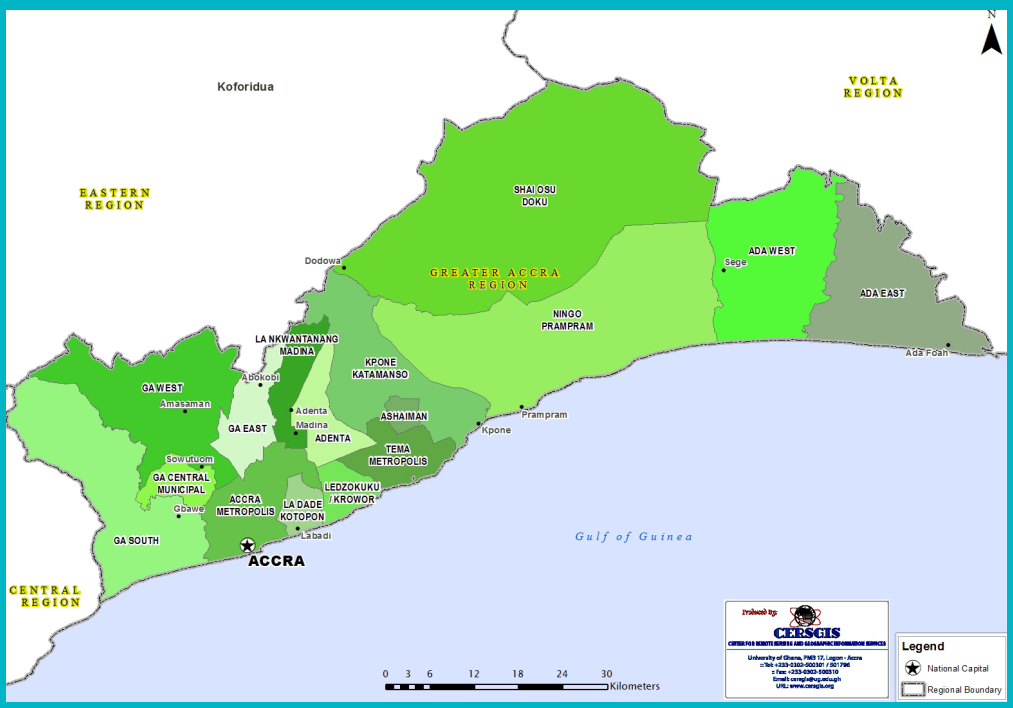
Programme (UNDP), Gesellsfact fuer International Zusammenarbeit (GIZ), 100 Resilient Cities, Cities Alliance, and the Regional Institute for Population Studies (RIPS) of the University of Ghana.

The CityStrength Diagnostic featured the following tailored steps in Accra:

1. **Prediagnostic phase and data collection—January 2016–August 2016:** In an effort to understand the current situation in the GAMA region, an extensive data collection exercise was carried out with the ongoing support of different government agencies. This consisted of a combination of primary and secondary data. The information was used to prepare a pre-diagnostic report outlining the initial findings.

2. **Inception workshop—February 2016:** Different representatives from national, regional, and local governments, as well as representatives from a wide variety of sectors, were invited to attend an inception workshop. The purpose was to introduce the concept of urban resilience to the participants as well as present the CityStrength methodology and the proposed process. After a round of discussions, the stakeholders identified the aforementioned sectors for coverage. It's important to note that the module for Drainage and Coastal Zone Management was specifically developed for Accra as they were not included in the original methodology.

Figure 6: Map of GAMA Showing MMDA Boundaries



Source: CERSGIS, 2016

3. **Consultation workshops—May 2016:** A two-day workshop was organized in May 2016 in Accra to further assess resilience in each of the 16 MMDAs and in each of the sectors. The objectives of the workshops were to engage with a wide range of stakeholders (government officials, academic institutions, Non-Governmental Organizations (NGOs), and development partners) to: (i) identify, map and further explore the shocks and stresses in GAMA; (ii) present the findings of the pre-diagnostic phase and obtain validation from local stakeholders; (iii) fill in information gaps; and (iv) prioritize the challenges in sectors and MMDAs and brainstorm about the required actions to address them.

   Due to the large number of MMDAs participating in the exercise, the discussions, facilitated by World Bank specialists, were grouped in four clusters of MMDAs based on locational proximity, spatial-economic characteristics, historical and administrative relationships, and common watershed areas. Concrete outputs from the workshop included: (i) hot spot maps developed by the MMDAs with guidance from World Bank staff; and (ii) presentations from each of the sectors and clusters of MMDAs with the identified shocks and stresses, current level of resilience, and priority actions and potential implementing bodies. The assessment of resilience was done against the five characteristics of resilience in the methodology: coordination, inclusiveness, reflectiveness, redundancy, and robustness.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4. **Prioritization session—September 2016:** Recommendations made by the sectors and clusters of MMDAs were brought together in a preliminary list of priorities for the Greater Accra Metropolitan Area. Representatives from MESTI and MLGRD were present during the session. In addition, a separate meeting was held with senior level officials from MESTI during which the recommendations were also presented. In both cases, there were no objections to the list of priorities for GAMA. A follow-up gathering was organized in September 2016 to confirm the findings once all the inputs gathered were curated.

5. **Dissemination workshop—June 2017:** The findings from the exercise are captured in this report, highlighting the most pressing needs at the national, regional, and city level, and listing recommended actions to enhance resilience in GAMA and the different sectors. The report was prepared with input collected at the different phases of the CityStrength diagnostic and the outcomes were validated by the appropriate agencies. Moreover, a dissemination workshop was organized to convene key high-level stakeholders to share the findings and gauge interest in implementing the identified recommendations.

This findings report is not meant to be the end of the engagement with the Government. Instead, it is meant to be a starting point for the Government to build on the findings and enhance resilience across GAMA. The report can also be used to approach internal and external partners to request further technical and financial support.

4. Report Structure

Section I presents an introduction to the concept of urban resilience, its relevance in the context of Ghana in general, and its investment needs. Moreover, it includes a description of the methodology used.

Section II provides an overview of GAMA, covering its geography, demographics, urbanization trends and climate change impacts. The section also discusses the shocks, stresses and challenges of resilience, and demonstrates the hotspots that were identified by participants of the workshop under four geographical clusters.

Section III focuses on the resilience of urban systems, based on assessments of nine sectors across GAMA.

A summary of the priority actions and investments required at both the GAMA and respective MMDA levels are presented in Section IV. These have been grouped under four thematic areas, namely: (1) Improved Metropolitan Planning and Coordination; (2) Adopt an Integrated Urban Flood and Coastal Zone Management Plan; (3) Enhance Resilience in Vulnerable Communities; and (4) Improve Disaster Preparedness and Response.

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II. RESILIENCE CHALLENGES IN GAMA

The Greater Accra Metropolitan Area (GAMA) has long been a dominant urban center due to its concentration of assets, economic activities, and government. GAMA is also a destination for rural migration linked to economic opportunities and a better quality of life. In recent decades, GAMA has become one of the fastest-growing metropolitan areas in West Africa. Urbanization has far outpaced planning and available services and infrastructure, with implications for the inclusion and living conditions of the residents. Low-income communities, in particular, find themselves living in informal and overcrowded housing with limited or no access to urban services. This haphazard urban development represents a challenge for the city. Furthermore, GAMA faces a number of shocks and stresses that impact the city due to its lack of capacity to withstand them. Flooding events, fire outbreaks and diseases continue to bring GAMA to an economic and social halt. These issues are predicted to exacerbate as a result of the effects of climate change.

Figure 7: GAMA in Ghana

Source: CERSGIS, 2016

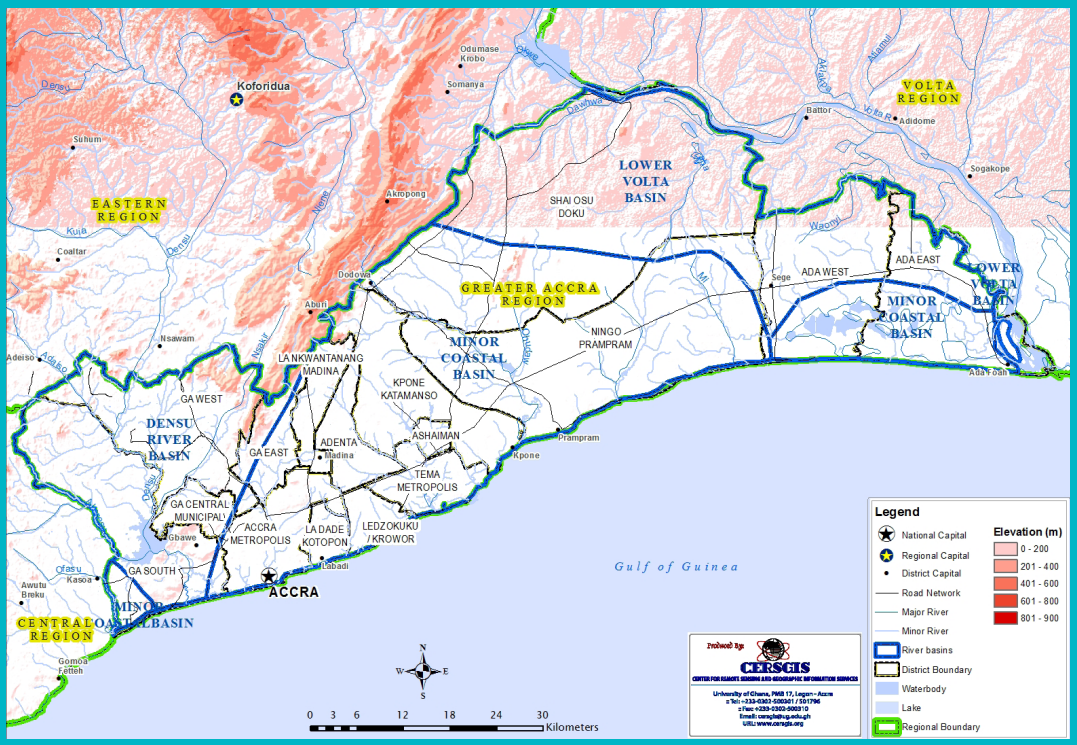
1. Overview of GAMA

1.1 Geography, Topography and Climate

GAMA is located in the southern part of Ghana along the Atlantic coast of West Africa, occupies a total area of 3,245 square kilometers, and includes the capital city, Accra. It has a coastline of approximately 225 kilometers, stretching from Kokrobite in the west to Ada in the east. GAMA falls within the dry coastal equatorial climatic zone with temperatures ranging between 20°C and 30°C, and annual rainfall ranging from 635 mm along the coast to 1,300 mm in the northern part of the country.

There are two distinct rainy seasons in GAMA: from April to July and from September to November, with two rainfall peaks notably in June and October. The first rainfall season is associated with the major cropping season in the region. The relief is generally gentle and undulating low plains with heights not exceeding 60 meters in the Accra Plains area and raising to about 430 metres as it approaches the Akwapim Ridge. The Volta and Densu rivers flow through GAMA as well as some small streams (including the Odaw, Lafa, Chemu, Nima, Dakobi, Ponpon, Nsaki, Onyansia and Doblo) flowing mostly from the Akwapim Ridge into the sea through numerous lagoons (including Korle, Chemu, Sakumo, Songor). Because GAMA is bordered on the south by the Gulf of Guinea, there are ecologically important but highly polluted lagoons and wetlands within its landscape.

Figure 8: Hydrology Map of GAMA



Source: CERSGIS, 2016

1.2 Demographics and Socio-economic Status

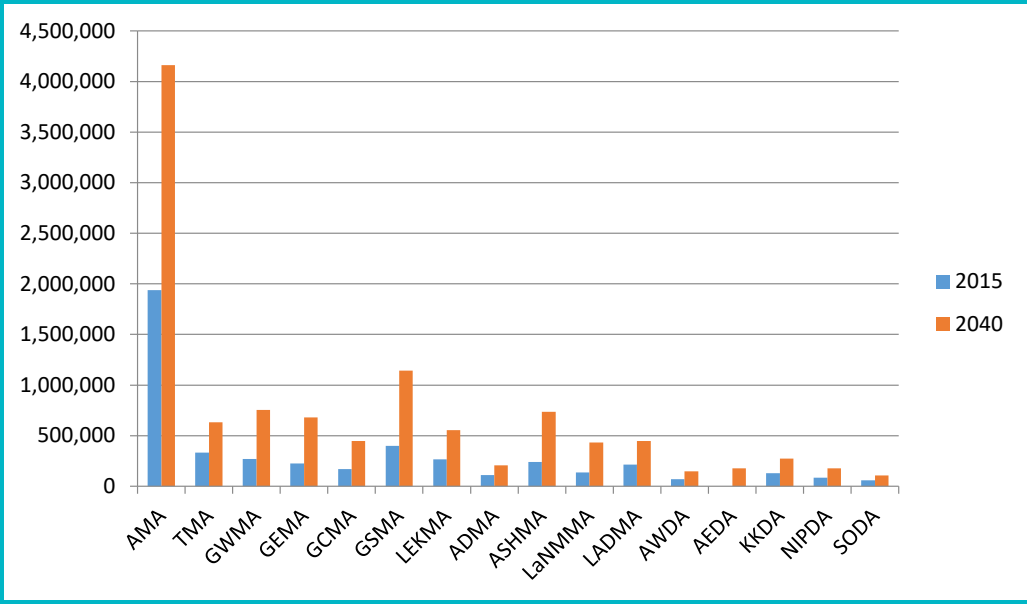
Based on projections from the 2010 Population and Housing Census (PHC) results, GAMA has a 2016 population of 4.6 million inhabitants with an average annual population growth rate of 2.4 percent.[38] This represents a 15 percent increase over the total population in the year 2010. The distribution of population across the 16 MMDAs within the GAMA region is uneven (See Figure 9).

The GAMA region accounts for about 25 percent of the national GDP and dominates formal (32 percent) and informal (28 percent) urban employment.[39] As the governmental and commercial capital of the nation, GAMA acts as a magnet for investment into the country and as a gateway for international trade attracting foreign direct investment. It is roughly at the center of a West African regional economic corridor—and interconnected by air, sea, and highway links—between Abidjan (Cote d'Ivoire) and Lagos (Nigeria).

GAMA is the least poor region in the country, with the incidence of poverty (5.6 percent) lower than the national average of 24.2 percent in 2012/2013. The incidence of extreme poverty is virtually non-existent in urban localities, with GAMA representing only 0.9 percent, with rates of income inequality falling from 41.9 percent in 2005/06 to 37.0 percent in 2012/13. [40]

Access to services is determined both by their availability and affordability. Availability of

Figure 9: Population Distribution by MMDA



Source: Projected based on 2010 Population and Housing Census (Ghana Statistical Service, 2012)

[38] Data Production Unit, Ghana Statistical Service, 16th September, 2016. http://statsghana.gov.gh/docfiles/2010phc/Projected%20population%20by%20sex%202010%20-%202016.pdf

[39] Ghana Statistical Service, 2014. Ghana Living Standards Survey Round 6 (GLSS - 6) – Main Report

[40] ibid

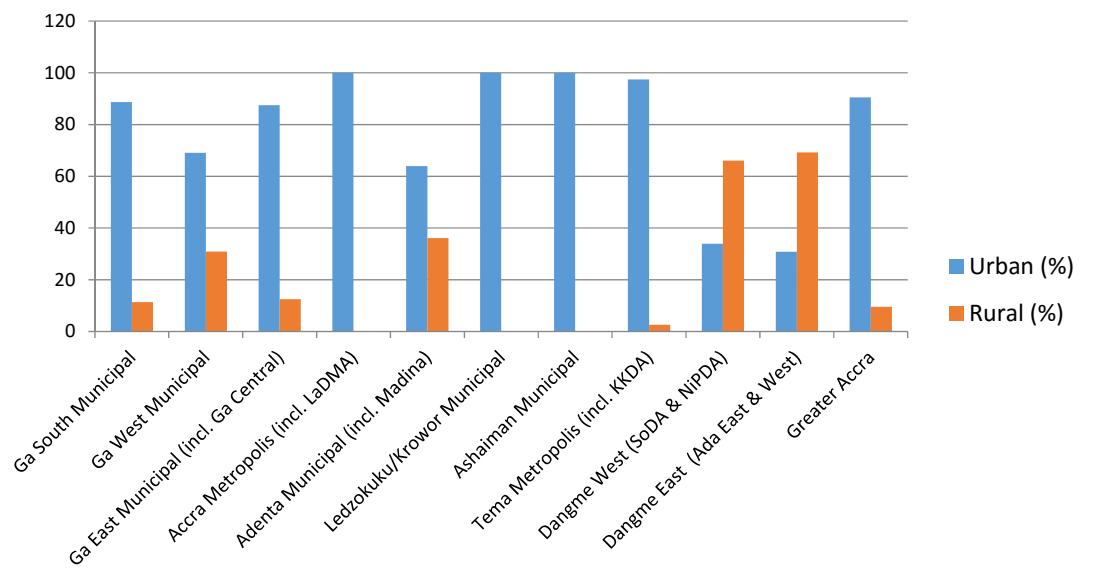
services is largely determined by their location because infrastructure is available within proximity. Urban areas normally have much more service availability than rural areas. On the other hand, affordability is largely determined by households' ability to pay for available services as a result of cost and income. According to the Ghana Living Standards Survey 6 (GLSS 6), GAMA's access to potable water (defined to include pipe, bottle/sachet, protected well/ spring, and borehole) is over 95 percent. About 50 percent have adequate access to an improved toilet facility (a flush toilet or the KVIP toilet) and 92.7 percent have access to electricity.[41] Access to health facilities stands at 76.9 percent, which is relatively high compared to other urban areas, despite the spatial inequity or disparities in the distribution of health facilities across localities in GAMA.[42]

2. Urbanization Trends in GAMA

2.1 Urbanization in GAMA

GAMA accommodates 16.3 percent of Ghana's 2016 total population [43] and is acknowledged as one of the fastest-growing city regions in West Africa. Of the 4.6 million people living within the metropolitan area (as defined by the 16 MMDAs) in 2016, about 4.15 million reside in urban areas and 450,000 in rural; an urbanization level of 90 percent (Figure 10). Contiguous MMDAs (AMA, LADMA, LEKMA, TMA, ASHMA, LANMMA, GCMA and GEMA) are currently almost completely urbanized while four MMDAs are predominantly rural—SODA, AEDA, AWDA, NiPDA. It is important to highlight that the urban expansion in GAMA is also starting to extend into the neighboring

Figure 10: Rural-Urban Population Distribution in GAMA



Source: Ghana Statistical Service, 2012. 2010 Population and Housing Census Report

[41] ibid

[42] Ghana Statistical Service, 2014. Ghana Living Standards Survey Round 6 (GLSS - 6) – Main Report

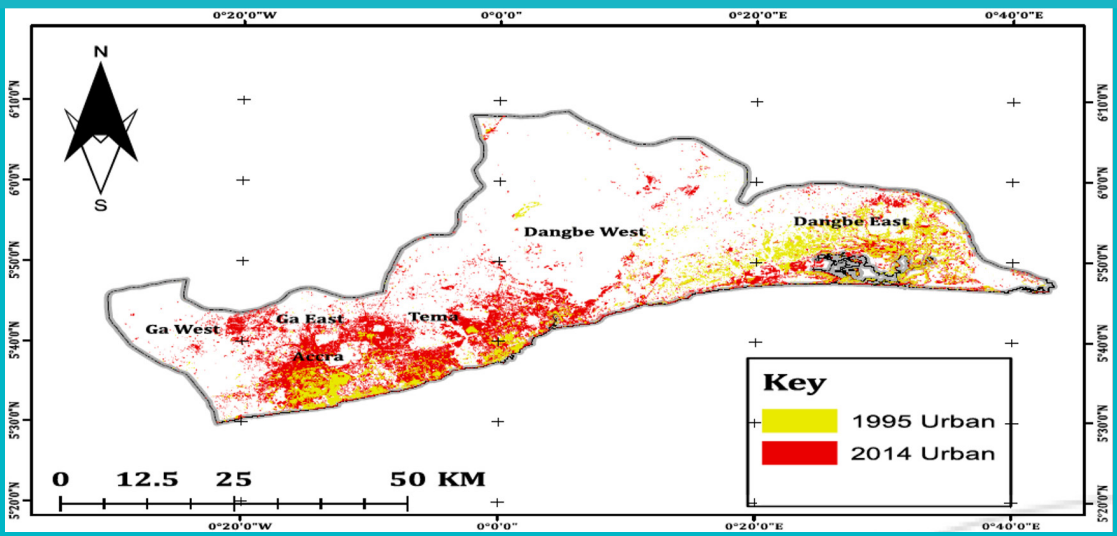
[43] Ghana Statistical Services (2016), Data Production Unit, 16th September 2016

regions – as such, Akwapim South, Nsawam-Adoagyiri and Gomoa East MMDAs are becoming satellites to the GAMA area, as an extended settlement.

GAMA's total population and urban population grew at 3.5 and 3.9 percent annually, respectively, between 2000 and 2010.[44] Furthermore, GAMA's population is anticipated to more than double, to 10.5 million, by 2040 with the whole region almost totally urbanized (99.6 percent).[45] In addition to rapid urbanization, most of the 16 MMDAs are experiencing outward expansion and proliferation of informality; a situation that calls for a more pragmatic and holistic development approach. The challenges and stresses that this rapid expansion and development brought about without advance planning are characterized by a proliferation of under-serviced and infrastructure-deficient communities, with increasing congestion, high levels of pollution, and limited employment opportunities.

Urban sprawl has changed over the past decades. Figure 11 shows that there has been a considerable change in urban form between 1995 and 2014. The significant change of expansion and density is concentrated primarily in Western GAMA. The central and western districts of the region (AMA, LEKMA, LaDMA, TMA, GEMA and ASHMA) have much higher densities compared to the eastern districts. Additionally, built-up densities have been increasing faster in the western districts. In essence, the GAMA exhibits a relatively compact development in the west and central, with sparse and fragmented development in the east

Figure 11: Built-up Density Characteristics



Source: Osei-Frimpong, Emanuel; Balogun Olutayo, Bolarinwa; Afrifa Gyasiwaa, Comfort (2015)

[44] Ghana Statistical Service, 2012. 2010 Population and Housing Census Report
[45] ibid

3. Challenges in GAMA: Hazard Exposure, Shocks and Stresses

Challenges of unplanned urban expansion and climate change impacts are inextricably linked to shocks and stresses to which GAMA is exposed. Shocks refer to sudden events that impact the performance of the city's sectors, structure, infrastructure and institutions. Stresses refer to longer-term trends that undermine the performance of the city's systems and increase the vulnerability of actors within it. Managing these risks and increasing overall resilience requires adequate information on predicted and unpredicted events. Many shocks and stresses that GAMA faces are largely predictable; nonetheless, they have been left unaddressed. Major shocks identified by the local stakeholders during the CityStrength workshop include: flooding, urban fire, cholera outbreak and coastal erosion, coupled with the following secondary shocks: tidal surge, building collapse, windstorm, drought and earthquake (Table 3). Major stresses identified include: poor sanitation, rapid urbanization, proliferation of informal settlements, excessive unemployment, as well as land and chieftaincy conflicts; while secondary stresses include water scarcity, land and environmental degradation, as well as weak governance (accountability and transparency).

Table 3: Key Hazards in GAMA

Hazard	Comment
Flooding	Although flooding events and their impacts are not systematically documented by the MMDAs, it is estimated that flooding occurs during all rainy seasons, from March to June or July. The most recent flooding event on June 3rd, 2015 was the deadliest, leaving 150 casualties and affecting 52,000 people.
Cholera	Cholera outbreaks were reported by many MMDAs as happening every year. Between June 2014 and February 2015, 20,500 cholera cases were recorded in the Greater Accra region with 121 fatalities. Open defecation, lack of access to adequate sanitation solutions, and limited drainage network have contributed to cholera outbreaks.
Fire	All MMDAs noted rising exposure to fire. On average, three big fires are reported in a year. Major causes are electrical and gas faults, illegal connections and/or unsafe cooking practices.
Coastal Erosion and Sea level rise	Sea-level rise has led to increased erosion and inundation of vulnerable areas in Accra,[46] with 80 percent of the shoreline threatened by erosion.[47] Significant numbers of houses have vanished due to coastal erosion in the past and the trend continues in some coastal areas.[48]
Building Collapse	Collapse of buildings, both completed and incomplete, have been witnessed with some regularity in the past few years. The challenge is due to outdated building regulatory frameworks and limited or no technical supervision during construction.
Earthquake	GAMA is exposed to earthquakes. Records show that the metropolitan area has experienced earthquakes of varying intensity since 1615, with the most recent quake occurring in 1939 at a magnitude of 6.5 (a similar intensity earthquake in Philippines which killed 12,000 people) [49].

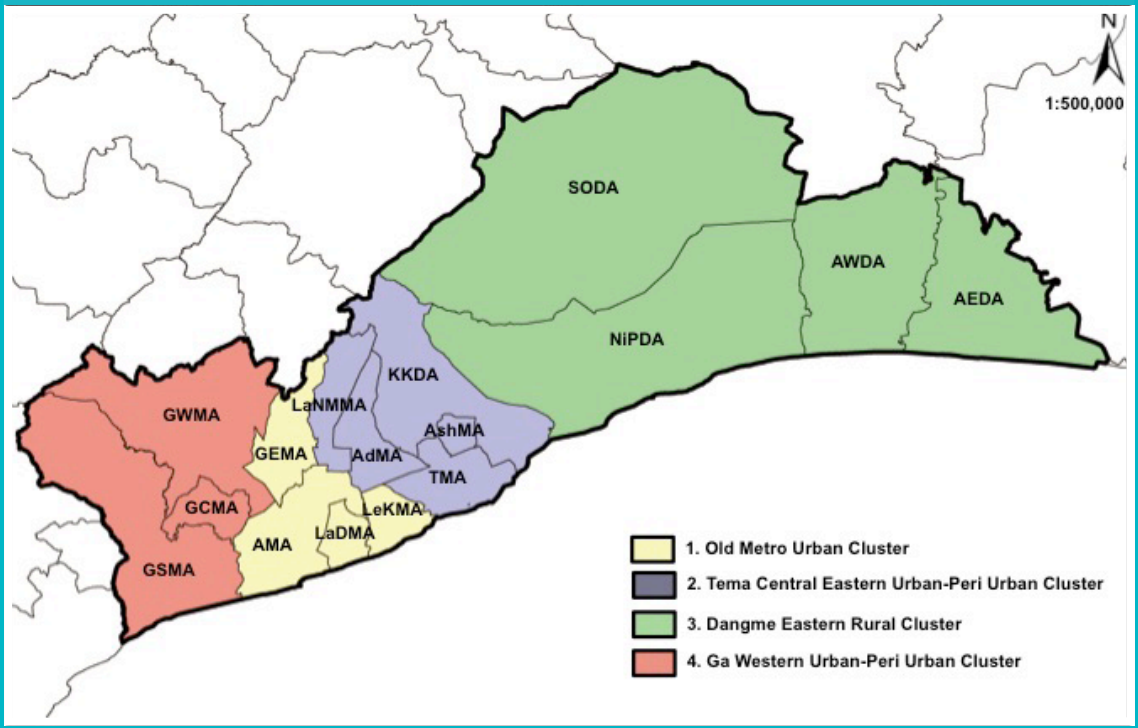
Note: The severity of hazard as perceived by workshop participants. Flooding was identified as the most severe shock, followed by other hazard.

[46] Amoani et al., 2012
[47] Appeaning Addo et al, 2008
[48] Boateng, 2012
[49] Kutu, 2013

For the purposes of identifying spatial disaggregation of these shocks and stresses, the 16 MMDAs were grouped into four clusters (Figure 12): 1. Accra Old Metro Urban Cluster; 2. Tema Central Eastern Urban-Peri Urban Cluster; 3. Dangme Eastern Rural Cluster; and 4.Ga Western Urban-Peri Urban Cluster. The designation of clusters was based on locational proximity, spatial-economic characteristics, historical administrative relationships, and common drainage shed.

Cluster 1, Accra Old Metro Urban cluster is composed of AMA, LaDMA, LeKMA, and GEMA, as the core contiguous areas of metro GAMA that are almost 100 percent urbanized and include the city center of Accra. Cluster 2, Tema Central Eastern Urban-Peri Urban Cluster encompasses TMA, AshMA, KKDA, LaNMMA, and AdMA; Cluster 3, Dangme Eastern Rural Cluster, encompasses SODA, NiPDA, AWDA, AEDA, each of which are predominantly rural in nature and largely sparsely populated (except in the areas around their respective capitals). Cluster 4, Ga Western Urban-Peri Urban Cluster, delineates the western part of GAMA and encompasses GWMA, GCMA, and GSMA.

Figure 12: Four Clusters in GAMA



The following Table 4 and Table 5 summarize the spatial distribution of shocks and stresses in the GAMA MMDAs.

Table 4: Spatial Distribution of Shocks in GAMA MMDAs

Cluster	MMDA	Flooding	Fire	Tidal/ Coastal Erosion	Cholera Outbreak	Wind Storms	Building Collapse	Earth Quake
1	AMA	✓	✓	✓	✓		✓	✓
	GEMA	✓	✓				✓	
	LADMA	✓	✓	✓	✓		✓	
	LEKMA	✓		✓				
2	TMA	✓	✓	✓				
	LANMMA	✓	✓					
	ADMA	✓	✓					
	ASHMA	✓	✓		✓			
	KKDA	✓	✓	✓				
3	SODA	✓	✓					
	NIPDA	✓		✓				
	AWDA	✓	✓	✓				
	AEDA	✓		✓				
4	GCMA	✓	✓			✓		✓
	GSMA	✓	✓		✓	✓		
	GWMA	✓	✓		✓	✓		

Table 5: Spatial Distribution of Stresses in GAMA MMDAs

Cluster	MMDA	Poor Sanitation	Rapid Urbanization	Traffic Congestion	Land/ Boundary Disputes	Jobs	Proliferation of Informality	Water Scarcity	Land Degradation
1	AMA	✓	✓	✓		✓	✓	✓	
	LADMA	✓	✓	✓		✓	✓	✓	
	LEKMA	✓	✓	✓		✓	✓	✓	
	GEMA	✓	✓	✓	✓	✓	✓	✓	
2	TMA	✓	✓	✓	✓	✓	✓		
	LANMMA	✓	✓	✓		✓	✓		
	ADMA	✓	✓	✓	✓	✓	✓		
	ASHMA	✓	✓	✓	✓	✓	✓		
	KKDA	✓	✓	✓	✓	✓	✓		
3	SODA	✓			✓			✓	✓
	NIPDA	✓			✓			✓	✓
	AWDA	✓						✓	✓
	AEDA	✓						✓	✓
4	GCMA	✓	✓	✓	✓	✓			
	GSMA	✓	✓	✓	✓				
	GWMA	✓	✓	✓	✓				

3.1 Shocks

1) Flooding

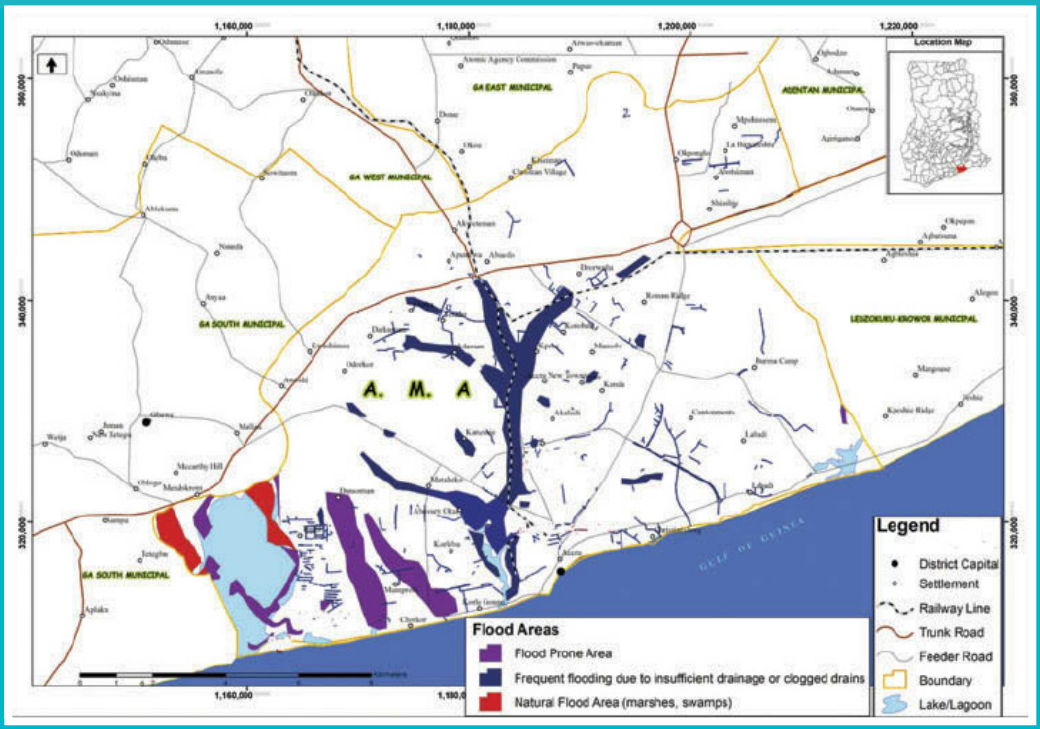
GAMA, which is enclosed by Nyanyanu basin in the west and the Volta Delta estuary east of Ada, is drained by the following basins from West to East: Densu, Lafa, Chemu I, and Odaw River, draining the city center to Korle Lagoon, Osu, Kpeshie, Songo Mokwe, Sakumo II, Chemu II and Ada-Songhor (See: Geography, Topography and Climate). In these basins and drains, flash and riverine floods have become a frequent phenomenon in all MMDAs, leading to loss of lives and property. Significant flood events have been recorded in 1973, 1986, 1995, 1999, 2001, 2002 and the recent devastating June 2015 event (Figure 13). Although flooding events and their impacts are not systematically documented by the MMDAs, it is estimated that flooding occurs during all rainy seasons, from March to June or July.

Multiple responsible entities at national, regional, and municipal levels have looked into the underlying structural and institutional causes of flooding and ways to address them. In addition to the low-lying nature of GAMA, the area's rapid expansion and urbanization has increased the risk of flooding. Figure 14 shows flood prone areas in Accra Metropolitan Assembly (AMA) and other areas affected by floods for specific reasons such as insufficient drainage and clogged drains or natural flood plain such as swamps.

Figure 13: June 2015 Flooding in Accra

Source: https://www.yahoo.com/news/photos/deadly-gas-station-blast-in-ghana-1433432254-slideshow/deadly-gas-station-blast-in-ghana-photo-1433510815458.html

Figure 14: Flood Prone Zones in AMA



Source: Amaoko, 2016

With urbanization, the infiltration capacity of the natural drainage basin system has drastically reduced in recent years. In the absence of adequate wastewater and solid waste collection, the inadequately maintained drains are commonly used as sewers and garbage collectors in all Clusters, which, combined with siltation, chokes the channels further reducing the discharge capacity. The blockage of free-flow streams and drains render low-lying neighborhoods vulnerable to flooding anytime it rains in Clusters 1, 3, and 4. Moreover, most of the lagoon outlets to the sea are significantly silted, causing flooding to become a perennial phenomenon in large parts of the GAMA region. Weak enforcement of planning standards and building codes has resulted in incompatible land uses (including buildings) dangerously encroaching the banks of streams and drains in Clusters 2 and 4.

Design flaws in transport infrastructure further contribute to the overall failure of hydraulic infrastructure. Concrete cover slabs on roadside drains often break and block water flow. These covers are also often installed incorrectly by being placed inside the drain, at water depth, reducing flow capacity and causing spillover. Additionally, runoff patterns and flow regimes are not properly assessed during the design of road infrastructure, causing the associated drainage works to be built to suboptimal capacities.

A recent study on the impact of flooding in Accra came to the following conclusions: (i) Precipitation patterns in Accra have changed considerably within the past three decades, (ii) there will be an increase in the average monthly precipitation from 160 mm in 1991-2010 to 200 mm in 2011-2020, (iii) Accra has a high flood occurrence rate of 17-20 percent in any

given year, (v) Accra has more than 20 percent probability of inland flooding in any given year and communities living closer to the coast are more susceptible during intense rainfall, (vi) if there is no flood protection in any given year in Accra, a 10-year flood has a 10 percent probability of occurring and could cause US$98.5 million urban damage, and 34,000 affected people in Accra.[50]

Table 6 shows the flood prone areas of each MMDA and Cluster.

Table 6: Areas Exposed to Frequent Flooding in GAMA

MMDA	Flood Prone Areas	Cluster
AMA	- Pambros Salt Ponds, Dansoman-Mpoase-South Odorkor corridor, Dansoman-Sukura-Chorkor corridor, Mataheko-Abossey Okai-Korle Lagoon corridor, Odaw-Dzorwulu-Awudome Industrial Area System and Darkuman-North Kaneshie-Tesano corridor	1. Accra Old Metro Urban Cluster
LekMA	- Coco Beach, Kasapreko, Mukwedjor, Nkomefa and Rasta/Otabil	
LaDMA	- Adiembra, Adobertor, Burma camp, Cantonments, Ako Adjei, New La Kpanaa, Labone, New Kaajano Abafum/Kowe/Abese and Tse-Addo/Mantiase	
GEMA	- Kwabenya, Agbogba, Ashongman, Taifa, Dome, Okoe, and Christian Village	
TMA	- Communities 3, 5, 11, 12, 16, 18, 19 & 20, Sakumono, Tema Newtown, Lashibi/Klagon and Adjei Kojo	2. Tema Central Eastern Urban-Peri Urban Cluster
AdMA	- Adenta Commando Area, Ashiyie, Ashale- Botwe, Japan Motors, New Legon, Nanakrom, Abenwoha and Nsuonano	
AshMA	- Middle east, Damsite, Roman Down, Lebanon zone 5, Community 22, Jericho, Asensuba, Valco Flat, TDC old quarters and Ashaiman New town	
LaNMMA	- Aboman, Adenta West, Redco, Madina West, Labone, Firestone, Hanna, Agbogboshie, Arapa jay	
KKDA	- Golf City, Zenu Dam site, Community 25, Kpone Shalom Estate, Kpone-Kokompe and Gbetsile Dam site	
NiPDA	- Afienya, Tsopoli, Annewe Olowe, Ayetepa, Kpongunor, parts of Dawhenya, Old and New Ningo, and Prampram	3. Dangme Eastern Rural Cluster
AWDA	- Akplabanya, Anyamam, Wokumagbe, Goi, Lolonya, Luhuor, Agbedrafor, Matsekope and Addokope	
SODA	- Dodowa, Odumase, Alikope, Ayikuma, Luom, Doryumu, Natriku, Asutsuare and Labuse	
AEDA	- Ada Foah, Azizanya	
GWMA	- Kotoku, Medie, South Ofankor, Fish Pond, Nsakina	4. Ga Western Urban-Peri Urban Cluster
GSMA	- New Weija, Old Weija, Tetegu, Oblogo	
GCMA	- almost the whole area	

Source: CityStrength Diagnostic consultations

[50] Asumadu-Sarkodie et al. 2015.

2) Fire Outbreak

In recent years, fire outbreak has become a common feature in most of the GAMA region, and all the MMDAs noted rising exposure to its hazards. Fire outbreaks can be categorized according to a variety of contexts, such as industrial, market, residential and bush fires, with several losses to property and sometimes casualties counted during these incidents. Clusters 3 and 4 are both susceptible to residential fire, while rural Cluster 3 is the only one susceptible to bush fire. Industrial fires are mostly recorded in industrial areas of AMA, TMA, KKDA and are largely attributed to lack of safety precautions and electrical faults. Similarly, dilapidated electrical wiring, illegal electricity connections and unsafe cooking practices in formal and informal market places have contributed to fires in AMA, GaEMA, TMA and AshMA. Fire outbreaks in the slums or informal communities are also common in AMA, LaDMA, TMA, AshMA, and LaNMMA. Residential fires are largely due to over-crowding, illegal connections, improper wiring by unqualified electricians and unsafe cooking habits. The most recent fire incident was in AdWDA and SoDA. Moreover, wildfires or bushfires occur in rural areas of GaEMA, LaNMMA, KKDA, AdMA, and MMDAs in Cluster 3, especially from November to March when the dry, hot season is at its peak. Fire outbreak hotspots are shown below in Table 7.

Table 7: Fire Outbreak Hotspots

Fire	Hotspots
Industrial Fire	- AMA: industrial area
	- TMA: industrial area
	- KKDA: industrial area
Market Fire	- AMA: Agbogboloshie, Kaneshie, Katamanto, Makola
	- GaEMA: Dome
	- TMA: Community 1 Market
	- AshMA: Ashaiman Main Market
Residential Fire	- AMA: Old Fadama, Nima
	- LaDMA: La
	- AshMA: Old Tulaku, Adakordz
	- TMA: Tema Newtown, Communities 1, 2, and 5
	- LaNMMA: Madina Zongo
Bush Fire	- GaEMA: Adenkrebi, Ayi Mensa, Sesemi, Dedekrom, Bodomase, Ogoha
	- LaNMMA: Danfa, Addo Teiman and Otinibi
	- KKDA: Appolonia, Oyibi, Gonten and Nanoman
	- AdMA: Marlejor and Amrahia
	- AWDA: Addokope, Dorgobom, Kablevu, Sege and Akplabanya
	- SODA: Dawa, Gbogbodziri, Agomeda; Asenema, Sanfo Dawu, Kpeyibo, Kentenkyiren, and Dzogbedi

Source: CityStrength Diagnostic consultations

The impacts of fire outbreaks are further exacerbated by lack of adequate access roads, traffic congestion, and increasing neighborhood density and informality, making it difficult for emergency services to reach the affected areas and fire can spread quickly due to overcrowdedness. As a result, fires are usually out of control by the time the Fire Service responds and gets to the fire scene.

3) Cholera Outbreak

There is an observed frequency of epidemics of diseases such as cholera, common primarily during or immediately after the rainy seasons within Clusters 1 and 4. The vulnerability to cholera is linked to poor sanitation and hygiene, and poor drainage and solid waste management associated with densely populated and informal developments within the GAMA area. Open defecation in coastal areas continues to be common practice, especially in the eastern, more rural MMDAs. The weak enforcement of sanitation bylaws by the respective MMDAs also contributes to the problem.

Between June 2014 and February 2015, 20,500 cholera cases were recorded in the Greater Accra region with 121 fatalities.[51] The main hotspots during the 2015 incidence of cholera included Old Fadama, Chorkor, Mensah Guinea, James Town, Gbegbeise in AMA and La Kpanaa, Abafum, Kowe, Abese, New La Kpanaa, Adienbra and Adobertor in LaDMA. GaSMA and GaWMA have also recorded the highest incidence in the Clusters, including Weija, Tetegu, Mallam, Gbawe, Oblogo, Amanfro, Bortianor, Kokrobite and South Ofankor, where open defecation, inadequate household toilet facilities, and improper solid and liquid waste disposal are acute.

4) Coastal Erosion and Sea Level Rise

Sea-level rise has led to increased erosion and inundation of vulnerable areas in Accra.[52] About 80 percent of the GAMA's 225 kilometer shoreline is threatened by erosion.[53] Significant numbers of houses have vanished due to coastal erosion and the trend continues in some coastal areas.[54] Property loss is expected to rise to 926 buildings submerged[55] and the potential economic losses will include the fish landing sites and the salt mining industry.[56] By 2100, the coastline is expected to have retreated by 189 to 202 meters.[57] Additionally, eight hectares of vegetation will also be lost to inundation by 2100. It is estimated that the coastline is eroding at a rate of four meters annually in the east (around Ada) and two meters annually in the west (around Kokrobite).[58]

The high erosion rates are adversely affecting coastal infrastructure and valuable cultural resources, as well as the environment and communities. In addition to sea level rise, coastal erosion has been exacerbated by sand and gravel mining for construction in the past,[59] poor management of the coast over the years, inadequate construction of sea-defense walls,[60]

[51] IFRC, 2015
[52] Amoani et al., 2012
[53] Appeaning Addo et al., 2008
[54] Boateng, I., 2012
[55] Appeaning Addo et al., 2011
[56] ibid
[57] ibid
[58] Appeaning Addo, 2013
[59] Although recently banned, the construction sector relied heavily on the use of coastal sand and pebbles from the coastal areas of GAMA when constructing buildings, houses, bridges and roads. Despite the ban, this practice continues as a form of sand theft, directly causing erosion.
[60] Representatives of TMA and KKDA at the pre-diagnostic workshop also indicated they believed the construction of sea-defense walls in nearby coastal communities has transferred the tidal pressure of the sea to their coastlines, resulting in the increasing rate of coastal erosion being recorded within their jurisdictions.

and excessive and indiscriminate encroachment of buildings along the coast. Coastal erosion is a chronic issue along the coastline of Clusters 1 and 2, with the most severe cases occurring at Nungua and Teshie in LeKMA, La in LaDMA, Mensah Guinea in AMA, as well as the coastline of TMA and KKDA.[61]

5) Secondary Shocks

The risks of tidal surge or building collapse are not prevalent across all MMDAs but does effect some of them. Drought and earthquakes have not been identified as main shocks by the MMDA clusters but there is a need of frequent monitoring as either would have a significant destructive impact.

a. Tidal Surge

Tidal surge is one of the biggest problems that affect the socio-economic life of the people living and working in the coastal areas of Cluster 3. Heavy and strong tidal waves from the sea have eroded the sandy coastline, leading to occasional flooding in some communities. During high tide, houses are inundated and submerged, leaving hundreds of people homeless and destroying the economic livelihood of the affected population. In late April/early May of 2016, more than 300 people were displaced within Ada West alone. Representatives of AWDA mentioned that the retention wall being built in the neighboring region is exacerbating tidal surges for them. The situation exposes the inhabitants to the threat of environmental sanitation, communicable diseases and squalor. In an attempt to address the erosion of the coastline and inundation associated with the surge, a couple of sea defense initiatives were implemented at Ada and Blekusu. Discussion and coordination between neighboring regions are also critical as highlighted in the case of AWDA.

The main tidal surge and coastal erosion hotspots include the following areas: Kewunor, Lolonyakope, Pute, Otrokpe, Anyakpor, Elavanyo and Totope in AEDA; Akplabanya, Anyamam, Wokumagbe, Goi, Lolonya, and Kablevu in AWDA; and Kpongunor, Minya, Abia, Akokokrom and Prampram in NiPDA.

b. Building Collapse

Structural defects, lack of adherence to building codes and the use of unqualified artisans to develop high-rise buildings have resulted in recent building collapses in Clusters 1 and 2. Collapse of buildings, both completed and incomplete, have been witnessed with some regularity in the past few years. There has been series of the incidents in AMA, LaDMA, LaNMMA and AshMA, where most middle-rise building development has taken place. A six-story Melcom shopping mall in November 2012, a four-story building under construction at Cantonments in July 2015, a ten-story building under construction for Export Development and Agricultural Investment Fund (EDAIF) in November 2015, and the incomplete five-story Airport City building in February 2016, all collapsed, resulting in the loss of lives and property. The city authorities vehemently denounced the owners of the buildings for failing to acquire the necessary permits before putting up the structures and the building inspectors for their negligence and wanton disregard for the structural integrity of the buildings. A common excuse among most developers is that they build without the necessary permit due to the long waiting time for approval. Strict supervision and enforcement of building codes is critical to this effect.

c. Windstorms

Windstorms are seemingly a secondary shock affecting only Cluster 4, such as Lomnava and Israel in GCMA, Amanfro and Obom in GSMA,

[61] Coastal erosion hotspots are identified by the Department of Oceanography and Fisheries of the University of Ghana and officials of the affected Metropolitan and Municipal Assemblies (MMAs)

and Manchie and Kotoku in GWMA. However, they are becoming a worsening phenomenon in recent times due to climate change. Buildings and livestock have been mostly affected and some injuries have also been recorded. Between 2011 and 2016, over 200 houses and 30 people have been reported to have suffered from damages and injuries respectively due to windstorms in GWMA.

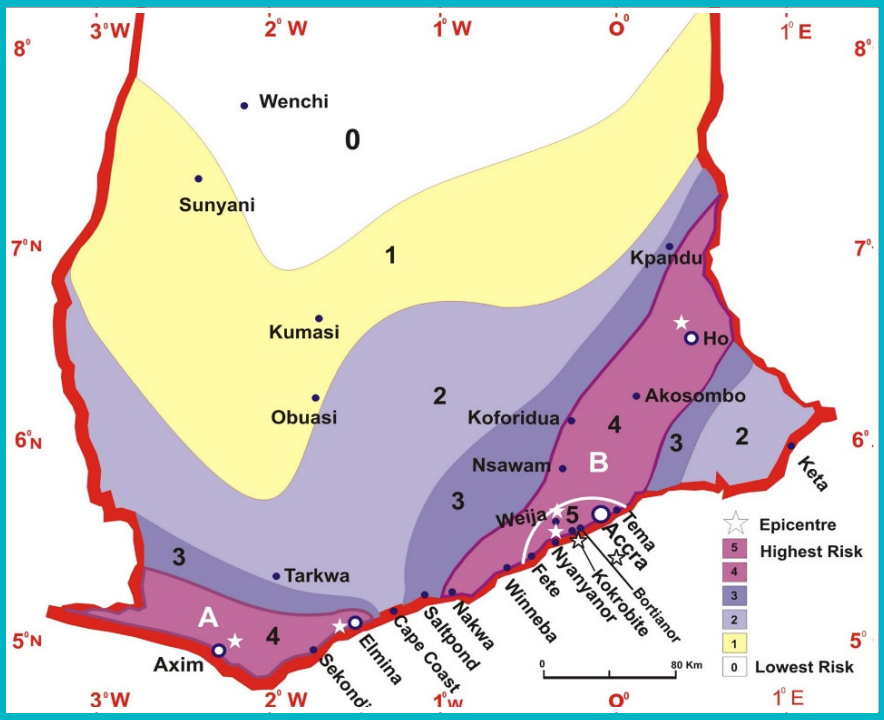
d. Drought

High temperatures, acute dry weather conditions and reduced rainfall are leading to the drying up of most of the rivers that supply water to the western part of GAMA during the dry seasons. Most affected are areas in the GWMA, GCMA and GSMA that rely on water from the Densu River. Drought in the northern areas in Ghana also effects GAMA, pushing people who lost their agricultural sector livelihoods into the city, thus putting pressure on basic services and increasing informality. [62]

e. Seismic Movements and Earthquake Hazards

GAMA is situated in an active seismic location—a fault line from the Akwapim ridges runs through SODA, GWMA, GCMA and GSMA—with the underlying terrain being highly fractured and yet bearing a lot of buildings that are susceptible to earthquake disaster (Figure 15). Records show that, since 1615, the metropolitan area has experienced earth movements of varying intensity, with the most recent earthquake occurring in 1939 with a 6.5 magnitude on the Richter scale. In the 1990's, an earth tremor was experienced in the region and there is a likelihood of reoccurrence. Public information on earthquake predictions and appropriate responses is virtually nonexistent. Poor building construction design, and weak enforcement

Figure 15: Major Earthquake Epicenters, and the General Earthquake Risk-Level Zones of Southern Ghana



Source: Kutu, 2013 [63]

[62] Kutu, 2013

of building and seismic codes and regulations contribute to vulnerability to earthquakes, worsened by a lack of preparedness to deal with such disasters. Disaster risk management by respective districts has been mostly focused on recurrent shocks such as epidemics and floods. worsened by a lack of preparedness to deal with such disasters. Disaster risk management by respective districts has been mostly focused on recurrent shocks such as epidemics and floods.

3.2 Stresses

1) Rapid urban expansion

GAMA's urban population is growing at an annual rate of a little less than three precent. Rapid urbanization in and of itself can yield many positive outcomes, but it is categorized as a stress for GAMA because the city cannot keep pace with the need for planning and provision of basic services, and as a result, the growth has been haphazard. In the eastern half of the region (AEDA, AWDA, SODA, NiPDA) and the peri-urban portions of the western half (GASMA, GAWMA, GAEMA, AdMA, KKDA), rapid urban expansion has placed pressure on land, housing, infrastructure and basic services as well as the environment. These MMDAs are the current frontiers of the urban expansion of the GAMA region with land development occurring at an alarmingly rapid rate. In the case of newly developed areas in pre-urban Cluster 4, service provision and infrastructure has been particularly difficult because it features sparsely populated settlements.

Table 8: Areas of Urban Expansion with Informality

MMDA	Areas	Cluster
AMA	- Sukura, Russia, Sempe, Sabon Zongo, James Town, Korle Dudor, Adedenkpo, Chorkor, Old Fadama, Mpoase, Gbegbeyise, Mamponse, Darkuman, New Fadama, Abeka, Akweteyman, Achimota, Maamobi, Kotobabi, Niiman, Mempeasem, Old Tesano/Adaman, Avenor and Alajo, Ayidiki, Babylon and Abuja	1. Accra Old Metro Urban Cluster
LekMA	- Teshie and Nungua old towns	
LaDMA	- La	
GEMA	- Dome, Taifa, Kwabenya and Haatso	
TMA	- Tema Manhean, Klagon, Sakumono Village, Adjei Kojo	2. Tema Central Eastern Urban-Peri Urban Cluster
AdMA	- Approtech, Ashiyie, Nsamanpom, Adentan Mamomo, Old Ashaley Botwe, Ogbojo, Adjiriganor and Otano Villages, Amanfro and Amrahia	
AshMA	- Ashaiman	
LaNMMA	- Madina, Agbogba, Danfa, Otinibi, and West Adentan	
KKDA	- Kakasunanka, Zenu, Appolonia, Kpone Bawaleshie, Gbetsile, Kpone and the area just south of the Free Zone Enclave and north of Bankuman	

Source: CityStrength Diagnostic consultations

2) Proliferation of informality

Rapid urban expansion has been accompanied by a proliferation of informality, particularly in the western half of the GAMA region. Informal settlements in GAMA, constitute over 40 percent of the built-up area, with the largest portion recorded in AMA, LaDMA, AshMA, and LaNMMA (Table 8). The lack of a properly functioning housing and land market and the increased cost of land in the center of Accra, have contributed to further expansion of informal settlements and slums. In the absence of formal provision of infrastructure and services, the majority of informal settlers resort to informal channels for obtaining services, usually at inefficient and relatively high cost. In the case of land, informal transactions can sometimes lead to conflict, with land being sold to multiple buyers. This poses further stress on their already precarious living conditions and the city's management capacity.

3) Lack of Infrastructure and Service Delivery

a. Poor Sanitation and Waste Management

GAMA faces serious challenges throughout the environmental sanitation chain, beginning with the limited access to toilet facilities associated with inadequate waste management. Though there is access to some type of sanitation facilities throughout the region, coverage is still below standard. In Ga West, for instance, total sanitation coverage isestimated at 47 percent by domestic entities and 65 percent for by institutional entities. Some residents in Cluster 4 use unapproved toilet facilities like pit and pan latrines and still practice open defecation.

Sanitation challenges are often associated with a variety of potential bottlenecks: (i) limited wastewater and septic sludge collection and transportation, (ii) lack of operational wastewater and sludge treatment facilities, (iii) inadequate solid waste collection from low-income areas, and (vi) absence of adequate solid waste disposal facilities. More than half of the population in Cluster 3 have no access to organized means of waste disposal; therefore, waste continues to be dumped and burned. In the case of Cluster 4, there are systems in place to ensure door-to-door collection; still, it is inadequate and unaffordable for some households. Some municipalities (e.g. GSMA and GCMA) have no engineered landfill final disposal sites for both liquid and solid waste, and depend on other municipalities, ending up increasing the cost of waste disposal due to transportation cost.

There are existing Municipal Environmental and Sanitation Strategy and Action Plans (MESSAPs) for each of the municipalities, but these plans are not effectively implemented, often due to inadequacy of funds and lack of commitment from relevant institutions. While these problems are common to all MMDAs in the GAMA, and waste flows across political boundaries, solutions are usually sought individually by each MMDA.

b. Lack of Connectivity and Congestion

Deficiencies in transportation infrastructure are pervasive throughout the 16 MMDAs. Road transport is used most widely and by the overwhelming majority of people, as other modes of transport are poorly developed. In core urban areas, however, accessibility and mobility are problematic, with inadequate road infrastructure, poor surface conditions of roads including major collectors and most local roads, and improper traffic management systems. There is an over-concentration of activities in certain areas (especially in the central business district of AMA) and the circulation system has not been properly designed to take land

use into account, leading to persistent traffic congestion (Table 9). Roads in the peri-urban and rural portions are also poorly developed with most lacking roadside drains, making them inaccessible during the rainy season and adversely affecting agribusiness in markets. (Table 9). Roads in the peri-urban and rural portions are also poorly developed with most lacking side drains, making them inaccessible during the rainy season and adversely affecting agribusiness in markets.

c. Water Scarcity

Availability of water resources and accessibility to piped water are the main concerns in Clusters 1 and 3. Both clusters suffer from water scarcity because current demand on potable water has exceeded its capacity. In AMA, for instance, Weija and Kpong Waterworks supply 401,800 m^3 of the 532,570 m^3 daily demand, which accounts only for 75 percent of demand. Water scarcity affects rural areas and low-income populations disproportionately. In urban areas of Cluster 1, there is marked variation in access to water with respect to income class. Some wealthy areas in AMA, LEKMA, and LADMA are connected to the water network most of the days and they pay official rates. In the areas where middle- and low-income households reside, the supply of water is poor and irregular even if households are conneted to piped-water. In case of GEMA (e.g. areas such as Dome, Taifa, Agbogba and Ashongman Musuko) there is limited or no access to water connections, and therefore, many families end up having to purchase water from private vendors at high cost.

Unlike urban areas, rural areas in Cluster 3 have far more limited access to water. Except for bigger and suburban communities connected to Ghana Water Company Ltd. lines from Kpong and

Table 9: Congestion Hotspots

MMDA	Areas	Cluster
AMA	- Central business district, Kwame Nkrumah Circle, Obetsebi Lamptey Circle, Dansoman-Asoredanho, Dansoman-Sakaman and Kaneshie Market	1. Accra Old Metro Urban Cluster
LekMA	- Teshie-Nungua Beach Road, Nungua Barrier, Spintex Road, Adogon Railway crossing—Baatsonaa road	
LaDMA	- Osu-La Beach Road, Labone, Switchback Road, Cantoments and Airport	
GEMA	- Achimota Golf Course-Dome Pillar 2, Dome old town, and Kwabenya-Ashongman corridor	
TMA	- Ashaiman Interchange—Motorway Roundabout; Valco Roundabout—Motorway Roundabout, General Hospital Roundabout	2. Tema Central Eastern Urban-Peri Urban Cluster
AdMA	- Madina Road and Ashale Botwe—Nmai Dzorn Road	
AshMA	- Ashaiman Interchange—Ashaiman Market, and Municipal Assembly—Bus Terminal	
LaNMMA	- Atomic Junction Roundabout, Madina Market—Ritz Junction, and Ritz Junction—Ashale Botwe Road	
KKDA	- Motorway Roundabout—Dawhwenya Road, Motorway Roundabout—Afienya Road, and Kpone Township roads	
GWMA	- Pokuase U-Turn to Ofankor Roundabout, Sarpeiman, and Faase	4. Ga Western Urban-Peri Urban Cluster
GSMA	- Toll booth to Kasoa first light	

Source: CityStrength Diagnostic consultations

Osudoku Water Project, the smaller communities depend on dams, streams, rivers and dug-outs for drinking water and other domestic uses. Even for those communities connected to pipe lines, the flow of water is irregular in most communities. The main water scarcity hotspots in Cluster 3 include the following: Otsebleku, Abbeypanya, Ajumador, Kpotsum, Nyigbenya to Dawa areas in NiPDA; Asasekorkor to Lanor areas in SoDA; Wonyi Ada to Medovunu areas in AWDA; and Asigbekope areas in AEDA.

4) Excessive unemployment

The unemployment rate of 13.4 percent in GAMA is higher than Ghana's national average of 10.4 percent, and can be attributed to the mismatch of rapid urbanization and availability of adequate jobs in the city. Services constitute the major sector of GAMA's economy, with agriculture limited to the rural parts of the region (GEMA, AEDA, AWDA, SODA, and NiPDA). The regional economy continually fails to generate enough industrial development and growth, with most jobs concentrated in low value-added informal services. The large informal sector has limited access to finances and therefore typically remains composed of relatively small household enterprises. Inadequate employment opportunities combined with low informal sector wages and salaries pose a serious threat to GAMA's security. The situation affects a large cohort of youth with limited skills and training. It was reported during consultations that the lack of employment opportunities might be leading to social problems such as criminal activites (including drug dealing) and crime and violence. Moreover, current social protection programs that provide support to poor and vulnerable households are not always effectively targeted. They often focus on rural areas, have relative low coverage, are fragmented, and largely focus on specific categories of vulnerable groups, such as the elderly and disabled. In addition to the daily stress that unemployment presents for individuals, the cumulative impact among segments of society could undermine the inclusive growth agenda and may contribute to social unrest.

5) Land, boundary and chieftaincy disputes

In the process of creating new municipal and district assemblies, the delineation and re-demarcation of land without clear and agreed-upon boundaries has contributed to boundary disputes and tension among some MMDAs. This development is affecting planning and development of communities around contested boundary areas. The land acquisition and ownership structures and processes are not conducive to effective city development. Almost 80 percent of land ownership in Ghana is customary and such lands are vested in traditional authorities, families and clans who lease out the lands or sell them. Bureaucracy in processing land property documents have resulted in multiple sale of lands and the associated conflicts in the city. The peri-urban areas of GEMA, GSMA, GWMA, LaNMMA and AdMA are the most effected. So-called "land guards" (informal secuiry personnel) have often been mobilized to secure lands, and conflicts over the ownership of these lands have resulted in damages and in some cases even deaths, posing a threat to security and law and order within the GAMA region.

6) Weak urban governance and institutional coordination

A general lack of regulatory enforcement and institutional coordination presents another cross-cutting stress in the region. The resilience challenge confronting GAMA is compounded by the array of stakeholders with planning,

management and operational responsibilities within its jurisdiction. These stakeholders include the Regional Coordinating Council, the 16 MMDAs (planning and rating authorities), parastatals, customary landowners, the private sector, individuals and NGOs. Their number and diversity, combined with an environment of inadequate institutional and coordination capacity in the Ministries, Departments, and Agencies (MDAs) and MMDAs, an unresponsive legislative framework, human resource shortages, and inadequate financial resources, together pose a steep challenge for joint decision-making and coordination as well as enforcement of plans and regulations. Building governance and stakeholder institutional capacity and coordination will be key to maintaining a functional system and enabling the resilience envisaged for the GAMA region.

4. Summary of findings across MMDAs

The Greater Accra Metropolitan Area is facing new opportunities and challenges. The great majority (90 percent) of the GAMA population resides in urban areas,[63] with large concentrations of people, investments and economic activities, and growing at an annual rate of almost three percent. However, city services and infrastructure have not kept pace, contributing to a number of stresses, which are exacerbated by the region's exposure to flooding, fire, earthquakes, and other impacts from climate change. The combination of shocks and stresses threaten the development gains made in the area thus far and may cause the city to miss opportunities to leverage the positive impacts of urbanization going forward.

Main shocks identified by local stakeholders in the course of the CityStrength consultations

[63] Ghana Statistical Service, 2012. 2010 Population and Housing Census Report.

included flooding, fire, cholera outbreaks and coastal erosion; secondary shocks included tidal surges, building collapse, windstorms, drought and earthquakes. Flooding is a dominant shock across all MMDAs, given its frequency and impact on people's lives and property, but it is not the only recurrent threat facing the region. The largely urban MMDAs have been affected by fire, high-density and informal settlements across the city, as well as lack of basic services and infrastructure leading to public health issues. In the coastal MMDAs, communities have a high vulnerability to coastal erosion and tidal surges, coupled with sea level rise as a consequence of climate change. A few mostly rural MMDAs that are part of GAMA reported water scarcity, land degradation, bushfire outbreaks, and lack of connectivity to markets as their main concerns.

Urban stresses have placed pressure on GAMA's built and natural environment. The region is under strain due to poor sanitation, proliferation of informal settlements, excessive unemployment, and land and chieftaincy conflicts. Secondary stresses identified include water scarcity, land and environmental degradation, as well as weak governance and institutional coordination. The pressure of rapid urban expansion on land, housing, the environment, infrastructure and basic services makes GAMA more vulnerable to various shocks as it is unprepared to withstand their impact. Embedded fragmentation of jurisdictions and lack of coordination among MMDAs undermine equitable basic service delivery and coherent land use planning. Stresses occur unevenly across the MMDAs, but affect the poor and vulnerable in a disproportionate manner. Urban areas have relatively better access to service and infrastructure than peri-urban rural areas. High-income households can afford access to formal services, while low-income households end up using private vendors, often at a high cost.

The capacity of existing urban systems to withstand the combination of shocks and stresses will be further discussed in the next chapter.

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III. ASSESSMENT OF RESILIENCE OF URBAN SYSTEMS

Introduction and Overview

In this chapter, the findings of the sectoral assessments of resilience are presented. The sectoral specialists and local stakeholders conducted the assessments jointly, based on information collected as part of the pre-diagnostic phase and discussed collectively during the consultation workshops. The performance of each sector was measured against the five characteristics of resilience included below. The process at the sectoral level was intended to provide participants with a better understanding of strengths and weaknesses in each of the sectors and their linkages with other systems. These insights served as input into the overall prioritization process. There was an analysis of the Food Security and Agriculture sector but the results are not included since they do not reveal sufficient new information.

The following sectors, organized under three categories, were part of the exercise:

1. Urban Development, Housing and Disaster Risk Management

1.1. Urban Development, Land Management and Housing

1.2. Disaster Risk Management

1.3. Urban Finance

2. Urban Services and Infrastructure

2.1. Transport and Roads

2.2. Water Supply and Sanitation

2.3. Solid Waste Management

2.4. Drainage and Coastal Zone Management

3. Community Development and Social Protection

Qualities of Urban Resilience

Quality	Description
Robust	Robust systems include well-conceived, constructed and managed physical assets, so that they can withstand the impacts of shocks without significant damage or loss of function. Robust design anticipates potential failures in systems, making provision to ensure failure is predictable, safe, and not disproportionate to the cause. Overreliance on a single asset, cascading failure and design thresholds that might lead to catastrophic collapse if exceeded are actively avoided. An important aspect of robustness is proper operations and maintenance to ensure that systems are functioning properly. (e.g., A building is designed to accommodate a seismic event without collapse or excessive damage.)
Redundant	A redundant network or system has a belt and braces approach which includes spare capacity or back-up to accommodate disruption, extreme pressures or surges in demand. Providing diverse ways of achieving a given need or fulfilling a particular function is a means to achieving a redundant system. If one service channel gets disrupted, another can be used. (e.g., A power distribution network is able to rebalance to respond to a surge in demand in a particular area).
Reflective	Resilient urban systems examine, learn, and evolve based on their past experiences and new information, modifying standards or norms based on emerging evidence rather than seeking permanent solutions based on the status quo. As a result, people and institutions examine and systematically learn from their past experiences, and leverage this learning to inform future decision-making (e.g., A financial management system might make use of information on past shocks and stresses to improve budget reserving policies).
Coordinated	Coordination between city systems and agencies means that knowledge is shared, planning is collaborative and strategic, and decision-making is based on investments that are mutually supportive towards a common outcome. Exchange of information between systems enables them to function collectively and respond rapidly through feedback loops occurring throughout the city (e.g., A coordinated transport systems is not only aligned with urban growth dynamics and land use but also has open communication with other agencies so that it can divert user traffic to different modes of transport based on changing conditions).
Inclusive	Being inclusive recognizes that risk is perceived differently by different stakeholders and that shocks and stresses affect the most vulnerable the most. An inclusive approach contributes to a sense of shared ownership or joint vision to build a resilient city. This can be achieved through consultation and engagement with a wide range of stakeholders, including the most vulnerable groups, to ensure that systems are more resilient by considering a wider range of vulnerabilities, risk management capacities, and localized information. Equity in access to infrastructure and services underpins social cohesion and opportunity (e.g., An inclusive budgeting process could help ensure that the allocation of city resources reflects community priorities).

1. Urban Development, Disaster Risk Management and Urban Finance

1.1 Urban Development, Land Management and Housing

In a resilient city, physical and socio-economic planning processes are well-coordinated, legally enforced, inclusive, and cross-sectoral. Key stakeholders are involved to align plans with sector priorities and to ensure that the interests of all societal groups are taken into consideration (coordinated and inclusive). Coordination among departments and other agencies enables the use of existing knowledge and data across the city to better understand current and future vulnerabilities (reflective). Urban planning and development ensures a holistic and long-term approach to urban growth, factoring in potential shocks and stresses and encouraging proactive mitigation measures (robust). Multiple strategies are in place to ensure that primary urban development goals can be achieved in the face of changing demographics, urbanization rates, or economic shifts (redundant).

Sectoral Overview

As evidenced in other sections of this report, GAMA is rapidly urbanizing. The growth has been sprawled, haphazard, and with various densities in different MMDAs. GAMA's outward expansion coupled with the lack of a formal and efficient land market, as well as timely land use planning, has led to the proliferation of informal settlements which make up a large area of the city. Informal housing has generally featured low-quality construction materials, crowdedness and limited services provision (e.g. water supply, transport, sanitation and solid waste management). Moreover, many people have settled in dangerous areas such as river canals. Lack of funding and weak technical capacity have made it challenging for the city to provide the appropriate infrastructure and maintain existing assets. GAMA therefore experiences recurrent stresses and is not able to withstand the various shocks that impact the city and disproportionately affect the urban poor. There is no existing body that coordinates land use planning and risk mitigation efforts at the metropolitan level, thus resulting in disjointed individual initiatives in the different MMDAs and worsening haphazard urban development. While good urban and housing policies are in place, the challenge remains with implementation.

Institutional Set-up

MMDAs are responsible for overall urban development as informed by the Local Government Act, 1993 (Act 462) and the National Decentralization Policy Framework, 2015–2019. However, this responsibility is subject to policy directives/guidance, planning evaluation and monitoring responsibilities of national level urban sector Ministries, Departments and Agencies (MDAs). This oversight is, by extension, also exercised by the Regional Coordinating Councils (RCCs) as political institutions and the regional-level Ministries, Departments, and Agencies (Regional MDAs) as bureaucratic and technical institutions.

Operating within the framework of national policy, the MMDA is the urban policy-making body for its jurisdiction. It has legislative power and taxation power. The deliberative and legislative functions of MMDAs are performed by the General Assembly under the leadership of the Presiding Member (Speaker of the House). Each MMDA is under the control of a Chief Executive representing the central government but deriving his/her authority from the Assembly. Each MMDA has an Executive

Committee headed by the Chief Executive, which superintends the implementation of the decisions of the General Assembly. Departments of the MMDAs and district-level departments of other MDAs carry out implementation of urban development initiatives within the districts.

Policy Context

The main policies that drive urban development, land management and housing are implemented by various ministries at the national level, and by MMDAs and MDAs at the local level. They include:

- National Urban Policy (2012–2017): Guides urban development at the national level and includes climate change adaptation and mitigation mechanisms (see Box 2);
- National Housing Policy (2015): Promotes access to adequate housing, inclusion in decision making, and sustainable funding to meet housing demand;
- National Land Policy (1999): Aims to harmonize laws and policies to facilitate access to land and security of tenure, away from dangerous areas. Furthermore, promotes capacity building for government officials; and
- National Spatial Development Framework (2015–2035): Long-term spatial development strategy. A framework is being prepared for the Greater Accra Region. prepared for the Greater Accra Region.

Box 2: Goals of National Land Policy

The goals of the National Land Policy are to: (i) harmonize statutory laws and customary practices to facilitate equitable access to land and enhance security of tenure through registering systematically all interests in land; (ii) minimize and eliminate, where possible, the sources of protracted land boundary disputes and litigation in order to bring their associated economic costs and socio-political upheavals under control; (iii) ensure payment within a reasonable timeframe of fair compensation for land acquired by the state from customary or private landowners; (iv) instill order and discipline in the land market to curb the incidence of land encroachment, unapproved development schemes, multiple or illegal land sales, land speculation and other forms of land racketeering; (v) create and maintain effective institutional capacity and capability at the national, regional, district, and where appropriate, community levels for land services delivery; (vi) promote community and participatory land management and land use planning within a decentralized planning system; and (vii) formalize land markets where appropriate to promote business-like and professional property management principles with the aim of maximizing economic, financial and social returns while working towards a self-financed land administration system.

Table 10 presents a variety of urban development program initiatives in the Greater Accra.

Table 10: Projects and Programs—Urban Management and Housing

Type/ Name of Project	Details or Program Components	Sponsor	Primary Government Counterpart	Budget	Time Period	Beneficiary MMDA(s)
Land Administration Project (LAP) 1 and 2	Lay a policy and institutional foundation and pilot initiatives in land administration. Land Commissions (LC) were created and business processes were computerized for faster delivery of services. The registration of deeds was decentralized to all nine regional capitals and land use planning was modelled at three levels, including preparation of spatial development frameworks, structure plans and local plans.	World Bank	MLNR, MESTI, TCPD, LC	US$50m	LAP1: 2003-2011 LAP2: 2011-2018	Nation-wide
Greater Accra Spatial Development Framework	Preparation of regional spatial development framework for Greater Accra	World Bank	TCPD, MESTI, RCC	US$0.65m	2016–2017	GAMA
GAMA Sanitation and Water Project	Sanitation and water supply improvements	World Bank	MLGRD, G ARCC	US$150m	2013–2018	GAMA
Local Government Capacity Support Project	Urban infrastructure and services improvement, Municipal finance	World Bank	MLGRD	US$175m	2011—2018	46 MMAs
Support for Decentralization Reforms (SfDR) Project	Urban management, urban services, capacity building	GIZ	MLGRD; LGS	EUR20.8m	2003 – 2016	MMDAs
District Development Facility (DDF) 2	Performance-based earmarked revenue granted to MMDAs to support implementation of items within the Medium Term Development Plan (MTDP).	Canada, Danida, AFD, KfW, and SECO	MLGRD	US$230.2m	2014-2018	All MMDAs
Accra's Planned City Extension Project	Spatial/land use planning	UN-Habitat	MLGRD, TCPD	US$1.7m	2015 – 2017	NiPDA

Robustness

The robustness of the urban development, land management and housing sector in relation to shocks and stresses is limited. National building regulations are not enforced and haven't been updated since 1996. Regardless, building standards, building permit and plot size standards do not incentivize housing options for informal communities.

Most MMDAs have either no land use or sector plans, or existing plans are outdated. MMDAs also have incomplete land registration and cadastral systems, which lead to informal land transactions. Land use plans that take shocks and stresses into account are either non-existent or unenforced.

Both the national urban policy and the new housing policy have provisions for resilience and climate change actions and make specific reference to the 'use of sustainability principles to guide shelter and human settlement development' (Ghana Housing Policy, 2015). The challenge will be the successful implementation of the policy and related initiatives. MMDAs are facing challenges in managing the uncontrolled and unpermitted expansion of built up areas (formal and informal), which leads to an increase of settlements in high risk zones. Following the June 2015 flood disaster, ad hoc efforts were undertaken along the hot spots in some of the river basins to remove settlers from high risk zones, but the efforts do not appear to be informed by a comprehensive long-term analysis and providing viable alternatives for settlers.

Coordination

The roles and mandates of actors in urban development, land management and housing are clearly described across existing laws and policies, but effective coordination is weak. To some extent, the coordination of some core urban services has improved between the MMDAs, especially through sector specific initiatives such as collaboration on urban transport in the Greater Accra Passenger Transport Executive (GAPTE), collaboration on solid waste initiatives in the water sector, and on sanitation. In terms of land use planning, coordination of housing provision with spatial development is still limited. There is weak coordination between key land agencies, e.g. Lands Commission, Land Use and Spatial Planning Authority (LUSPA)[64] , MMDAs, and the utility companies. There is lack of provision of land and sites and services schemes for expansion and housing. Severe gaps remain with regard to consolidation of land information systems, regular updates of land tenure, and the lack of coordination between urban service providers and local authorities. There is also limited collaboration between public and private stakeholders, although the initiatives under the Land Administration Project (LAP), the urban policy and the new housing policy provide some opportunities in this area if implemented. Efforts to coordinate the sector at the national level have not been sustained over time (for example, there is still no joint Government and Development Partner Sector Working Group established for urban development).

[64] New name of Town and Country Planning Departments (TCPDs) as of December 2016.

Urban management at the metropolitan level is complex due to the existence of 16 MMDAs, which makes land use planning challenging. It becomes more complex as advanced planning initiatives aim to address climate change amplifications as well as reduction of risks in key areas. Furthermore, there are unclear district boundary demarcations, leading to risk of land conflicts and duplication in planning efforts.

Inclusiveness

While informed by comprehensive national policies and the existence of a framework for local planning, local level land use planning leaves a lot to be desired. Many stakeholders, including low-income communities, are seldom engaged in the planning and implementation process. Many MMDAs do not have local sector plans for land use and a legal framework is lacking, e.g. there is often no land registry. There is very limited consultation with land owners, MMDAs, and national utilities. In some cases, there is a parallel informal land market system for the processing of land transactions outside of the official system. GAMA does have a consultative process in place for planning purposes, but it is unclear how this gets transferred to the implementation phase.

Redundancy

The government does not have different ways to provide urban services in case of disruptions and the services are already stressed on a daily basis due to the extensive demand across the GAMA area. The rapid growth of the city and the lag in urban planning limits the ability of the city to think about redundancy. In the case of housing provision, the building codes are strict which creates an incentive to build informal housing. This means that there are no alternative options to ensure safe housing for people of different incomes.

Reflectiveness

There is limited overview of the location and quality of the current housing stock and other infrastructure in the MMDAs; it is only done at the national level but it is not comprehensive. There is no deliberate use of existing Ghana Statistical Services (GSS) data nor is it typically spatially mapped. This reduces the ability of decision makers to identify in a systematic way the overall quality of assets in the city beyond what can be noted from field visits and observations. Reflection on past and future disasters at the MMDA level planning is limited, especially in contingency planning.

Urban planning, as emphasized throughout the report, is challenging due to the current urban growth rates. As a result, the city reacts to the situation on the ground with limited ability to reflect on past trends.

1.2 Disaster Risk Management

In a resilient city, the disaster risk management system combines a well-functioning and inclusive disaster preparedness and emergency response mechanism with effective disaster prevention infrastructure (robust, redundant and inclusive). Such a mechanism and infrastructure is based on an integrated citywide risk assessment and is developed to prepare for, limit, and recover from expected shocks (reflective). In a resilient city, risk information is a necessary foundational element for institutional decision making across sectors (coordinated) and in particular for budget and strategic decisions for territorial planning and management of the built environment (reflective).

Sectoral Overview

The Greater Accra Region is highly exposed to flooding in addition to cholera outbreak, fire, building collapse, and coastal erosion. The perception of seismic risk and sea-level rise is not as prevalent but there is a level of exposure which can seriously impact the functioning of Accra. The region is not prepared to effectively ascertain and mitigate disaster and climate risks. The approach to disaster risk management is responsive; whenever there is a shock, different agencies and affected MMDAs come together to address the situation. The National Disaster Management Organization (NADMO) is the main agency tasked with managing disasters. NADMO has different committees to coordinate efforts at the national, regional and district level. Nonetheless, implementation of policies has been a challenge in part because the focus remains on response rather than preparation, and there is lack of technical capacity. An example of weak long-term planning is the relocation of people who live near waterways to other areas in the city—in an effort to protect against future flooding— despite experience that people tend to return to proximity to their livelihoods. There is, however, improvement in the sector. MMDAs are now mandated to include disaster risk management and climate change adaptation considerations into their medium-term development plans. It will be important for MMDAs to have the necessary funding and support to fulfill their mandate.

Institutional Set-up

The National Disaster Management Organization (NADMO) under the Ministry of the Interior is mandated to (i) manage disasters by coordinating the resources of governmental institutions and non-governmental agencies, and (ii) develop communities' capacity to respond effectively to disasters and improve their livelihood through social mobilization, employment generation and poverty reduction projects. NADMO is made up of the National Disaster Management Committee (NDMC) at the national level, and Regional and District Disaster Management Committees at the regional and district levels, respectively. Responsibilities of the NDMC include implementing national policies on disasters, coordination of regional and district disaster management plans and activities, and coordination of post-disaster activities. At the district level, each district is required to formulate a disaster management plan as part of its planning process. NADMO also has technical committees for various hazards that serve an advisory role. NADMO has not been able to develop a comprehensive national Disaster Risk Management Master Plan (DRMMP) with clearly defined action plans to mitigate natural disasters. The new NADMO bill would give greater emphasis to prevention, early warning and preparedness, and building codes, and would establish a National Disaster Management Fund. NADMO would benefit from collaboration with the Ghana Meteorological Service (GMet), responsible for monitoring hydro-meteorological and climate events, and issuing forecasts.

Policy Context

- National Development Policy Framework 2014–2017 (GSGDA II): The strategic direction underlying the second Ghana Shared Growth and Development Agenda (GSGDA II) is to leverage the natural resource endowments, agriculture potential and relatively large human resource base to accelerate socio-economic transformation through value addition and industrial production, starting with light manufacturing and diversification. This will be underpinned by partnership with the private sector to expand development of critical infrastructure through self-financing vehicles including Public-

Private Partnerships (PPPs) and other commercial arrangements. In line with the Sustainable Development Goals (SDGs) and addressing climate change concerns, the GSGDA II takes into consideration the need to promote basic living standards, adopt green economy principles in national development planning and implementation, and enhance capacity to mitigate and reduce the impact of natural disasters, risks and vulnerability.

- National Climate Change Policy (NCCP): The National Climate Change Policy is Ghana's integrated response to climate change. Framed within the context of national sustainable development priorities, it provides a pathway for dealing with the challenges of climate change within Ghana's current socio-economic context, and looks ahead to the opportunities and benefits of a green economy. The objectives of the Policy are: (1) effective adaptation; (2) social development; and (3) mitigation. Four thematic areas have been identified to address the adaptation issues in Ghana: (1) energy and infrastructure; (2) natural resources management; (3) agriculture and food security; and (4) disaster preparedness and response.

- Medium-Term Development Plans (2014–2017) of the MMDAs: To mainstream Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) into MMDA development planning, disaster-related issues, disaster preparedness and disaster reduction issues, programs, plans and strategies are now integrated into the Medium-Term Development Plans of the MMDAs. DRR and Disaster Risk Management (DRM) forms part of the Functional Organizational Assessment Tool (FOAT) of MMDAs undertaken by the MLGRD.

- National Disaster Management Plan (NDMP) (2010): Guides NADMO in achieving its main mandate to ensure that disasters are properly managed. The NDMP identifies appropriate disaster management measures in different phases: (1) Pre-Disaster Phase (Mitigation and Preparedness), (2) Disaster or Emergency Phase (Response and Relief), and (3) Post Disaster Phase (Rehabilitation, Resettlement and Reconstruction).

- Standard Operating Procedures and Contingency Plan by NADMO

- Ghana Plan of Action on Disaster Risk Reduction (DRR): Shift the national agenda approach from disaster response to disaster prevention and risk reduction, and mainstream disaster risk reduction and climate change adaptation into MMDA development planning and programs.

Table 11 below provides a summary of some of the projects and programs aimed at bolstering Ghana's capacity for disaster risk prevention and response.

Table 11: Projects and Programs—Disaster Risk Management

Type/Name of Project	Details or Program Components	Sponsor	Primary Government Counterpart	Budget	Time Period	Beneficiary MMDA(s)
Advocacy and capacity building for disaster risk reduction and preparedness in Ghana	Capacity building and advocacy for disaster preparedness and risk reduction at national and regional level	GFDRR, UNDP	NADMO	US $0.5m	Nov. 2014–Dec. 2016	Nationwide
Community Resilience through Early Warning (CREW) Project	Aims to build national capacity to reduce disaster risk by putting in place an integrated early warning system that is both scientific and people-centered. This includes hazard maps, enhanced systems and coordination capacities for early warning, and disaster risk reduction projects in 10 pilot sites.	Norwegian Govt.; UNDP	NADMO, Ghana Meteorological Service	US $5.2m	2012–2015	Nationwide
Disaster Risk Management Plan	Flood protection	GFDRR	Water Resources Commission	US$0.8m	2014–2016	
Ghana Climate Innovation Center	A green project incubation hub where entrepreneurs and startup ventures access support to develop their innovative ideas into strong and viable businesses	WB	Ashesi University College	US$17.2m		

Qualities of Resilience

Robustness

The lack of enforcement of land use planning and outdated building regulations make it difficult to effectively mitigate disaster risks. Lax spatial planning and sprawl of the city, along with limited or inadequate drainage network, has increased the exposure of citizens to flooding. While some MMDAs receive early flood warnings, these are inadequate. The most popular preventive activity for flooding is to relocate at-risk populations (e.g., people settled in buffer zones or floodplains) to safer areas. Nonetheless, in almost all cases, the affected population returns to areas at risk areas to be close to the location of their livelihoods. The robustness of the DRM system is also undermined by the inadequacy of equipment. Fire outbreak is one of the main shocks reported, however, the number of fire trucks is insufficient and fire fighters are unable to reach fires on the upper stories of tall buildings. Sprinkler systems are also not available in most buildings in the city. Furthermore, the poor conditions of roads and ongoing problems associated with traffic congestions make it challenging for emergency vehicles to access all areas in the city, particularly informal communities.

A good step forward that can lead to more robust infrastructure is requiring MMDAs to incorporate disaster risk management and climate change adaptation measures in structural plans and in their urban development plans. To date, however, there is a trend in GAMA to rely only on structural solutions, such as improving drainage systems, which will not provide comprehensive solutions. Dedicated actions and investments which comprehensively address structural and non-structural mitigation measures, incentives for positive behavioral changes, and innovative ways of financing and maintaining mitigation options will be needed to develop a robust DRM system in GAMA.

Coordination

MMDAs do not have emergency plans and post-recovery plans and they also lack shelters for an affected population in case of a disaster. While some coordination between MMDAs and NADMO exists, such as in the dredging of flooded areas (Ga South Municipal Assembly), there is continuous need to integrate disaster preparedness and awareness within the existing structures of local governments. The weak metropolitan management across GAMA hampers effective development and implementation of DRM actions. DRM is a cross sectoral issue that needs coordinated planning and actions, vertically from different levels of government and the ministries and horizontally across different MMDAs. The absence of metropolitan planning structures in GAMA inhibits cross-sectoral and jurisdictional collaboration and coordination, and causes a negative impact during and after disasters. In the event of a shock, the most popular approach for flood or other emergency response is to set up a steering committee under the Mayor to coordinate post-disaster relief and recovery.

Inclusiveness

The DRM system aims to be inclusive, involving vulnerable communities, men and women and giving them specific voice through national and regional disaster risk reduction platforms. The most vulnerable groups adequately participate in the planning activities for emergency response.

Redundancy

There is no adequate redundancy in the DRM system in GAMA. In terms of fire outbreaks, water hydrants are scarce and fire trucks too few for

fire fighters to respond to multiple fire outbreaks. There is also insufficient quantities of medicine to treat people with malaria and cholera during seasons of high incidences.

Reflectiveness

There is no systematic study undertaken by the MMDAs to establish a disaster and climate risk profile that could provide information on location and extent of exposure to hazards. Such an assessment is critical for developing effective land use plans, designing disaster risk reduction and mitigation solutions, and preparing for different scenarios of potential disasters. There is no detailed seismic, flooding, coastal erosion and sea-level rise map for the Greater Accra Region. However, flood prone areas are considered in urban planning processes.

The Accra Metropolitan Assembly (AMA) learned from the recent flooding and has improved preparedness and budget for post-disaster response. NADMO has also improved DRM strategies and MMDAs are taking actions to clean drains before the rainy season. Nevertheless, more actions are needed at the overall GAMA level to improve disaster risk mitigation planning and implementation.

Risk insurance is not available to businesses and many MMDAs do not have contingency plans or budgets. Inadequate funding for operations and perennial delays in the release of funds to support planned and emergency programs for disaster risk management are widespread. The MMDAs have no contingency plans for potential natural and man-made disasters and related environmental and technological hazards and risk. The MMDAs divert budget resources from other sectors to support relief, and in some cases, to provide recovery support.

Once more, a key initiative toward resilience in DRM would require individual MMDAs to consider disaster risk management and climate change adaption when preparing land use and structural plans as part of their medium term development strategies.

1.3 Urban Finance

In a resilient city, the municipal finance system is able to withstand large-scale shocks to revenues or unforeseen needed expenditures through reserves and flexible budget reallocation mechanisms (robust and redundant). Budget planning, management, and policymaking are based on actual performance data, including information on damage and loss from previous shocks or stresses (reflective). A resilient city has a municipal finance system that has sufficient autonomy to manage its resources and coordinates across departments to ensure that spending serves the city's priorities (coordinated). It creates a stable and informed investment environment that allows for the involvement of diverse actors and supports an inclusive approach to budgeting, ensuring that the allocation of city resources reflects community priorities (inclusive).

Sectoral Overview

The urban finance sector at GAMA level is challenged by structural, administrative and systemic inefficiencies. Important sources of funding include the District Assemblies' Common Fund (DACF) (a minimum of 7.5 percent of the national revenue set aside to be shared among all District Assemblies in Ghana).[65] transfers from the central government, and internally-generated funds (IGF). The most

[65] With the passage of the new NADMO Act, 2016 (Act 927), a mandatory 3% of the DACF is to be set aside for disaster-related initiatives.

significant source of funding remains the central government. Given that the national government does not include disaster preparedness and response in their financial planning, this leaves the MMDAs of GAMA financially susceptible to shocks and stresses. Whenever there is a disaster at the GAMA level, individual MMDAs are the first responders and they have to divert funding from other purposes, such as maintenance of infrastructure, to respond. Transfers from the government are not always timely, which hinders financial planning at local levels. Furthermore, a weak land use plan and significant levels of informality create obstacles in collecting fees, taxes, and other sources of funding that fall under internally-generated funds. Limited borrowing rights for the MMDAs and weak capacity to collect internally-generated revenue were mentioned as additional challenges by the participants of the CityStrength consultations.

Institutional Set-up

Multiple institutions participate in municipal finance management at all levels of government. Policy guidance, oversight and technical support is provided by the central level agencies, while the Regional Coordinating Councils monitor and provide support to MMDAs in charge of implementation. Key among the institutions are the Ministry of Finance (MOF), Ministry of Local Government and Rural Development, Controller and Accountant General Department (CAGD), Audit Service, National Development Planning Commission (NDPC), civil society organizations, development partners, private sector institutions, 34 line MDAs, and the Bank of Ghana.

In addition to the District Assemblies' Common Fund, other sources of MMDA financing include grants, land rates, mineral royalties, government transfers, ceded revenues and external credits. MMDAs are also expected to generate funds internally through mechanisms such as fees, fines, rates, rents, trading services and licensing, for administrative and other related expenses.

Policy Context

The National Decentralization Policy (2010) seeks to ensure that there is equilibrium between MMDA mandates and the decentralized fiscal resources. Funding provided to MMDAs comes from sources that include the District Assemblies Common Fund, District Development Facility (DDF), and other miscellaneous transfers. The Intergovernmental Fiscal Framework (2016) articulates the fiscal decentralization vision of Ghana and sets out policy measures, including revenue assignment and internally generated funds.

All sources of MMDA revenues are for mandated use. Funds from the DDF are entirely linked to compliance performance, as are 11 percent of funds from the IGF and DACF. The MMDAs' use of the balance of DACF funds is discretionary.

Programs and Projects for Urban Finance

A number of reforms have been initiated to enhance the revenue mobilization performance of MMDAs over the years and empower them to manage IGF effectively. National level initiatives include:

- The introduction of IGF-related indicators in the Functional Organizational Assessment Tool (FOAT) annual performance assessment of MMDAs by MLGRD;
- Target setting for MMDAs through the composite budgeting process;
- Development of guidelines for rate-fixing;

- Properly naming streets and property addresses to facilitate internally generated revenues; and
- IGF training modules undertaken by the Institute of Local Government Studies.

At the local level, MMDAs have also undertaken interventions:

- Recruiting revenue collectors who are compensated on the basis of commission;
- Implementation of street naming and designation of addresses to improve the identification of properties and businesses and thus facilitate revenue collection from rates and licenses;
- Regularization of physical development and valuation of properties;
- Creation of commercial and market centers;
- Outsourcing of the revenue collection operations to the private sector in various forms
- Awareness creation and targeted service delivery to encourage voluntary compliance of rate payers
- Sanctioning of defaulters

Table 12 below provides a summary of projects and programs within the sector.

Table 12: Selected Projects and Programs—Urban Finance

Type/ Name of Project	Details or Program Components	Sponsor	Primary Government Counterpart	Budget	Time Period	Beneficiary MMDA(s)
Local Government Capacity Support Project	Providing support for development of policies, manual guidelines, staff salary	World Bank	MLGRD	US$175m	2011—2018	46 MMAs
Support for Decentralization Reforms (SfDR) Project	Providing capacity building support to improve the performance of MMDAs	GIZ	MLGRD	N/A	N/A	All MMDAs
District Development Facility (DDF) 2	Performance-based earmarked revenue granted to MMDAs to support implementation of items within the MTDEF.	Canada, Danida, AFD, KfW, and SECO	MLGRD	US$230.2m	2014-2018	All MMDAs
Study on MMDA Capacity to Borrow	Technical Assistance: Assessment of MMDA capacity to borrow in the context of the draft Local Government Borrowing Bill	World Bank	MOF	Technical Assistance	2017	AMA, Kumasi Metro Assembly, Sekondi Takoradi, Tamale Metro Assembly, Ho Municipal Assembly, Shama District Assembly

Assessment of Sectoral Resilience

Robustness

MMDA budgets are separated into Capital Budget (for infrastructure: clinics, classroom blocks, roads, water) and Operational Budget (for administrative expenses, staff training, other support services). MMDAs plans and budgets are seamlessly linked. However, the over-reliance of MMDAs on few funding sources, including external funding, results in a lack of fflexiblity, and also limits the ability of MMDAs to plan for unforeseen events.

Furthermore, there appears to be little planning for disaster-related expenditures at the national level, leaving the economy very susceptible to sudden shocks. Naturally, this extends to the financial planning of municipalities, given that they rely heavily on the national government for financial support. This issue is compounded by poor revenue collection and management within the MMDAs. If a disaster occurs and the municipal government is unable to finance the required response, then the national government must support the municipality. This creates an incentive for both national and municipal governments to improve financial planning for disaster events.

Other challenges identified during the CityStrength diagnostics consultations include the following:

- Inadequate budgetary allocations from the central government;
- Delays in the release of constitutionally-mandated DACF payments to MMDAs;
- Excessive deductions from DACF at the central level;
- Deficiencies in basic revenue management systems, including inadequate records;
- Low capacity for revenue collection, including absence of billing and collection systems, and inappropriate accountability and management of collected funds;
- Incomplete transfer of functions to local governments;
- Limited borrowing rights of MMDAs;
- Insufficient local political will;
- Out-dated property valuation rolls;
- High costs associated with compliance of federal mandates at the MMDA level;
- Poor coordination of multiple stakeholders with divergent interests; and
- Low citizen understanding of financial obligations to their respective MMDAs.

Coordination

The MMDA municipal financing system offers limited coordination or leadership in financing adequate responses to shocks and their aftermath. In addition, there is no predefined financing arrangement between municipalities and the national government to finance emergency disaster relief, reconstruction, or disaster risk reduction initiatives. This leaves municipalities to reallocate funds from other projects within their own budgets, or reliant on a transfer of funds from the national government, which can be slow and unpredictable. The establishment of clear roles and responsibilities between national and local governments is an important first step in arranging appropriate financing for disaster preparedness, prevention and mitigation. The absence of clear and enforced mandates, which give rise to financial obligations for MMDAs and the national government, inhibits proper coordination of efforts and cost-effective financing.

Inclusiveness

MMDA budgets are meant to be developed through transparent and participatory planning (town halls, public hearings), involving all stakeholders and citizens of MMDAs. In some MMDAs, this process is not always followed.

Redundancy

At present, MMDAs rely heavily on a relatively few sources of finance, drawing about half of their funding from external sources. MMDAs do not utilize insurance mechanisms to provide resources for emergency relief and reconstruction in the aftermath of a shock.

Increasing the use of insurance for both individuals and the municipal government can diversify municipal emergency funding resources and build MMDAs' financial resilience to shock events.

Reflectiveness

As mentioned earlier, the national government does not anticipate the impact of shocks in their financial planning process, despite long experience with recurrent shocks and stresses and their costs. Due to the close connection between financial planning at the national level and mandates and funding at the local level, reflection at the GAMA level remains significantly weak.

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2. Urban Services and Infrastructure

2.1 Transport and Roads

In a resilient city, the transport system offers multiple modes of transport to its users to ensure uninterrupted mobility in the event of disruptions and to ensure access to transportation for all population groups. Flexibity and proactive coordination are necessary among agencies to divert user traffic to different modes of transport based on changing conditions. In a resilient city, the transport sector planning and investments are based on an assessment of past shocks and stresses and are closely aligned with other departmental plans and overall key priorities of the city.

Sectoral Overview

The transport and road system across the 16 MMDAs is not resilient to growing hazard exposure and climate impacts. Challenges in the transport sector center on road traffic congestion and inadequate infrastructure. All the MMDAs face poor traffic management, which results in congestion and a high rate of traffic accidents. Private road transport in the cities is dominated by trotros (private mini-buses) and taxis, with no alternative modes of transport for basic intra-city mobility. Limited storm water drainage, uncontrolled street-hawking and growing informal settlements also exacerbate traffic congestion that can lead to accidents. A number of MMDAs, such as AMA, LaNMMA, AshMA, and TMA, have historic centers or market areas with street patterns that do not facilitate access, especially during fire or flooding for emergency vehicles. Generally, planning for the transport and roads sector is not based on risk assessments or effectively aligned with the existing land use plans. All MMDAs are in need of improved traffic management, provision and oversight of public transport services within the city region, an improved and comprehensive approach to drainage, and improved urban planning and development control.

Institutional Set-up

The road and transport sectors are overseen at the national level by the Ministry of Roads and Highways (MRH) and the Ministry of Transport (MoT), respectively. MRH's responsibilities include policy formulation, coordination and oversight, infrastructure development and maintenance, and financing. Similarly, the MoT has overall responsibility for the transport sector, including provision of modes of transport and traffic management. Within GAMA, the Department of Urban Roads (DUR) plays a major role in the administration, planning, control, development, and maintenance of urban roads and associated infrastructure. MMDAs share these responsibilities with DUR, and are also responsible for the enforcement of road and transport regulations, alongside the Motor and Transport Traffic Unit of the Ghana Police Service (within the Ministry of the Interior). Private sector operators play a significant role in the road transport sector, as they account for nearly all bus and taxi transit options. There is currently no national body mandated to develop regulations for transport operations and services.

International development partners play a significant role in the transport sector. Over the last decade, they have provided over US$2 billion in grants and loans for policy and infrastructure development in the sector.

Following a disaster in GAMA, responsibility for road repair and reconstruction falls mainly to the DUR and the MMDAs. Given that both bodies are underfunded, funds necessary for further sector development are regularly diverted for the repair and reconstruction of flood-damaged roads.

Policy Context

The Transport Sector Medium-Term Development Plan (2014—2017) aims to: (i) develop and integrate land use, transport planning, and services provision; (ii) create an environment for private sector participation; (iii) develop and implement a comprehensive and integrated policy, governance and institutional framework; and (iv) develop adequate human resources and apply new technology.

The Urban Transport Policy (2007) outlines Government's commitment to: (i) invest into mass transport systems with the aim of contributing up to 80 percent of all person trips; (ii) concentrate on providing urban transport infrastructure and regulations, creating the environment that will empower the private sector to invest into transport service provision; (iii) develop and implement a decentralized institutional and regulatory framework for urban transportation; and (iv) integrate urban transportation within a strategic urban development framework.

Ongoing/Planned Projects and Programs - Urban Services and Infrastructure

There are recent or ongoing activities that provide significant opportunity for urban transport improvement. These include:

i. Passage of bylaws by 11 MMDAs and establish Urban Passenger Transport Units (UPTU) to provide the planning and regulatory framework for urban passenger transportation;

ii. Recent GAMA MMDA collaboration establishing the Greater Accra Passenger Transport Executive (GAPTE) to plan and regulate cross jurisdictional travel (more than 70 percent of total trips) in the Accra area;

iii. A proposed project to modernize and improve the coordination of traffic lights in Accra and Kumasi.

Table 13 on next page presents other relevant projects and programs in the sector.

Assessment of Sector Resilience

Robustness

The transport system is not designed to withstand shocks and there is a dearth of engineers to properly design shock-resistant infrastructure. In the case of flooding, road design seldom accounts for runoff, nor the larger drainage infrastructure scheme, resulting in road damage. In addition, there is inadequate road maintenance and road expansion due to the diversion of funding to respond to shocks. Poor road surface conditions and flooding are compounded by roadside rubbish dumps by residents.

Accra's fast-growing urban population will lead to more congested roadways as car use is expected to increase five-fold every 15 to 20 years, especially as transport alternatives, such as adequate mass-transit, remain unavailable. The congestion problem is exacerbated by the constant flooding, but also by illegal or inappropriate use of roads, such as hawking at intersections and toll collection points, and the seldom used pedestrian bridges. The construction of illegal accesses and illegal parking which goes unenforced, also contribute to traffic congestion.

Coordination

While some MMDAs find a lack of coordination with the national government, with no clear division of responsibilities in the case of a disaster, others consider that integrated

Table 13: Projects and Programs—Transport and Road Sector

Type/ Name of Project	Details or Program Components	Sponsor	Primary Government Counterpart	Budget	Time Period	Beneficiary MMDA(s)
Transport Sector Project	Support to Road Sector and Educational Entities, Improvement of Trunk Roads, Urban Roads and Infrastructure, Feeder Roads, and Support to MoT.	World Bank	MRH	US$225m	2009-2018	All MMDAs
Urban Transport Project	Mobility improvements in participating MMDAs: traffic engineering measures, implementation of a Bus Rapid Transit (BRT) system.	World Bank	DUR	US$83m	2007–2015	Selected MMDAs
Awoshie-Pokuase Road	Rehabilitation of Awoshie-Pokuase road project; improvement of schools, hospitals, and water supply along the project corridor	AfDB (co-financing with AFD)	MRH, MoT	EUR98.67	2009-2014	GaEMA, GaCMA
Kwame Nkrumah Circle Interchange	Construction of multi-level interchange	Brazil Govt	DUR	EUR74m	2013-2016	AMA
Kotoka International Airport Expansion Project	Construction of Terminal 3 and other expansion works	AfDB	GACL	US$400m	2016-2017	LaDMA
Transport Master Plan Project in Great Accra Region	20-year Transportation Master Plan for GAMA region	KoICA	MoT, GARCC	US$1.5m	2015-2016	GAMA MMDAs
Corridor Development for West Africa Growth Ring Master Plan Project	The West Africa Growth Ring consisting of Abidjan-Ouagadougou, Accra-Ouagadougou, Lome-Ouagadougou, and Abidjan-Lagos corridors. Project objective is to propose the strategies and plans to promote investment and development along the project corridors.	JICA	MRH/GoG	TA	2014-2016	MMDAs along project corridor
Project for the Improvement of the Tema Motorway Roundabout	Construction of four by-passes to reduce the number of vehicles approaching the roundabout; Construction of additional third lane to widen the roundabout; Upgrading a section of the Akosombo Road into a dual carriageway; and rehabilitation of a section of the Harbour Road. Some roads are also undergoing asphaltic overlay.	SECO	MLGRD	Swiss Franc 5.7m	2016–2020	GAMA MMDAs
Ghana Urban Mobility and Accessibility Project	Aims at improving urban mobility and accessibility in Greater Accra Metropolitan Area (GAMA). Strengthen public transport planning and traffic management capacities of selected MMDAs	SECO	MLGRD	Swiss Franc 5.7m	2016–2020	GAMA MMDAs

transport planning exists to some extent with national level agencies responsible for agriculture, health, and education. At the municipal level, the respective MMDA Works Departments do not coordinate with one another on road and roadside drainage design and there is limited coordination with the Hydrological Services Department. There are a number of other agencies responsible for the road transport sector, but the lack of coordination makes it challenging to have an area-wide traffic management system.

While some regulations for road transport exist, they are rarely enforced. There is no national or GAMA-wide regulatory authority (similar to the maritime sector) that can develop and enforce uniform regulations across MMDAs. Some enforcement is carried out by the Ministry of Interior's Motor and Transport Traffic Unit, but it does not extend to issues such as illegal parking in areas of high traffic, transport access points, lorry sites, illegal hawking, or public transport. MMDAs are well-placed to carry out enforcement for these issues, but they lack the financial resources or the capacity to do so.

Transportation in GAMA also suffers due to improper land use planning, which includes conflicts in coordination among agencies and actors. For instance, land set aside for specific purposes is often sold and made unavailable for the implementation of land use plans. In some cases in GAMA, this has led to sprawling and poorly sited lorry stations, contributing to traffic congestion.

In the case of flooding, improved collaboration with the solid waste management sector can minimize the level of flooding by addressing the dumping of waste in ditches and drain canals.

Inclusiveness

Consultative processes involved in transport-related planning are not as robust or comprehensive as needed. Local communities are often consulted, but the needs of vulnerable groups, including the poorest communities or those with disabilities, are not included in sector development planning.

There are also challenges for the non-motorized transport (NMT) users. This includes lack of adequate infrastructure such as pedestrian bridges, which makes NMT users vulnerable to accidents. NMT users also transport wheelbarrows and hand-pulled trolleys along with motorized traffic, further increasing conditions for accidents. There is no appropriate legislation to protect NMT users. It is important to note that there have been investments such as bicycle lanes in important urban centers such as Accra and Tamale; however, there is an apparent lack of commitment to continue these types of initiatives which benefit NMT users.

Redundancy

There is a severe over-reliance on road transport and, more specifically, private vehicles. Mass transport options such as trains and buses are limited and unreliable. In the case of buses, they are largely operated by private operators, with unregulated service, limited route coverage, and vehicles in poor condition. Private operators must also procure and own the buses. Since these operators have no guarantee as to what routes will be available to them, the risk lies almost entirely with the operator. While the Government has tried to expand public transport by implementing a bus rapid transit (BRT) system, the current scheme has been unsuccessful. Additionally, while there is a significant number of alternative routes available in case of congestion or flooding, there is a lack of information available in the aftermath of floods as to what routes are open or unaffected.

Reflectiveness

Planning is conducted according to past experiences. For example, reconstruction efforts for roads damaged by floods and improvement of drainage design take past failures into account. However, technical capacity to implement the lessons learned and revised plans is limited at the MMDA level.

While there is a transport-specific integrated plan, a national transport policy, and a section on transport in the GSGDA II, land use planning is not aligned with these policy documents. Lack of coordination among agencies and actors also exacerbate the problems related to lack of implementation capacity as per guiding strategies.

2.2 Water Supply and Sanitation

A resilient water supply and sanitation system takes a holistic planning approach that considers current and future shocks and stresses in line with the key priorities for the various jurisdictions that constitute the city region. It provides inclusive access to the water supply and sanitation services for all segments of its population. Planning and investment in the sector is driven by demand and supply data and is based on cross-sectoral and cross-jurisdictional collaboration that aligns with urban development plans and priorities. It has sufficient technical and financial capacity to undertake sustainable and long-term operation, maintenance, and planning for the water supply and sanitation infrastructure and services.

Sectoral Overview

GAMA's water sector is performing significantly better than its sanitation sector, though there is still room for improvement. At the national level, Ghana country met the Millennium Development Goal (MDG) target for increased access to improved sources of water [66] (including bottled and sachet) from 56 percent to 89 percent, which was above the expected target of 76 percent.[67] Over the MDG implementation period (2000 – 2015) however, there was a decrease in access to water on premises in urban areas from 42 percent in 2008 to 22 percent in 2014.[68] MMDAs are responsible for the delivery of sanitation services to residents within their areas of jurisdiction. The MDG sanitation target for the country was 52 percent, but the level achieved in December 2015 was only 16 percent.[69] In Accra, the vast majority of excreta produced is disposed of inappropriately which creates public health concerns for a city region that already struggles with cholera.[70] Plans are currently being designed for sanitation sector improvement but there is no accompanying implementation plan, which has proved a shortfall of previous plans. There is a need for greater clarity around mandates related to sanitation, e.g., in the management of toilets, which impact the functioning of the sector. That said, GAMA has wide availability of vacuum trucks for collection, transport, and discharge of fecal matter to disposal sites, which alleviates pressure from the lack of sewage infrastructure.

[66] WHO/UNICEF Joint Monitoring Platform defines this to include water from household connection, borehole, protected dug well, protected spring and public standpipe.

[67] Ghana Statistical Services, 2015. Ghana Demographic and Health Survey 2014

[68] ibid

[69] National Development Planning Commission, 2015. Ghana Millennium Development Goals 2015 Report

[70] Nikiema, et al., 2015

Meanwhile, water supply is still falling short of meeting the increasing demand as GAMA continues to grow, even as supply has doubled in the past 18 months with the completion of the Teshie Seawater Desalination Plant and the Kpong Water Supply Expansion Project, among others. [71] There is a master plan in place for the water sector but lack of funding and resulting delays make the plan outdated as the city continues to expand. Overall, the water and sanitation sector struggles with a shortage of technical experts such as engineers, as well as inadequate equipment and tools to deal with challenges of major infrastructure endeavors in a city region that is constantly changing.

Institutional Set-up

The institutional arrangements for water and sanitation in Ghana are well structured. The Ministry of Sanitation and Water Resources (MSWR) provides policy direction through the Water and Environmental Health and Sanitation Directorates and the Ministry of Local Government and Rural Development leads the various MMDAs in the delivery of sanitation services. There are three main water agencies under the ministry: (1) the Ghana Water Company, Ltd. (GWCL), responsible for the supply of water to residents in the urban portions of GAMA; (2) the Community Water and Sanitation Agency, responsible for facilitating water supply for rural and small towns; and (3) the Water Resources Commission (WRC) , responsible for managing the water resources of the country. The Public Utilities Regulation Commission is an independent entity responsible for regulation of urban water supply.

Policy Context

The National Water Policy (2007) (NWP) provides the overall framework for the sustainable development, management, and use of Ghana's water resources. The ultimate goal of the NWP is to improve the health and livelihoods of the people of Ghana, reduce vulnerabilities, and assure good governance of water resources for present and future generations.

The NWP elaborates key policy issues related to the basic principles and challenges confronting water resources management, development and use in the three subsectors—water resources management, urban water supply, and community water and sanitation. For each , the NWP considers:

- Conservation of the water resources stock in all its occurrences to sustain availability and maintain acceptable quality for the betterment of human health and the environment; and
- Regulation and control of demands of water use and waste disposal to stay within the natural capacity of the water resources base, which must necessarily maintain its regeneration and self-purification characteristics.

It further outlines proposals and guidelines for implementing the policy, including institutional roles and responsibilities, standards, regulations, definitions, and references:

- Water Sector Strategic Development Plan (WSSDP): The Plan has the goal of "providing sustainable water and basic sanitation for all by 2025" and includes a detailed plan for implementing key actions.

[71] Contribution at September 2016 validation workshop by John Tettey, Director of Works – Ministry of Water Resources, Works and Housing

- Integrated Water Resources Management Plan (IWRMP): A comprehensive planning and implementation framework for managing the water resources in the country.
- Updated Environmental Sanitation Policy (2010) (ESP): Develop a clear and nationally-accepted vision of environmental sanitation as an essential social service and a major determinant of improved health and quality of life in Ghana. The vision is accompanied by a strategy and action plan as well as a financing framework.

A summary of physical investments planned in urban water supply by the Ghana Water Company Limited over the planning horizon (2012–2025) is provided in Table 14.

Table 14: Sector Investments—Urban Water: (2012–2025)

Planning Horizon	Interventions	Estimated Cost (US$ mill.)	Remarks
2012–2015	Rehabilitation, upgrading and expansion of existing systems	US$317.00	Interventions in all 10 regions.
2016–2020	Rehabilitation, upgrading and expansion of existing systems	US$372.50	Interventions in all 10 regions
2021–2025	Rehabilitation, upgrading and expansion of existing systems	US$372.50	Interventions in all 10 regions
Total		US$1,062.00	Averaging US$75.9m/yr

Source: Ministry of Water Resources, Works and Housing, 2016

Currently, a good number of the projects of the Ghana Water Company Limited (GWCL) are tackling system capacity issues to increase production and availability of water. However, investment in distribution infrastructure is limited.

Other relevant projects are presented in Table 15:

Table 15: Projects and Programs—Water and Sanitation

Type/ Name of Project	Details or Program Components	Sponsor	Primary Government Counterpart	Budget	Time Period	Beneficiary MMDA
OBA Urban Sanitation Facility for the GAMA Project	Sanitation and waste treatment and disposal for low-income communities in GAMA	World Bank	MLGRD; Planning Coordinating Unit	US$8.76m	2014–2018	11 MMDAs in GAMA
Kpong Water Supply Expansion Project	Construction of 40MGD capacity Water Treatment Plant (WTP) to serve GAMA supply area	CHINA EXIM BANK, GOG	MWRWH/ GWCL	US $273m	2015	Parts of GAMA
Greater Accra Metropolitan Area (GAMA) Sanitation and Water Project	Update of the Urban Water Supply Master Plan. Transmission and Distribution Improvement Works (about 150km), construction of storage reservoirs and stand pipes	WORLD BANK	MWRWH/ GWCL	US$ 1.5b	2014-2018	GAMA
Tema Sewarage Improvement Project	Rehabilitate the sewerage system in the Tema Metropolis and improve environmental conditions	AFD	TMA	US$ 7m	Submitted proposal to AFD	TMA

Qualities of Resilience

Robustness

The robustness of sanitation services is very limited. Sewerage network services cover less than 10 percent of the geographic footprint of GAMA (basically central Accra, Dansoman, central Tema, University of Ghana campus and Sakumono) and are poorly maintained due to inadequate technical capacity and operational budget.[72] The majority of residents in the city region are located in the high-density, low-income communities and do not have access to household toilets (only about 30 percent of households in GAMA have access to a household toilet).[73] Instead, there are many public toilets which serve as the primary toilet for many residents. These toilets are mostly overused and do not meet basic hygienic requirements for ensuring good health. The households with toilet facilities use onsite sanitation systems including mostly Water Closets (WCs) and Ventilated Improved Pit Latrines (VIPs). These have to be emptied periodically.

[72] The World Bank, 2013. Project Apraisal Document – Greater Accra Metropolitan Area Sanitation and Water Project
[73] Ghana Statistical Service, 2014. Ghana Living Standards Survey Round 6 (GLSS - 6) – Main Report

There is also very limited treatment and disposal capacity for the sewage/septage/fecal sludge produced in the metro area and its surrounding municipalities. The three sludge treatment plants built over the last three decades (Achimota in the late 1980's, Teshie Nungua in the early 1990's, and Nungua Farms in the early 2000's) were closed after poor maintenance rendered them unserviceable. The major disposal point in the city is at "Lavender Hill" on the beach in the Accra Metropolitan Assembly where between 150 and 200 trucks dump raw untreated human waste into the sea. Approximately 79 percent of the human waste produced in Accra is disposed of inappropriately.[74] A new treatment plant at the University of Ghana serves the University and four other educational institutions nearby. It is expected that in the medium term, households and other entities within the catchment area will also be connected to the sewerage network.

The strength of the sanitation sector is the availability of several (up to a hundred) vacuum trucks in the city for the collection, transport, and discharge of fecal matter to disposal sites. This service is paid by the households and it is a potential source of revenue for new treatment plants that are in the pipeline, to ensure the sustainability of the facilities. The private sector plays a key role in the provision of vacuum trucks for the needed services.

Several plans for the sanitation sector have been developed but not implemented. There is an Integrated Urban Environmental Sanitation Master Plan (IUESMP) under development for solid waste, liquid waste and drainage funded by the International Development Association (IDA), but there is no implementation plan. There are current efforts to facilitate implementation of the master plan to stop the haphazard growth of the city region, but without essential municipal services in place. The same IDA-funded project is developing a Water Supply Master Plan. In some cases, the agreements governing the management of the toilets are contentious, thereby making it difficult for the assemblies to ensure that public toilets are managed and operated efficiently.

The robustness of water supply services in GAMA is relatively better. Water supply has not kept pace with the growth of the city region, but nonetheless, supply has almost doubled in the last 18 months following completion of some key projects, including the Kpong Water Supply Expansion Project and the Teshie Seawater Desalination Project. The GWCL had a master plan in place but not the funding necessary to keep pace with the expansion of the metropolis. The main challenges are the delay in providing distribution water mains to unserved areas and the frequent pipe bursts due to old water distribution infrastructure.

Overall, MMDA spending on basic sanitation and water supply is very limited. A portion of the budget is for solid waste collection which, together with basic sanitation, is termed "environmental sanitation". Because water supply in the GAMA assemblies is seen as the responsibility of GWCL and the Community Water and Sanitation Agency (CWSA), the assemblies spend virtually no resources when it comes to water supply. In the areas where there were severe water shortages recently, the assemblies sometimes facilitated the services of water tanker operators to provide water at a cost to the residents. Solid waste is prioritized in the distribution of resources, partly because it's more tangible when waste

[74] Nikiema, et al., 2015

remains uncollected. Basic sanitation is seen as a household responsibility.

The human resources capacity in most of the assemblies is a major challenge. There are not enough personnel with the right qualifications and expertise, especially engineers. Where public health engineers have been engaged in the last two years, there are still challenges since an appropriate scheme of work was not developed prior to their engagement. This has led to a high attrition rate. Additionally, some of the engineers are unable to provide the services required since they do not have the necessary tools and resources to do so.

Coordination

The roles and responsibilities in the sector are clearly defined with several policies, guidelines and implementation strategies in place. The presence of the Water and Sanitation Sector Working Group also enhances the coordination among the various stakeholders in the sector. Further, there is collaboration among assemblies that have disposal sites and those that do not. There are no extra charges for vacuum trucks crossing municipal boundaries. The assemblies are also in contact with GWCL in the provision of water supply services. Reports of pipe bursts are sometimes channeled through assemblies.

There are several projects and programs ongoing in the water and sanitation sector. However, residents in low-income communities, in particular, complain about the varied and seemingly uncoordinated interventions taking place. In some instances different NGOs and other organizations have consultations with the residents and the subsequent interventions never happen. When the interventions do take place, there have been instances of duplication of work. However, there are efforts by the Water and Sanitation Sector Working Group [75] which meets regularly to oversee that there is no duplication and that the various interventions are undertaken using similar approaches. In addition, the Working Group facilitates communications between assemblies and the residents to avoid confusion from any differing approaches. Despite these efforts, there is clearly room for improvement. Lack of coordination with different implementation and financing arrangements poses a challenge to assembly officials and residents.

Overall, coordination efforts have not led to an improvement in the quantity and quality of delivery of water and sanitation services in the city region.

Inclusiveness

Access to water and sanitation is poor across GAMA. About 54 percent of households in GAMA have access to an improved toilet facilities (a flush toilet or the KVIP toilet) [76]. The significant proportion of residents in the city region are located in the high-density, low-income communities, which is the focus of the majority of ongoing water and sanitation interventions. A major obastacle to improved access to sanitation is the requirement that households pay full cost for the provision of a household toilet, with no financial support. By law, all households are supposed to be constructed with toilet facilities. However, in most of the low-income communities, the majority of households live in compound

[75] Comprises public, private and civil society stakeholders in the water and sanitation sector
[76] Ghana Statistical Service, 2014. Ghana Living Standards Survey Round 6 (GLSS - 6) – Main Report

houses which are made up of single rooms. It is estimated that between 60 percent and 90 percent of households in some of the low-income urban communities do not have toilets. Providing a single toilet for a typical compound house which usually has more than one household and more than twenty inhabitants, is considered a shared facility and was not counted in meeting the target for the MDGs.

For water supply, efforts have been made by the GWCL and CWSA to provide water via standpipes to households in the low-income communities. The regulations require that households submit site plans and building permits for houses, but this is impossible in most cases since the houses do not meet the required standards to obtain a building permit.

Redundancy

The water supply system is very vulnerable to shocks. In the past two years, there have been substantial improvements in the provision of additional water supply from two sources. There is a new desalination plant at Teshie-Nungua, with water supply of 60,000 m^3 per day, serving the Ledzokuku-Krowor Municipality and its immediate surroundings.[77] A new treatment plant with a water supply of 360,000 m^3 per day, is located at Kpong serving the northern part of GAMA.[78] There are, however, still areas where water is rationed. This means there is no redundancy in the system in case of an emergency shutdown.

The sanitation system does not meet the needs of the city region and hence there is no redundancy.

Reflectiveness

There are social norms which impact sanitation delivery negatively, in particular, the belief that toilets are dirty and should therefore be far away from households. Lack of maintenance contributes to the unsanitary conditions of toilets. Thus, it is necessary to provide positive examples of clean household toilets to encourage residents to move away from public toilets. Greater public awareness and education about the public health dangers of open defecation, including the spread of cholera, is also essential to changing residents' behavior.

Where sanctions are to be applied to people who don't comply with sanitation laws, there is usually intervention from traditional and political leaders who plead for their constituents, and therefore, policies remain powerless.

2.3 Solid Waste Management

A resilient solid waste management (SWM) system takes a holistic planning approach that provides inclusive access to SWM services and sustainable disposal of waste in the city. It provides for safe collection and disposal as well as recycling of waste. It ensures that there is sufficient technical and financial capacity to undertake sustainable and long-term operations, maintenance, and planning for SWM infrastructure and services. The planning for and investment in the sector is driven by demand and supply data and is based on cross-jurisdictional and cross-departmental collaborations that support coordination with urban development plans and priorities.

[77] Note: Based on observation from a SWM specialist during CityStrength workshop (May, 2016)
[78] Ibid

Box 3: Solid Waste Management in GAMA—Key Data

Total estimated population (2015): 4.25 million

Total estimated waste generated (2015): 2,500 tons per day

Estimated waste generation rate per person: 0.6kg per person per day

Proportion of organic material in the waste stream: 60 percent

Average collection coverage: 75 percent

Remaining life of existing engineered disposal capacity: less than 4 years

Source: Ministry of Local Government and Rural Development. 2015. "GAMA Emergency Solid Waste Management Improvement Program (E-SWMIP)"

Sectoral Overview

GAMA's rapid growth has steadily increased the quantities of municipal solid waste generated by the city region (see Box 3), placing increasing strain on the solid waste management services. This strain is likely to continue to increase as quantities of waste generated by the city continue to grow.

In the face of this challenge, a number of SWM policy interventions and investments have been made over the past two decades. This has included privatization of MMDA waste collection operations and significant investment in waste transfer, waste treatment and landfill facilities. The city's waste collection operations now serve much of the city and several modern, well-engineered waste facilities have been built and commissioned over the past five years (Kpone landfill, Zoompak waste transfer facility and Accra Compost and Recycling Plant (ACARP)) with more planned for the future.

Despite these actions, however, Accra's SWM system still en ounters challenges. Current solid waste collection services do not provide for all communities across the city, particularly low-income and informal areas. GAM generates over 2,500 tons of municipal solid waste (MSW) per day, of which an estimated 75 percent is collected from households.[79] Collection coverage varies significantly between MMDAs, ranging from a low of 35 percent in Ga South to a high of 93 percent in Dade Kotopon (see Table 16).[80] Significant quantities of waste are still dumped in open areas and drainage channels across the city, creating public health problems and exacerbating flooding. Only one of the city's allocated disposal sites (Kpone) is engineered to provide adequate environmental protection. The remaining two dump sites (Nsumia and Abloraadjei) pose significant health and environmental risks to nearby residents and to the wastepickers that collect recyclables on these sites. The level of data collection to create baselines for planning varies across MMDAs which have different levels of implementation planning.

[79] Ministry of Local Government and Rural Development. 2015. "GAMA Emergency Solid Waste Management Improvement Program (E-SWMIP)".
[80] ibid

Table 16: Waste Collection Coverage, by MMDA

MMDA	Population (2015)	Waste generated[1] (t/day)	Waste collected (%)	Waste collected (t/day)
Accra Metropolitan	1,883,892	1,130	91%	1,024
Adentan	88,493	53	57%	30
Ashaiman	216,067	130	91%	118
Ga Central	132,624	80	44%	35
Ga East	167,157	100	68%	68
Ga South	465,435	279	35%	99
Ga West	248,670	149	38%	57
Kpone Katamanso	124,301	75	61%	46
La Dade Kotopon	207,706	125	93%	116
La Nkwantanang-Madina	126,634	76	68%	52
Ledzokuku Krowor	257,884	155	77%	119
Tema Metropolitan	331,246	199	78%	155
TOTAL	4,250,109	2,550	75%	1,918

Source: Ministry of Local Government and Rural Development. 2015. "GAMA Emergency Solid Waste Management Improvement Program (E-SWMIP)".

Note 1: Based on estimated waste generation rate of 0.6kg per person per day.

Institutional Set-up

The Solid Waste Management (SWM) sector involves a wide range of actors with different levels of responsibility. The Ministry of Sanitation and Water Resources (MSWR)[81] is the lead sector agency. Its functions include:

- Coordination and formulation of environmental sanitation policy including technical guidelines, monitoring and evaluation;
- Promulgation of national legislation and model bylaws;
- Direction and supervision of the National Environmental Sanitation Policy Coordination Council;
- Facilitating the mobilization of funds for sector plans and programs.

Within MSWR, the Environmental Health and Sanitation Directorate (EHSD) and the Regional Environmental Health Offices (REHOs) play the leading role in supporting environmental sanitation. The functions of the EHSD include:

- Guidance to MSWR on environmental sanitation sector planning, policy and legislation;

[81] This is a new government ministry created by the new Ghanaian administration in January 2017 by merging the Environmental Health and Sanitation Directorate of MLGRD and the Water Directorate of MWRWH to form a new ministry. MWRWH has since been renamed Ministry of Works and Housing (MWH)

- Technical assistance to District Assemblies and service providers;
- Coordinating and disseminating the results of research in the environmental sanitation field; and
- Regulation of all service providers, both public and private.

The Ministry of Environment, Science, Technology and Innovation (MESTI) also plays a role in the SWM sector by way of setting overall environmental regulatory policies and standards, and ensuring compliance with same.

The MMDAs are responsible for SWM in their respective jurisdictions and carry out the following distinct functions:

- Waste management
- Public health management

Provision of works related to Solid Waste Facilities at the District Assembly level is the responsibility of the District Works Department (DWD). The District Environmental Health and Management Departments (DEHSDs) typically liaise with DWDs in preparing plans and costs for sanitation facilities.

Policy Context

National Environmental Sanitation Policy (ESP) of 2010, under the MLGRD: The ESP is the overarching policy document guiding operations of the SWM sector. A corresponding National Environmental Sanitation Strategy and Action Plan (NESSAP) is in place in response to the new framework of national planning that requires comprehensive sector policies and strategic plans and investment costs. The NESSAP refocuses attention on environmental sanitation in Ghana and provides clear strategies and action plans that guide implementation by MMDAs. All MMDAs are required to prepare their own sanitation strategy and action plan, known as MESSAP or DESSAP depending on metro, municipal or district status.

Qualities of Resilience

Robustness

Greater Accra's SWM services have a moderate level of robustness. The city has waste collection services which serve much of the city and significant investments have been made in waste transfer, treatment and disposal capacity over recent years (e.g. Kpone landfill, Zoompak waste transfer facility and Accra Compost and Recycling Plant). However, the lack of treatment and disposal capacity in Accra has reached a critical state and affects the robustness of the solid waste management sector. There is only one engineered landfill, which is nearing capacity, and one residual waste treatment facility for the entire city. Significant quantities of waste are not collected and transferred for treatment and disposal. Dumping of wastes, particularly in drainage channels, is still widespread, causing flooding and public health risks. This practice is particularly common in lowerincome areas where households either do not have access to, or choose not to pay for, waste collection operations.

National and local legislative frameworks provide clear responsibilities and mandates for SWM, though coordination among different agencies remains challenging where interests and agendas overlap (e.g. MLGRD and MESTI). Further, coordination among MMDAs needs improvement, particularly on the issue of providing adequate residual waste treatment and disposal capacity.

There is also room for improved collaboration between the formal and informal sectors in SWM operations. The formal sector features

private companies competing for government waste treatment and disposal contracts. The informal sector provides waste collection services and recycles materials such as metals, cardboard and plastics serving low-income communities that are not reached by the formal sector. There is some level of public-private sector coordination but it could be strengthened. Experience in other cities shows that the informal sector can be very effective at providing wastes collection services at a local level where they are properly integrated with the formal sector.

Inclusiveness

Over the past 20 years, national and local governments in Accra have successfully engaged the private sector in delivering SWM services and infrastructure. Progress has also been made in engaging non-governmental and community-based organizations on SWM issues. However, public awareness of SWM issues remains poor, especially about the negative consequences of practicing open dumping. As noted in Box 4, informal wastepickers work the dump sites daily, collecting and removing recyclable materials, though at significant risk to their health from waste, fumes, pathogens, and waste slides.

The city's waste collection operations now serve much of the city, with an estimated 75 percent of GAMA's daily generated municipal solid waste (MSW) collected from households. Solid waste collection services do not provide for all communities, particularly low-income and informal areas, and collection coverage varies significantly between MMDAs, ranging from a low of 35 percent in Ga South to a high of 93 percent in Dade Kotopon (see Table 16).

At present, the majority of waste collection services are provided by formal (private sector) waste management companies with some services also being provided by informal waste collectors, known as 'kaya bola'. Waste is collected directly from households and also from centralized collection containers (typically 7-8 m^3 skips) placed around the city to which informal collectors and residents bring their waste.

Box 4: Negative Impacts of GAMA Waste Management

Most Dump sites in the GAMA are sources of considerable environmental impact. The Abloraadjei dump site is one example, in particular. Wastes are burned on site, causing local air quality impacts, and with no engineered lining at the site, it is possible that leachate is polluting the Ga East groundwater, though no studies have assessed this issue. The site is also likely generating methane gas, a potential asphyxiation/explosion risk for nearby residents and also a powerful greenhouse gas. Any impacts of the site will become more acute as housing is built increasingly close to the dump site's boundaries.

Approximately 100 wastepickers scour the dump site daily, collecting recyclable materials. The conditions for these activities are dangerous, with wastepickers exposed to pathogens from decomposing organic and medical wastes, hazardous substances in the waste, dangerous fumes from burning materials, and potential waste slides due to the steep piles of waste.

The formal waste companies that operate on behalf of the MMDAs, under concession-type contracts, collect fees directly from residents in accordance with fee rates set by the MMDAs. Different rates are set for low-, middle- and high-income households. The side-effect of this approach is that private collectors focus on high- and middle-income areas where fee rate collection rates are higher. This results in low-income areas not receiving collection services. Informal collectors also charge households directly, typically on a weekly or per collection basis. These informal collectors do not have contracts with the MMDA so they operate in competition with the formal companies. However, there are some instances where private companies subcontract collection operations to informal collectors, particularly in low-income areas of the city where it is more difficult to operate with large vehicles.

Redundancy

Currently, there is very limited additional capacity in Accra's SWM systems. Collected wastes are transferred, either directly or via the Zoompak waste transfer facility, to one of three disposal sites in Accra. One of these is an engineered landfill (Kpone Landfill in TEMA) and the other two are dump sites with no engineered containment or effective operational practices to prevent pollution (Nsumia dump site in Akwapim South and Abloraadjei dump site in Ga East). There are also a number of smaller dump sites across the city used by households, and informal collectors, and possibly also by formal companies. The Kpone landfill was constructed in 2013 with a design life of 8-10 years but by 2016, it has received over four times its anticipated input. As of end of 2016, the site had exceeded its design capacity.

In addition, approximately 500 tons of waste per day are delivered to the Accra Compost and Recycling Plant (ACARP). At this plant, recyclables are removed and organic waste treated to produce a compost which is sold for use in landscaping. The remaining 'residual' waste (about 20 percent of the input volume) is disposed of at a landfill site located at the ACARP site.

In the event of a shock that affects the SWM system, there is very limited contingency available to keep services operating and ensure that wastes are collected and transferred for appropriate disposal and treatment. This has the potential to significantly increase public health risks as the quantities of dumped waste around the city and in drainage channels increases. This is also likely to increase the risk of flooding.

Reflectiveness

The level of data collection and analysis on SWM factors varies considerably among MMDAs. For example, AMA has an integrated SWM strategy which sets out, in detail, the baseline situation and a detailed implementation plan for improving SWM. Other MMDAs provide plans for improving SWM in their MESSAP and DESSAP documents, with varying levels of evidence-based analysis and degree of detailed implementation planning that has been conducted.

There is also a significant gap between the plans that are developed and the actual implementation of these plans. The system is reflective on paper, but in reality, past experience does not appear to inform implementation on the ground.

Recognizing the challenges that GAMA's SWM system faces and the very real hazard that this poses in terms of environmental health and flood risk, the MLGRD developed an Emergency Solid Waste Management and Improvement Program (E-SWMIP) in August 2015. This proposed the urgent development of additional landfill capacity at the Kpone landfill, a new landfill at Ashaladja in Ga East, and four new transfer stations at Achimota, Kaneshie, Mallam and Agbobloshie. The total cost of these investments was estimated at US$35 million. It is understood that the MLGRD is currently seeking funding to implement this program.

2.4 Drainage and Coastal Zone Management

In a resilient city, drainage and coastal zone management is intrinsically linked to the larger management of water resources in all of its dimensions. This stretches from the management of storm runoff, management of natural drainage systems and their riparian zones, and management of coastal wetlands and coastal zones in general. The drainage and coastal zone management system is integrated in all city planning processes, including construction, land use, socio-economic issues, and sectoral plans. A resilient city bases its decisions for budget allocation and investment prioritization on information that includes experienced and expected damages and losses from drainage and coastal zone-related disaster events.

Sectoral Overview

The coastal zone of Ghana is primarily a high-energy environment and has some lowlands which are prone to flooding. The coastal zone is defined as the area below the 30-meter contour representing about 7 percent of the country's land area.[82] It is home to about 25 percent of the nation's total population and host to about 70 percent of Ghana's industries and businesses.[83]

Underlying infrastructure issues largely drive Greater Accra's vulnerability to frequent flooding. Of particular importance are hydraulic infrastructure, solid waste management infrastructure, and transport-related infrastructure. The drainage and coastal zone management system in Greater Accra is not only highly vulnerable, but also a key entry point for sustainably managing floods from an infrastructure perspective. Due to rapid expansion of the city, the infiltration capacities of the basin surfaces have changed drastically in recent decades.

The CityStrength diagnostic consultations confirmed and highlighted the following stresses affecting the drainage and coastal zone management systems:

- Accra is rapidly growing, but only providing limited access to affordable housing and in all types of land with substantial impacts on the urban hydrology. The rapid expansion of informal settlements also impacts the drainage patters of the city (See: Housing);
- Spatial planning and building guidelines are seldom enforced, putting additional pressure on the vulnerable areas to be made available for construction (see: Land Management);
- A weak solid waste management infrastructure with only one designed and operational landfill in GAMA, combined with detrimental solid waste management practices by the majority of residents puts additional pressure on the drainage system

[82] Acorn International LLC. 2015. Independent Study of Marine Environmental Conditions in Ghana
[83] World Bank, 2010

and exacerbates flooding (see: Solid Waste Management);

- The division of responsibilities for drainage management, including operation and maintenance, is spread across the Hydrological Services Department (HSD), the MMDAs, and the Department of Urban Roads, resulting in weak coordination, planning and enforcement;
- Only a fraction of the required funding for operation and maintenance of the drainage system is regularly provided, resulting in the delay of needed maintenance work, such as desilting and regular dredging and cleaning of channels; and
- Artisanal sand mining along Accra's beaches threatens major parts of the coast and its protective function.

Institutional Set-up

With regard to protection, management and development of drainage and coastal zones, the following are the current arrangements:

- The coastal zones and drainage systems are planned and managed by the respective MMDAs through the Medium Term Development Plans. The Hydrological Services Department of the Ministry of Water Resources, Works and Housing (MWRWH) is responsible for the physical protection of the coastline and the construction of storm drains. Sometimes, however, the MMDAs, MLGRD and the MWRWH also handle storm drains through consultancy.
- The responsibility for drainage management, including operation and maintenance, is spread across HSD (for primary drains), the 16 MMDAs of greater Accra (for secondary drains), and the Department of Urban Roads (for tertiary or roadside drains). The coordinating roles are carried out by the Ministries depending on what program needs to be implemented. However, challenges associated with the number of agencies involved has resulted in weak coordination, planning and enforcement.

Policy Context

Key policies in the sector fall under three major areas: (i) Integrated coastal zone management and sustainable development; (ii) Marine environmental protection, both from land-based activities and from sea-based activities; and (iii) Sustainable use and conservation of marine living resources (both of the high seas and under national jurisdiction). Important plans under the areas include:

Coastal Zone Management Indicative Plan, 1990; National Environmental Action Plan, 1994; Integrated Coastal Zone Plan, 1998; Coastal Zone Profile of Ghana, 1998; National Oil Spill Contingency Plan with specific reference to the marine environment, 2002; and Environmental sensitivity map of the coastal areas of Ghana, 1999 and 2004.

Ongoing/planned projects and programs in the GAMA region include the Mensah Guinea Coastal Protection Project and the Ningo-Prampram Coastal Protection Project.

The MWRWH has prioritized and costed a total of 40 storm drains for GAMA alone, amounting to about US$345 million. The details of these storm drain projects are presented in Table 17, on next page.

Table 17: Details of 40 Prioritized Drains in GAMA

Ranking Order of Priority	Drain	Basin	Total Drain Length	Unlined Length
1	LAFA STREAM	LAFA	14,260	8,000
2	GBAWE	BARLEY	300	300
3	SOUTH ODORKOR		1,148	1,148
4	DANSOMAN A		1,430	1,430
5	DANSOMAN B		1,138	1,138
6	ODAW UPSTREAM	ODAW	12,165	2,000
7	MATEHEKO		3,469	1,669
8	SOUTH KANASHIE		1,730	1,730
9	WEST KANASHIE		1,400	1,400
10	SOUTH AWUDOME		2,000	2,000
11	ONYASIA DZORWULU		7,146	5,746
12	ONYASIA DZORWULU		4,000	4,000
13	NIMA	NIMA	7,050	2,000
14	NIMA	NIMA	1,881	1,881
15	CHEMU		4,190	627
16	MAMPON	MAMPON	2,140	2,140
17	DANSOMAN		1,000	1,000
18	MUKOSE	ODAW	3,250	500
19	WEST RIDGE		1,495	1,495
20	ADABRAKA		1,500	1,500
21	AKWETEMAN	APENKWA	655	655
22	APENKWA	APENKWA	760	760
23	OSU KLOTTEY	OSU KLOTTEY	4,460	914
24	OSU-CAMONITE	OSU KLOTTEY	973	973
25	OSU-BAFAROCK		1,500	1,500
26	CONFERENCE-CASTLE		1,700	1,700
27	AWUDOME	ODAW	1,000	1,000
28	FEO EYEO		1,518	1,518
29	ST. THERESA-DADEBAN		2,000	2,000
30	CIRCLE		1,000	1,000
31	KORLE GONNO		1,793	1,793
32	SOUTH LABADI	LABADI	1,550	149
33	CENTRAL LABADI		500	500
34	LA CENTRAL		400	400
35	LA KOLIKO		1,000	1,000
36	KPESHIE	KPESHIE	5,486	3,046
37	EAST LEGON		4,000	4,000
38	BURMA CAMP		3,000	1,105
39	KORDJOR		13,043	5,000
40	ONYASIA/DZORWULU	ODAW		70,717

Qualities of Resilience

Robustness

The drainage system of greater Accra is inadequately designed to accommodate the rapid expansion and population growth of the city, which has caused a drastic change of the infiltration capacity of its drainage basin surfaces in recent years. This, together with hydraulic infrastructure's substantially reduced retention capacity, leads to overwhelmed basins as a result of rainfalls with high peak flows. Only a small part of the main drainage channels are lined, while secondary and primary drainage systems are not well integrated or connected. Furthermore, the drains are commonly used as garbage collectors, which, combined with siltation, chokes the channels, further reducing the discharge capacity as maintenance is often limited. Most of the lagoon outlets to the sea are significantly silted. The situation was aggravated during the June 3, 2015 floods through the malfunctioning of the flapgate weir regulating the flow of the Odaw River into the Korle Lagoon. The actual storage and drainage capacity has been exceeded for some time now to adequately drain the storm waters, causing flooding to become a perennial phenomenon in large parts of the city over the past decades. Design flaws in transport infrastructure further contribute to the overall failure of hydraulic infrastructure. Concrete cover slabs on roadside drains often break and block water flow. These covers are also often installed incorrectly by being placed inside the drain at water depth, reducing flow capacity and causing spillover. Additionally, runoff patterns and flow regimes are not properly assessed during the design of road infrastructure, causing the associated drainage works to be built to suboptimal capacities.

Coordination

Greater Accra's drainage system scores moderately to poor with regard to its coordination quality. The institutional landscape responsible for drainage management in greater Accra is divided among many agencies with no coordination oversight managing the entire drainage network in greater Accra. Coordination between agencies is only done on an ad-hoc basis and related to specific interventions or projects. Upstream coordination in the planning process is missing. The institutional mandates, roles, and responsibilities regarding drainage networks must be clarified and coordinated in order to ensure proper operation and maintenance moving forward.

While MWRWH is responsible for the planning and development of main drainage infrastructure, MMDAs are responsible for the operation and maintenance. However, the MMDAs face significant budgetary restraints which do not allow for adequate maintenance. Additionally, the design and implementation of drainage infrastructure associated with transport infrastructure is the responsibility of the Ministry of Roads and Highways (MRH), leading to suboptimal coordination with other stakeholders to ensure designs are made to necessary specifications.

Inclusiveness

There is inadequate access to drainage and sanitation facilities in informal settlements.

Redundancy

Greater Accra's drainage system is not at all redundant vis-à-vis shocks. Even short and limited rainfall events immediately turn into

(localized) flooding. While the drainage system is under-designed and not fully operational, it also lacks buffer capacity to store or buffer peak flows. Retention basins in the upstream areas are absent and in-situ retention capacity of the drains is non-existent, making the system extremely vulnerable to shocks.

Reflectiveness

The decision makers and practitioners responsible for flood and drainage management in greater Accra are well aware of the challenges of the local drainage system, but have so far taken little action on mitigating the flood impacts. According to the Hydrological Service Department, no water level and discharge information has been recorded in any of the main rivers of Greater Accra (notably Odaw River and Korle Lagoon) since the early 1990s. Thus, many of the decisions that should be taken to sustainably address flooding (for example, the identification of areas at risk) lack a thorough understanding of the hydrology of Greater Accra.

For example, following the June 2015 floods, many of the existing plans were reviewed and mitigation measures, such as drainage cleaning, were quickly put in place. However, this has not yet been reflected in the long-term planning, operation and maintenance of the drainage system in Greater Accra.

3. Community and Social Protection

A resilient city provides all of its inhabitants, including vulnerable and marginalized people, with equal and fair access to basic services and engagement in the formal economy. The vulnerable and marginalized groups have sufficient capacity and resources to bounce back from shocks and stresses, such as timely alerts and information to make informed decisions and increased awareness of their risk. A resilient city creates opportunities for a thriving civil society that supports the fair representation of society. Support structures such as safety nets and emergency response target all vulnerable sections of the society and effectively deliver their services even in adverse situations.

Sectoral Overview

The Government of Ghana is moving forward in the area of community and social protection. However, even though the poverty rates in GAMA are the lowest when compared to other regions in the country, there are still vulnerable groups—including youth, disabled, elderly, women and the urban poor—that need assistance and the current support system is not adequate. Poverty remains a concern despite its overall decline, particularly in terms of spatial inequality; two districts in the region, Shai Osudoku (55.1 percent) and Ningo Prampram (31.2 percent), have poverty rates more than four times the regional average. [84] There are many social programs that target vulnerable groups and provide different types of services. The main poverty alleviation program is Livelihood Empowerment Against Poverty (LEAP) which consists of cash transfers. There are other programs which aim to increase school attendance, address malnutrition, and provide healthcare, among other objectives. There are good policies at the national level that have to be implemented by individual MMDAs. Overall, however, there is a lack of appropriate funding transferred from the national government for the different social programs. There are good coordination efforts across MMDAs and sectors for the provision of social services, especially for the LEAP program, but coordination is not as strong at the national level. There are efforts to protect vulnerable groups from malaria and cholera outbreaks, as well as initiatives to prevent impacts from floods and address any damages that do occur. However, there is a need for more proactivity as some actions just take place before flooding season, rather than having regular maintenance and monitoring. Prevention and relief efforts for the community have a short-term focus without consideration of how shocks impact individuals in the long term, such as the death of a household's breadwinner and loss of livelihoods. Basic services provision varies depending on the service, but low-income communities are generally affected the most by lack of coverage. Unemployment is also a significant stress as a result of inadequate skill-building. Based on the abovementioned information, the community and social protection sector is not ready to withstand significant impacts and provide for affected residents.

Institutional Set-up

In 2013, the Government established the Ministry of Gender, Children and Social Protection to oversee activities related to community and social protection, especially targeting vulnerable groups such as the disabled, the elderly, children, women, and the urban poor.

[84] Molini, Vasco, and Pierella Paci. 2015.

There are other institutions that are also involved in the provision of social services. The Ministry of Employment and Labour Relations is responsible for promoting job creation, vocational training, and overall economic growth. The National Disaster Management Organization (NADMO) is responsible for providing relief support to communities affected by shocks. There are also other agencies such as the National Health Insurance Authority (NHIA), the National Pension Regulatory Authority (NPRA), and the Ghana Education Service that provide other social services to residents. Most of the agencies have national level programs that are administered by the different MMDAs at the local level and overseen by the Regional Coordinating Council. At the MMDA level, the Social Welfare Agency administers the different social programs and provides services and resources to the vulnerable groups in the MMDA. Furthermore, there are different NGOs and Community-Based Organizations (CBOs) operating in the MMDAs, but there is weak coordination with the government agencies and any joint work is ad hoc.

Policy Context

National Social Protection Strategy (NSPS) (2007): Supports the vision of promoting an all-inclusive and socially empowered society and creating mechanisms for the protection of persons living in extreme poverty and related vulnerability and exclusion.

The policy's specific objectives are: (1) To increase the ability of the extreme poor to meet basic needs through improving access to livelihood opportunities and social protection; (2) To reduce extreme poverty and related vulnerability and exclusion through provision of LEAP Social Grants Programme; and (3) To strengthen the capacity of MMDAs to deliver, monitor and evaluate effective social protection programs.

National Employment Policy (2014): Aims to achieve the inclusion of vulnerable groups to increase their productivity and employability through different mechanisms, including a comprehensive database and labor market information to facilitate policy planning and programming; and protection of children against child labor, provision of alternative income-earning activities for children and their families, and the creation of a database on children at work to facilitate planning and decision-making.

Child and Family Welfare Policy (2014): The Child and Family Welfare Policy seeks to establish a well-structured and coordinated Child and Family Welfare system that promotes the wellbeing of children, prevents abuse and protect children from harm. The overall goal of the Policy is to help formulate child and family welfare programs and activities to more effectively prevent and protect children from all forms of violence, abuse, neglect and exploitation.

Other relevant policy and legal frameworks that support social protection include the following:

- National Health Insurance Act, 2012 (Act 865)
- National Pensions (Amendment) Act, 2014 (Act 883)
- National Pensions Act, 2008 (Act 766)
- The Children's Act, 1998 (Act 560)
- Juvenile Justice Act, 2003 (Act 653)
- Domestic Violence Act, 2007 (Act 732)
- Human Trafficking Act, 2005 (Act 694); and
- Disability Act 715

The major ongoing Government social protection schemes includes the following:

- Social Security and National Insurance Trust (SSNIT): Social Security Scheme established in 1965 to provide three basic benefits: (1) old age pension, (2) invalidity pension and (3) death-survivors payment;
- The National Health Insurance Scheme (NHIS): Established in 2003 to provide basic healthcare services to persons residing in the country, through mutual and private health insurance schemes;
- The Ghana School Feeding Programme (GSFP): Launched in 2005 to achieve the Millennium Development Goal concerning reduction of hunger; and
- The Livelihood Empowerment Against Poverty (LEAP) Social Grant Scheme: Under the Ministry of Gender, Children and Social Protection (MGCSP), is meant to decrease poverty in Ghana. It started as a 5-year-pilot program from 2008 to 2012 but has continued since then. It contains financial support for Orphan/Vulnerable Children, people over 65 years and people with disabilities. It involves conditional and unconditional monthly cash transfers. The cash transfers are funded from GoG budget and support from Development Partners like the World Bank, UNICEF, ILO and the Government of Brazil.

Other Government programs include:

(1) Capitation Grant (Primary and Secondary Education); (2) Social Welfare Programs; (3) Supplementary Feeding Programs; (4) Youth Employment Program; (5) Free antenatal care services; (6) Scholarships for brilliant but needy children; (7) Integrated Agricultural Support Program; (8) Microfinance Schemes; and (9) Emergency Management Schemes

The main current donor-funded social protection projects are presented in Table 18.

Table 18: Ongoing/Planned Projects and Programs—Social Protection Sector

Type/Name of Project	Details or Program Components	Sponsor	Primary Government Counterpart	Budget	Time Period	Beneficiary MMDA/ Beneficiary MMDA
Ghana Social Opportunities Project	Social protection; cash transfers	World Bank	MoF, MGCSP	US$88.6m	2010–2017	All MMDAs
Ghana Social Opportunities Project	Social protection; cash transfers	World Bank	MoF, MGCSP	US$50m	2014–2017	All MMDAs
Ghana—Maternal, Child Health and Nutrition Project	Community-based health and nutrition services for women of reproductive age, especially pregnant women, and children under 2 years old.	World Bank	MoF, MoH	US$73m	2014–2020	All MMDAs

Qualities of Resilience

Robustness

Flood prevention and response, as it relates to impacts on the community, is still inadequate, especially for vulnerable groups such as the poor. There is a need to be more proactive. The assessment of structures in risky areas is critical but is only done just before the rainy season. Given the complexity of moving people to a safe area, the assessments should be done on a more regular basis. Whenever a house is located in a risky area, NADMO requests the occupants to move to a different area, without compensation. If they do not comply with the request to move, the structure eventually gets demolished and the owner/occupier get charged with the cost of demolition. Moreover, people nonetheless return to be close to their livelihoods in the vulnerable areas. The response initiatives whenever there are shocks are also solely focused on relief support in the short term. NADMO works with MMDAs to provide shelter and other necessities to affected citizens, but there is no attention to alleviating long term disruptions such as the loss of livelihoods.

GAMA has a system in place to deal with outbreaks of malaria and cholera to assist residents. On the preventive side, there is quarterly fumigation before the rainy season. Citizens can also report concerns and issues to their designated representative in the Assembly, who then goes to the MMDA for follow-up.

Coordination

The different agencies involved in the provision of social services at the MMDA level are somewhat coordinated but this could be improved. There are meetings across sectors for information sharing that take place on a monthly and quarterly basis, depending on the subjects discussed and the participating agencies. The different social agencies do try to share information on the social program beneficiaries to prevent people from taking advantage of welfare programs. Social welfare officers from different MMDAs get together on a quarterly basis, especially to discuss the LEAP Program. Coordination appears to be weaker at the national level.

The Government does not effectively coordinate the provision of services with informal structures, such as family and community networks, and other non-government organizations, despite the fact that they operate widely in GAMA and are a strong support system for many.

Inclusiveness

At the district level, there is strong community consultation on issues of urban planning as instituted by the Ministry of Local Governments and Rural Development. There are boards for dissemination of important information and a radio station that communicates issues of concern. Nonetheless, the extent and level of engagement beyond the urban planning stage is unclear, as is whether there is accountability in project implementation. The TMA has a website with information on all their social programs, which is something that is worth replicating in other MMDAs.

Social services have ineffective targeting mechanisms and not everyone is getting the same quality of services across the MMDAs. While formal residents registered in each MMDA in GAMA are targeted for the provision of social services, there are no resources for those living in informality, such as unregistered

migrants. Provision of social services in GAMA is more about equality than equity. In terms of access to basic services, there are different rates of coverage depending on the service. For example, the amount of water supplied has increased although coverage is still lagging behind urban growth. Sanitation services as mentioned earlier are weak. Low-income and informal communities are the most affected by lack of provision of basic services and they also often experience overcrowding.

As Accra continues to be an engine of economic growth, the housing prices will progressively increase, especially in the middle of the city. As a result, many people are settling on the outskirts of the cities, including elderly people who have lived in Accra for a long time but who cannot afford the prices in the city with the pension they receive. This also encourages informal settlements, including in dangerous areas, of people who want to remain close to their livelihoods. The horizontal expansion of the city requires more people to commute to the city for work, which in turn creates traffic congestion, another stress that was reported by representatives from the sector.

Redundancy

There are multiple programs for the vulnerable as described above: LEAP, Disability Fund, Education and Uniforms for all children, among others. Ghana also has a strong informal network of families and community members that support the vulnerable when the government cannot provide for them. However, the redundant capacity is already strained; the sector is too reliant on the national government and whenever the transfers to the local government are delayed, the MMDAs are unable to provide social services to their citizens. The level of funding that the local government gets from the central government for social programs is two percent of the common fund; the actual amount is difficult to predict. Furthermore, the funding that is transferred is usually earmarked for specific programs, meaning that there is no flexibility for MMDAs to move funding from one program to another whenever there is a mismatch between demand and supply. MMDAs also depend solely on the national government for census-related data which feeds into their social programs. There are no proactive data-gathering initiatives at the local level.

Outbreaks of diseases are a challenge because when people get sick, they are unable to go to work which affects their income. The death of a household's breadwinner was reported as a stress by the community and social protection sector. GAMA has funding allocated to provide free essential medicine and vaccines to people such as for malaria, but as mentioned, funding is too dependent on the national government and the initiatives get disrupted whenever funding does not come through.

Reflectiveness

The MMDAs do try to gather data on past disasters to use it for future planning, however, it is unclear how effectively the lessons are actually incorporated. Additionally, the MMDAs inform people about the hazards that affect them and coping mechanisms but this is done on an ad-hoc basis.

The different social programs carry out background checks to determine eligibility. However, there is no ongoing monitoring of the recipients and no exit strategy to make sure that people are not perpetually benefitting from the system.

The educational system is not preparing students for jobs. Participants in the consultations reported that the material that is taught at academic institutions is too theoretical so when graduates enter the labor force, they need to develop skills that should be learned at school. This discourages employers from hiring recent graduates, which exacerbates the problem of youth unemployment. The lack of employment among youth is presumed to be leading to an increase in social vices such as armed robbery, prostitution, substance abuse, and cybercrimes. There is an employment agency called 'National Labor Services', however, its efficiency and effectiveness is questionable.

There are some good practices to try to prevent flooding and any impacts on communities. For example, assemblies have ongoing weekly sensitization programs about preparing for the rainy season and potential flooding. As the rainy season approaches, the programs are intensified, particularly in flood prone areas. MMDAs also check in on new settlements to make sure they are complying with basic safety features.

4. Conclusion

There have been many improvements in the individual sectors analyzed as part of the CityStrength exercise, and GAMA is taking the necessary steps to harness urbanization and create opportunities to lift many out of poverty and boost shared prosperity. Despite the many improvements made thus far, GAMA still has the opportunity to improve individual sectors' performance and contribute to enhanced resilience at the city level. Several issues identified as priority areas were found to be challenges common to multiple sectors and crossing jurisdictional lines of the 16 MMDA. But coordination remains a challenge as there is no institution in charge of metropolitan management. For instance, addressing constant flooding will require MMDAs to work together on cross-sectoral collaboration (i.e. transport, solid waste, and drainage). GAMA can leverage current efforts by the government to create Joint Development Planning Areas and position the GAMA area as a candidate for it.

There are existing mandates at the national level that respond to the call for increased resilience. For example, MMDAs have been tasked with incorporating disaster risk management and climate change adaptation into their medium-term development plans, which has implications for land use and structural plans. Nonetheless, there remains an overall lack of financial and technical capacity (e.g. engineers) to turn these mandates into practice.

GAMA will also benefit from a long-term vision for the development of the sectors that takes shocks and stresses into account as well as the future effects of climate change. As of now, the approach to shocks and stresses has been reactive, focusing on relief and emergency response, rather than taking a proactive approach of prevention and mitigation.

Urbanization has remained ahead of planning as a result of weak implementation capacity whenever plans are prepared. This has resulted in high levels of informality and location of settlements in dangerous areas. Furthermore, planning currently does not effectively integrate risk considerations. Contingency finance is also needed to prevent the diversion of funding from maintenance functions to shock response.

The provision of basic services varies depending on the service and MMDA, but it is generally inadequate, especially sanitation services, and has implications for the resilience of the city. For example, inadequate transport options and the collection and disposal of waste exacerbates traffic congestion, public health concerns, and flooding as a result of clogged drains. Improved sectoral performance is also going to require behavioral changes by residents who are unaware of the vulnerabilities or how their behavior puts others at risk and compromises the resilience of the city. This also relates to the inadequate disposal of solid waste which exacerbates flooding. GAMA is committed to the resilience agenda, and is addressing many of these challenges through investment in infrastructure, revisions of land use and structural plans, and capacity building.

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IV. PRIORITY ACTIONS AND INVESTMENTS IN GAMA

Strengthening urban resilience in a transforming metropolitan economy and society needs to adopt a multi- sectoral and multi-disciplinary approach in planning and implementation. In the GAMA region, because of the many local entities involved, the process must also be inter-jurisdictional. This chapter presents priority actions and investments that highlight GAMA's most pressing needs and recommended actions and investments to enhance resilience across the region's scale and sectors. These recommendations are based on the detailed sectoral and MMDA level priorities identified during different CityStrength diagnostics workshops. Recommendations were first made by the sectors and clusters of MMDAs, and then validated during various CityStrength Diagnostic workshops.

1. Key Shifts in Planning and Response

The lack of institutional coordination around urban resilience has hindered concerted efforts to address the range of shocks and stresses confronting GAMA. Moreover, in the absence of agreed proactive measures, emergency management has largely focused on response rather than reduction of underlying risks. If risk mitigation measures are not addressed urgently, trends suggests that the GAMA will see increasing shocks and stresses – more so, under the expected impacts of climate change – with potentially debilitating effects on the vibrancy of the region.

In recent years, there has been a high-level commitment from the Government of Ghana to shift the national agenda for disaster management from response to prevention and risk Reduction. The development of the Ghana Plan of Action on Disaster Risk Reduction by NADMO, with technical and financial assistance from UNDP and the World Bank, respectively, constitutes a milestone in this process. Similarly, the Community Resilience through Early Warning (CREW) project [85] aims to build capacities within the country to reduce disaster risk by putting in place an integrated early warning system that is both scientific and people-centered. However, planning efforts have been largely centralized and not effectively integrated with the local governmental planning processes and management efforts. While there is a national disaster management plan, GAMA MMDAs do not have disaster management plans of their own and there are no special funds for

[85] The CREW project is being implemented by NADMO, with technical and financial support from UNDP and the Norwegian Government, respectively, and by the Floods Early Warning Systems (FEWs) Project being implemented by the Water Resources Commission.

planning and disaster management at the local government levels. Recently there have been attempts to mainstream DRR and Climate Change Adaptation (CCA) measures into MMDA development planning. Disaster risks, disaster preparedness and disaster reduction issues, programs, plans and strategies are now required to be integrated into the MMDAs' Medium-Term Development Plans, and form part of the FOAT assessments of MMDAs. These initiatives ought to be strengthened and institutionalized at the local level, and indeed at all levels of the governance structure.

The path to enhanced resilience in GAMA therefore requires multi-level, multi-sectoral and inter-jurisdictional coordination and harmonization of planning and investment interventions among the many actors. The current statutory roles of the Greater Accra Regional Coordinating Council (RCC) (a deconcentrated arm of the national government, which oversees the GAMA region) and NADMO is limited and not capable of providing the leadership and coordination needed.

A new institutional framework is needed for integrated planning and collaboration. It should include a regional planning entity, providing a forum for the discussion and study of GAMA-wide problems and have the capacity and statutory authority to drive the development of policies, plans and action for their resolution. The new framework and entity should come to the table to convene a broad perspective on the needs of the local governments, the opportunities for cross-sectoral policy coordination and implementation (across land use, transportation, disaster risk reduction and management, solid waste and drainage management), and the quality of life and resilience issues that influence local governments in their decision-making.

2. Short-, Medium- and Long-Term Priorities

GAMA's rapid urbanization over the past three decades has been momentous, coinciding with rapid regional GDP growth and significant improvements in many human development indices. However, as has been revealed by the CityStrength diagnostic exercise, the lack of adequate planning and preparation to accommodate the rapid increases in human population and uncontrolled spatial expansion has left GAMA exposed to many shocks (flooding, fire outbreak, disease outbreak, and tidal surge—with associated coastal erosion) and a wide range of stresses (urban sprawl, housing shortage, proliferation of informality, traffic congestion, poor solid and liquid waste management, excessive unemployment, and land/chieftaincy conflicts). The trajectory of population and economic growth suggests that GAMA's rapid urbanization is expected to continue over the coming decades. If not properly managed, urbanization could worsen the existing shocks and stresses and even lead to new ones with potentially devastating effects on the GAMA environment and quality of life for its residents.

Improving GAMA's resilience will require purposeful actions and investments, including i) concerted efforts and commitment to long range integrated spatial planning for effective urban development and management; ii) improvement of strategic infrastructure and basic services delivery to address deficiencies and build capacity for future demands; iii) adoption of collaborative mechanisms to facilitate joint planning, financing and implementation management of GAMA-wide resilience building initiatives and projects; and iv) addressing weak

institutional capacity, community education on civic responsibility, and the enforcement of codes and regulations.

Informed by the discussions with participants in the CityStrength diagnostics, assessments of the many World Bank sectoral specialists, and the findings and recommendations discussed in previous sections, the following key four objectives/themes have been identified to strengthen GAMA resilience:

A. **Improve Metropolitan Planning and Coordination.** Effective metropolitan governance will engender a long-term vision for the region with effective urban and land use planning, including risk management. Emphasis should be given to key factors for urban resilience such as land management, information systems, and provision of infrastructure. Based on the findings of Metropolitan Management in Greater Accra Technical Assistance, the National Development Planning (System) Act, 1994 (Act 480) endorses the establishment of a designated contiguous area as a Joint Development Planning Area (JDPA) with a Joint Development Planning Board (JDPB) to formulate and supervise the implementation of development plans for that area. Therefore, the designation of a JDPA encompassing GAMA, and the establishment of a JDPB, are urgent preconditions to enhance planning and coordination as well as to create a Joint Development Plan. The Government should also expedite implementation of the new Land Use and Spatial Planning Act, 2016 (Act 925) and new three-tier Planning Model. The Model provides a framework and process for preparing comprehensive spatial development and structural plans for all MMDAs, sub-regions, and regions in Ghana. The Act also requires upgrading of existing community development plans and can leverage current efforts, such as the preparation of a Greater Accra Regional Spatial Development Framework and an Integrated Sanitation and Drainage Master Plan. Increased coordination will be key, along with capacity-building of staff responsible for designing and implementing strategic plans.

B. **Integrate Urban Flood and Coastal Zone Management.** GAMA needs urban systems that can handle floods and sea level rise in the context of climate change. Quick wins include finalizing the GAMA-wide Drainage and Flood Control Master Plan and updating existing plans for incorporation into current spatial development strategies and land use plans.

Drainage and flood control infrastructure and management systems should be improved. This can be done by:

1. mapping and demarcating floodplains and buffer zones of all drainage ways and enforcing existing regulations;

2. improving coordination between agencies (Hydrological Services Department, Ghana Highway Authority, Department of Urban Roads, and Department of Feeder Roads) and the 16 MMDAs in GAMA that are responsible for drainage works, operation, and maintenance; and

3. a substantial increase in the daily operation and maintenance budgets for the drainage system and hydraulic infrastructure at MMDA level, and not just on an emergency basis.

Also on the preparedness side, GAMA should identify and secure areas to increase water retention capacity and reduce runoff as well as develop green areas on floodplains. Adequate collection and disposal of solid waste, especially in densely populated areas, will prevent clogged drains that worsen flooding. This includes closer coordination between the private and informal sectors to reach all areas of the city and educating the public about proper solid waste disposal. Moreover, significant investment is needed to address the shortfall in engineered and appropriately operated waste transfer and disposal capacity.

C. **Enhance Resilience in Vulnerable Communities.** Disasters have the greatest impact on vulnerable communities, which also have the least access to urban services and infrastructure. Many vulnerable communities are located in low-lying areas particularly susceptible to floods, or are more exposed than other areas to cholera and malaria, or to crime and violence. Because the entire region is so closely linked together, these problems often spread beyond the vulnerable communities, and thus are of region-wide concern. As a priority, GAMA needs to identify vulnerable settlements so investment can be focused in the most exposed places. This key information can feed into a comprehensive urban upgrading and redevelopment strategy, which needs to be integrated with local economic development initiatives and any existing development plans. Close coordination with the Regional Coordinating Council and social protection agencies will enable the collection of important information about conditions on the ground.

D. **Improve Disaster Preparedness and Response to multi-hazards.** A good understanding of the risks facing the GAMA regionis essential for fulfilling the MMDAs' mandate to plan, mainstream,

and implement evidence-based disaster and climate risk management actions. This includes information on future climate change impacts such as sea level rise. Thus, a priority must be conducting comprehensive and detailed risk assessments for the region. The MMDAs should regularly collect data to ensure that strategies are up-to-date and effective. For example, the current sea defense wall intended to remediate tidal surges is having negative effects in some MMDAs. The information gathered in the assessment can guide preparedness actions, including stronger early warning systems, especially for the poorest and most vulnerable part of the population. A disaster risk management and climate change adaptation coordinating entity at the metropolitan (GAMA-wide) level can work jointly with NADMO to help implement policies and mandates at the MMDA level. Dedicated ressources and adequate staff and equipment will be key to implementing these preparedness and response recommendations.

The next sections describe detailed priority actions and investments identified to meet the above objectives. These recommendations are based on the detailed sectoral and citywide priorities identified during different CityStrength diagnostics workshops.

A. Improved Metropolitan Planning and Coordination

i) Objective

The objective is to improve urban resilience in GAMA through enhanced planning and coordination with particular emphasis on key factors for urban resilience such as land, information systems, and provision of infrastructure.

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ii) Rationale

Planning and coordination across the GAMA region is limited and fragmented with serious repercussions for service delivery and land management. The current institutional setup, with 16 individual MMDAs and several institutions involved in spectral interventions, leads to high risk of duplication and inefficiencies. Moreover, the existing planning instruments are not updated and do not reflect the reality on the ground, with negative impacts on both existing built up areas and green field sites, as well as on critical areas next to river beds and in core zones. The passing of new legal instruments for land use and spatial planning and for the creation of JDBPs create new opportunities

iii) Short-Term Actions

1) **Expedite modalities for implementation of the new Land Use and Spatial Planning Act, 2016 (Act 925) and new three-tier Planning Model** which provides a framework and process for preparation of comprehensive spatial development plans for all MMDAs, sub-regions and regions in Ghana. This recommendation requires the preparation of structure plans for all urban areas to guide future development, and redevelopment and upgrading of existing communities (including slum areas). In this direction, the following specific actions are required:

    a. Expedite preparation of subsidiary legislation and other modalities to implement Act 925.

    b. Invest in comprehensive update of land use plans (including the 1991 Master Plan), sector plans, using all available satellite imagery and procuring additional as necessary, and/or develop new, land use and spatial development plans for all MMDAs and GAMA region in accordance with Act 925. In this regard, take advantage of the ongoing preparation of Greater Accra Regional Spatial Development Framework (under LAP 2, LUSPA—World Bank) and ongoing drafting of Integrated Sanitation and Drainage Master Plan (under GAMA project, MLGRD—World Bank) to set in motion processes for review of existing plans and preparation of new plans for the respective MMDAs and the entire GAMA region.

    c. Devise and operationalize clear modalities to ensure the active participation of traditional authorities and other stakeholders in plan formulation and implementation.

2) **Designate the GAMA region as a Joint Development Planning Area (JDPA) and constitute and resource a GAMA Joint Development Planning Board (JDPB)** in accordance with provisions of the National Development Planning (System) Act 1994 (Act 480), to engender joint planning, harmonization, financing and coordination of development interventions within the GAMA region. It would take a combination of concerted investments in physical infrastructure, improved spatial planning and urban management, enforcement of building regulations and environmental bylaws and behavioral change interventions to address the underlying risks of disaster in GAMA. Therefore, effectively coordinated integrated land use and infrastructure planning and management is at the root of enhancing the resilience of the GAMA region. The designation of a JDPA and JDPB is the vehicle to make this happen.

3) **Create a consolidated repository/ observatory for maps, spatial data, and land use data at one institution** (e.g., LUSPA, Lands Commission or the Center for Remote Sensing and Geographic Information Systems (CERSGIS))—building on the existing frameworks including the Land Use Planning and Management Information System (LUPMIS) at LUSPA, and the Ghana Enterprise Land Information System (GELIS) at Lands Commission or CERSGIS's database).

4) **Address the human resource gaps at the local planning level** by leveraging the LUSPA planners in a consolidated manner across the 16 MMDAS to improve the technical capacity and coordination for planning and enforcement of spatial planning and building regulations, as well as operation and maintenance of urban management systems.

iv) Medium-Long Term Actions

1) **Implement the GAMA Regional Spatial Development Framework (when completed) and the consolidated Sanitation and Drainage Master Plan** when completed (under GAMA project) – and ensure correlation of the two plans across GAMA

2) **Continue to address the weak institutional capacities of MMDAs** by: expediting the completion of the ongoing decentralization reforms, especially strengthening sub-district structures of local governance; improving the technical capacity and coordination (LGSS to carryout mapping exercise to identify gaps in existing structures and personnel resources) among responsible MDA and MMDAs for planning and enforcement of spatial planning and building regulations as well as operation and maintenance of urban management systems; and devising and implementing a public education strategy that will engender behavioral change by instilling good civic responsibilities into GAMA communities.

3) **Implement innovative and sustainable measures to improve municipal finance** by: expediting completion of outstanding processes to pass the Municipal Finance Bill into law; completion of comprehensive street naming and property addressing to establish electronic, GIS-based database of properties and infrastructure within all MMDAs to aid with revenue planning and collection (expansion of property rates through regular valuation exercise, etc.); considering the establishment of community facility districts or assessment districts to enhance mobilization of funds for infrastructure development and operation and management; institute mechanisms to further develop public-private partnerships (PPP) to access private funding for provision of infrastructure and services; and rationalizing the intergovernmental fiscal framework, including completing the ongoing decentralization reforms, especially fiscal decentralization.

4) **Continue data gathering and management at the central repository for planning purposes, and integrate with accurate data gathering at the MMDA lev**el to facilitate better planning and provision of urban services. The MMDAs are best suited to carry out ongoing data gathering in their respective MMDAs to assess needs in all sectors.

5) **Institute a GAMA-wide "Waste Management Authority"** (under or affiliated with the aforementioned JDPB). This entity

will ensure effective GAMA-wide coordination on waste management initiatives. This will require political leadership and close partnership among the different jurisdictions in the city but there is clearly a need for close co-ordination in developing treatment and disposal capacity. There are also significant economies of scale associated with MMDAs working together to deliver this infrastructure. Responsibility for waste collection services would remain with MMDAs as collection is less capital intensive, and MMDAs are best suited to developing locally appropriate approaches.

6) **Improve regulatory framework for urban transport and empower MMDAs to fulfill their existing regulatory mandate under Act 462 to address traffic congestion in GAMA.** Measures to be taken include: Implementing mass, well-regulated public transportation (including bus rapid transit); construction of pedestrian bridges, crossings and sidewalks at strategic locations to minimize vehicular-pedestrian conflicts and facilitate smooth flow of vehicular traffic; enforcement of regulations on street hawking and operations of taxis, trotros and motorcycles to address rampant indiscipline on GAMA roads which contributes to congestion on the roads. In this regard, leverage the momentum generated by the passage of bylaws by eleven Assemblies and their setting up of Urban Passenger Transport Units (UPTU) to provide the framework for planning and regulating urban passenger transportation, and the recent collaboration of the Assemblies in GAMA in setting up of a Greater Accra Passenger Transport Executive (GAPTE) to plan and regulate cross jurisdictional travel (more than 70 percent of total trips) in the GAMA area.

7) **Modernize and improve the coordination of traffic signals in the GAMA region to reduce intersection bottlenecks** which contributes to the traffic congestion problem within the metropolis. Install power backups and Light Emitting Diodes (LED) technology for traffic signals to ensure uninterrupted operation and reduced energy consumption. This will reduce the incidence of vehicular conflict at key intersections and improve the safety of pedestrians at the junction crossings.

8) **Develop, rehabilitate and modernize the rail-based mass transport system** to complement and interlink with the road-based mass transport system by: rehabilitating the sub-urban railway lines (including, Accra–Nsawam, Accra–Achimota, Achimota–Asoprochona); completing construction of additional railway stations with adequate provision of parking along all routes, and interlink to other modes of transport in the city; undertaking feasibility study for the possible introduction of Tram services in the GAMA region; and increasing the number and quality of coaches on the route and frequency of service to make rail transport an attractive option within the Metropolis. In furtherance of this, accelerate development and implementation of a Railway Master Plan for GAMA, working in collaboration with Ghana Railway Development Authority (GRDA).

9) **Develop and implement a comprehensive and integrated Transport Master Plan for GAMA** (incorporating motorized and non-motorized transport facilities – coordinated with developments in low-income settlements) – in full integration with existing Drainage and Sanitation Master Plan.

10) **Develop and implement a strategy for improved agriculture production based on land use planning** to create economic, employment opportunities and food security and allow for use of green field areas in vulnerable basins to be protected.

B. Adopt an Integrated Urban Flood and Coastal Zone Management Plan

i) Objective

The objective is to ensure the GAMA region is prepared to handle floods and sea level rise in the context of climate change with urban systems that work, reducing the risk exposure to these shocks.

ii) Rationale

Drainage and coastal zone management are intrinsically linked to the larger management of water resources in all of its dimensions. This stretches from the management of storm runoff, management of natural drainage systems and their riparian zones, and management of coastal wetlands and coastal zones in general. The coastal zone of GAMA is also primarily a high-energy environment and has some lowlands, which are prone to flooding. The coastal zone is home to about 20 million people, 25 percent of the nation's total population, and a place where about 70 percent of industries and businesses are located. The drainage and coastal zone management system in Greater Accra is not only highly vulnerable, but also a key entry point for sustainably managing floods in Greater Accra from an infrastructure perspective.

iii) Short-Term Actions

1) **Finalize the comprehensive cross-jurisdictional (GAMA-wide) Drainage and Flood Control Master Plan** or update the existing master plan and ensure incorporation of same into any spatial development strategy and land use plans for the respective MMDAs. Further improve the drainage and flood control infrastructure and management systems by: mapping and demarcating floodplains and buffer zones of all drainage ways and enforcing existing regulations consistent with the national riparian buffer zone policy and local government development regulations; improve coordination between responsible MDAs (HSD, Ghana Highway Authority, Department of Urban Roads) and the 16 MMDAs in GAMA to jointly implement drainage works, operation and maintenance; collecting basic information needed for system planning and enhancement, including (i) the creation of an accurate digital elevation model for GAMA, (ii) bathymetric surveys, (iii) mapping soil infiltration characteristics, (iv) updating land use information, and (v) updating statistics on short rainfall events and tidal conditions and developing rainfall-runoff models for the sub-basins.

2) **Allocate appropriate resources to adequately and routinely maintain the hydraulic infrastructure** (not just as emergency response after floods). This would facilitate undertaking substantial infrastructure investments in the drainage system, including dredging of the major lagoons and drainage basins of GAMA, constructing retention basins, lining of channels, installing sand traps and other infrastructure in accordance with the existing drainage master plans (1991 Drainage Master Plan prepared by Mott MacDonald and Watertech and the new drainage master plan updated under the GAMA Sanitation project) that delineate the required drainage infrastructure. A substantial increase of

the operation and maintenance budget for the drainage system at the level of MMDAs and HSD and WRC is required to ensure that drainage and desilting work can be conducted regularly and not just on an emergency basis.

3) **Identify and secure areas to increase retention capacity and reduce runoff, and to develop green areas on floodplains.** Upstream, the retention capacity and measures to reduce the sediment load (notably sand traps) are of primary importance to ensure that peak flows can be reduced and sedimentation in the lagoons and drainage basins are reduced. Securing land and constructing retention basins upstream is an urgent priority going forward, as areas identified in the 1991 Drainage Master Plan for the upstream construction of flood retention basins have to some extent already been built up and require the search, securing of land and coordination to ensure that these areas remain free for the construction of retention basins. This will require enforcement but also alternative land use (such as parks) to avoid future encroachment.

4) **Protect raw water sources and implement drainage basin plans and riparian and coastal buffer zone policies**. Expand water sources, including the utilization of ground water and rain harvesting; and develop programs to monitor and potentially recharge the aquifers protecting them from sea water intrusion. Additionally, implement continuous communication and public education on water conservation and management.

5) I**mprove solid waste management (in critical areas)**. At present, there is a significant short-fall in the availability of engineered and appropriately operated waste disposal capacity. Also, due to the long distances between many parts of the city and disposal locations, an effective network of waste transfer stations is needed to reduce travel time and increase the cost and time efficiency of waste transfer activities. The MLGRD has developed an Emergency Solid Waste Management Improvement Program (E-SWIMP) to address these issues. This plan should be refined to suit the exigencies of the GAMA region and implemented urgently. There is the need to formulate a recycling strategy and modalities to appropriately integrate the informal and formal sectors in waste management. The informal sector is very active providing waste collection and recycling services in the city. However, with some exceptions, the informal sector is working in competition with the formal sector. By engaging informal sector representatives (e.g. the Ghana Bola Taxi Union) there is an excellent opportunity to maximize the skills and resources of the informal sector to address the current gaps in waste collection service provision.

iv) Medium-Long Term Actions

1) **Implement urgent actions in the Drainage Master Plan** when completed. Implement Plan investments GAMA-wide.

2) **Integrate land use planning and risk management mapping in the urban design as a tool to prevent flooding**, including transport and housing policies and programs to be coordinated with flood and coastal zone management. It is important to improve coordination for the planning and enforcement of spatial planning and building regulations. Therefore early involvement of WRC, HSD, and DUR in the spatial planning and zoning process at the level of MMDAs is required. An overall coordination mechanism is needed, either as a separate institution or

close coordination mechanism for existing MDAs and MMDAs, to better address drainage issues in the GAMA region. This would allow coordination and implementation of drainage planning in GAMA "under one roof".

3) **Improve solid (and liquid) waste collection and disposal capacity for the entire GAMA region** including the formal and informal sectors. It is important to optimize collection and treatment of solid waste transfer stations to increase the handling capacity to support the existing final disposal sites (landfills, etc.). This should include mainstreaming waste recycling and material recovery in waste management operations.

4) **Increase drainage infrastructure capacity.** Drainage infrastructure improvements should start with increasing the drainage capacity of the primary drainage system, followed by secondary and tertiary systems.

5) **Identify and implement erosion control measures in GAMA's coastal area.** Implement Coastal Protection Plans using non-structural measures, preferably "green infrastructure" as measures for erosion control in all of GAMA's coastal areas.

C. Enhance Resilience in Vulnerable Communities

i) Objective

The objective is to ensure that poor and vulnerable communities are protected against a variety of shocks and stresses, and have adequate access to urban services and infrastructure.

ii) Rationale

GAMA urban services are susceptible to several shocks and stresses, with the poor and vulnerable communities the worst-affected during disasters. The MMDAs are faced with decisions about the types and locations of infrastructure, services, and buildings to optimize the overall resilience of the GAMA region. How the MMDAs manage and support the poorest and most vulnerable groups will greatly affect the overall resilience of Ghana's marginalized communities as well as the MMDAs more broadly. Purposeful investments in urban services and infrastructure in vulnerable and disaster prone communities will also improve the resilience of the region.

iii) Short Term Actions

1) **Identify vulnerable settlements/ communities in GAMA.** Many informal settlements are located within the low-lying areas of the region and are worst affected during disasters, especially floods. There are no systematic studies, however, on the concentration of poor people in hazard prone areas, or how disasters such as flooding affect poor people. A study that systematically profiles areas exposed to hazards will aid in better targeting resources to support poor households. The MMDAs should do this in coordination with the Regional Coordinating Council as it will allow them to better understand the condition of the vulnerable communities in their MMDA. This should also include a stocktaking exercise of all the ongoing social protection programs to understand the current and future needs based on trends, current and projected population, and current and projected exposure to risks.

2) **Formulate a comprehensive slum upgrading and redevelopment strategy**, including a program to address main vulnerabilities of poor or informal settlements (e.g, housing and services) building on the experiences and lessons from

the existing urban upgrading initiatives. The strategy and programs must be integrated with local economic development (LED) strategies and programs, and must be coordinated with and be consistent with any spatial development plan for the GAMA region or its constituent MMDAs.

iv) Medium-Long Term Actions

1) **Formulate an inclusive GAMA-wide housing strategy (coordinated with land use and infrastructure plans)**, and ensure incorporation of same into any spatial development plans of the respective MMDAs. The housing strategy and plan must be consistent with the provisions of the National Housing Policy and the National Urban Policy.

2) **Incorporate skill building initiatives, job generating activities, and an exit strategy for social protection programs**. The MMDAs have a good system in place to register people in social welfare programs. This initiative should be complemented with a good exit strategy to make sure that people are not perpetually benefiting from the welfare system. Therefore, skill-building initiatives should be incorporated to provide people with the tools to become self-sufficient. The exit strategy would lay out a plan to get people out of the system as soon as possible. This should include targeted interventions and innovative mechanisms to help vulnerable groups.

3) **Implement a program to address main vulnerabilities of poor or informal settlements (e.g., housing and services)**. Improve access to basic services (including water, sanitation, solid waste collection, transport, and drainage) in low-income, vulnerable communities by ensuring provision of adequate, critically needed infrastructure and services, and making available appropriate financing mechanisms for households to access credit for construction of own facilities where possible. Improve the human resource and technical capacity and coordination among responsible MDAs and MMDAs for operation and maintenance of basic infrastructure and services.

4) **Address deficiencies in land management and housing provision by decentralizing land registration to the MMDA level and scaling up the successful pilot projects under the land administration project**. Data on land registration is centralized at the Lands Commission (in Client Services and Access Units (CSAU) and the Ghana Enterprise Land Information Systems (GELIS) under LAP 2) and should be decentralized at the MMDA levels. Measures should be introduced to instill more transparency in the local planning system, including online publishing of structure and local plans, and other measures to ensure public accessibility to aid with compliance.

D. Improve Disaster Preparedness and Response

i) Objective

The objective is to improve preparedness to multi-hazards in GAMA, including better understanding of hazards and climate impacts, strengthened disaster warning and response, and support for post-disaster recovery and reconstruction.

ii) Rationale

The MMDAs do not have a dedicated budget or staff to plan, mainstream, and implement disaster and climate risk management actions (as mandated by National Planning Development

Act, 1994 (Act 480)). A comprehensive and detailed risk assessment is needed to develop a disaster risk mitigation and preparedness action plan. Flood and other disaster warning systems need to be strengthened at GAMA level, with adequate community preparedness, especially for the most poor and vulnerable. MMDAs lack adequate equipment and resources to respond to fire or take fire safety measures, especially in tall buildings and informal markets. And in some MMDAs, the installed Sea Defense wall is exacerbating tidal surges in nearby communities (e.g., the Keta Sea Defence wall affecting the community of Blekusu in the Volta Region). Better understanding of future sea level rise and mitigation options is needed.

iii) Short Term Actions

1) **Undertake a detailed multi-hazard risk assessment for GAMA** and establish a risk information system at GAMA level to be shared with MMDAs. It is highly important to continually understand what and where are the risks, in order to rationally allocate resources. This includes the following:

    a. Generation and analysis of hazard and risk Information: This will focus on understanding risks and on generating hazard information and the development of risk analysis tools at national and local levels. It will also include relevant climate and disaster risk assessment and modeling.

    b. Seismic and flood hazard monitoring instruments and stations: A systematic diagnostic could be carried out to identify gaps in earthquake and flood monitoring capacity (e.g., seismometers, flood gauges) to generate a prioritized action plan for developing a network of seismic and flood hazard monitoring stations.

    c. Undertake climate and disaster risk assessment to plan for risk mitigation and emergency preparedness.

2) **Assess flood and coastal surge prediction, warning and response system**. An immediate assessment of the existing flood and coastal surge prediction, warning and response system is warranted as a basis for the formulation of a more robust system that responds to the particularities of GAMA. Investments in accurate prediction, warning and response systems would greatly enhance the resilience of GAMA to shocks and stresses as it could help avoid or minimize the losses associated with them.

3) **Develop early warning and response plans for most vulnerable communities**. To better prepare for disasters (including flooding), the MMDAs need to establish or build on existing early warning systems (e.g., CREW and FEWS), linking them with Ghana Meteorological Agency and NADMO. Flood preparedness plans need to be developed as a part of GAMA-level contingency plans and linked with preparedness activities at the community levels (especially those at high risk).

4) **Identify actions for improved fire response and preparedness and cholera/ health-related outbreaks**. A thorough understanding of the causes of the many fires and seasonal cholera outbreaks is required to formulate and operationalize specific actions and interventions aimed at improving response and preparedness for these shocks. This will also enable proper budgeting and allocation of resources which also contributes to improved preparedness and assures adequate response.

5) **Establish a disaster risk management and climate change adaptation coordinating entity across MMDAs at the GAMA level, with additional budget and staff in the MMDAs** (Act 480, 1994). This is to complement the efforts of NADMO at the various administrative levels. The MMDA coordinating units will work with the respective MMDAs to mainstream DRM and CCA implementation measures into MMDA development plans, programs and projects. The joint GAMA-level coordinating disaster risk management entity can operate under the umbrella arrangement of the Joint Development Planning Board or be affiliated to it once it is constituted.

iv) Medium-Long Term Actions

1) **Strengthen/implement flood and coastal surge warning systems**. Implement early warning and response plans for the most vulnerable communities.

2) **Implement actions for improved fire response and preparedness and cholera/ health-related outbreaks**. In the medium-long term, all the planning and preparatory works undertaken in the short-term with respect to response and preparedness to these shocks must be mainstreamed at the relevant levels.

3) **Develop and Implement flood and coastal zone management plans**. Informed by the many studies and planning undertaken in the short-term, comprehensive flood and coastal zone management plans should be formulated and operationalised in the medium-long term.

4) **Develop/ Implement MMDA-level DRM plans and allocate contingency budget**. Building on the short-term actions of coordinated GAMA-level assessments and planning efforts, all MMDAs must develop and implement jurisdiction level DRM plans and allocate contingency budgets for implementation of the plan. The new NADMO Act, 2016 (Act 927) stipulates the allocation of three percent of the District Assemblies Common Fund (DACF) for disaster preparedness and response management.

5) **Formulate and implement a building regulatory reform agenda following Sendai's Framework**, which is based on the realization that well-designed building and land use regulations are efficient and cost-effective tools for limiting chronic stresses (i.e. fire, spontaneous collapse, and unhealthy conditions) and weathering shocks of natural catastrophes. To this end, it is recommended that GAMA MMDAs sign up with the Building Regulation for Resilience (BRR) Program[86] initiated and being funded by the World Bank. The program seeks to maximize the respective strengths of the public, private and non-governmental sectors to create a comprehensive building regulatory regime. Partners help develop and enforce modern compliance tools for improved information and communications systems aimed at risk management, building practitioners' certification, private third-party accreditation to inspectors, and the use of insurance mechanisms to augment building control. Specifically, it seeks to develop and promote a new stream of activities to increase regulatory capacity

[86] The Building Regulation for Resilience program is a partnership of governments, international development institutions, and key public, private and non-governmental actors in the building sector—specifically professional associations and societies related to codes of practice; leading academic institutions in engineering, architecture, urban planning, construction, and building technology; accredited training institutions for the construction labor force; bodies responsible for licensing procedures for building professionals; and implementers of quality control processes for building materials.

and, in turn, promote a healthier, safer, and less risky built environment. By leveraging good practice in building regulation as part of a strategy to reduce both chronic risk and disaster risk, it will set GAMA on the path to effective reform and long-term resilience.

The BRR program aims to implement a vigorous building regulatory reform agenda by means of the following actions:

a. Ensuring the safety of new construction and reducing the risk of existing vulnerable settlements through regulatory reform;

b. Orienting regulatory and governance reforms toward compliance advice and support rather than solely enforcement;

c. Developing the capacity of national and subnational institutions to implement building regulations that address chronic health and safety issues as well as disaster risk (i.e., ensuring sufficient funding, staffing, and training at the local level);

d. Developing building standards that are accessible, affordable, and implementable by the poor and vulnerable, while also improving tenure security and reducing the cost of entry to legal land and housing markets;

e. Promoting innovation for effective land use and building control, including simplifying administrative procedures and reducing regulatory compliance costs; and

f. Leveraging private sector technical resources to expand the qualified workforce for regulatory implementation.

6) **Develop/implement critical climate change and disaster risk and preparedness awareness campaigns for citizens' and schools**. A concerted programme to raise citizens' awareness should be formulated and seriously implemented in the medium-long trem.

7) **Undertake seismic micro-zonation, mountain and gully erosion study to identify mitigation options**. A seismic micro-zonation, mountain and gully erosion study should be undertaken in the medium-long term to identify options for mitigation.

8) **Link disaster and climate risk assessments with master planning exercise**. In the medium-long term, all master planning efforts must necessarily be informed by disaster and climate risk assessments as a matter of policy.

9) **Undertake and implement disaster risk financing and insurance study**. A comprehensive study to understand the options for disaster risk financing and insurance should be undertaken and the findings and recommendations implemented in the medium-long term.

10) **Establish a local disaster and climate fund to support risk mitigation measures.** In the medium-long term, efforts should be geared towards the establishment of local disaster and climate funds to support risk mitigation measures undertaken by MMDAs. This should be in addition to the aforementioned three percent allocation from the DACF

3. Action Plan and Timeline

Table 19: Short-, Medium-, and Long-Term Priorities, and Implementation Responsibility

A. Improve Metropolitan Planning and Coordination			
No.	**Priority Action/Investment**	**Timeframe**	**Affected MDAs/MMDAs** [87]
1.	Expedite implementation of the new Land Use and Spatial Planning Act (Act 925)	Short-Term	**All MMDAs/TCPD/** MESTI/ NDPC
	a. Expedite preparation of subsidiary legislation to implement Act 925	Short-Term	**LUSPA**/MESTI/**MOJ**/NDPC
	b. Develop land use and spatial development plans for all MMDAs & GAMA region and review existing plans	Short-Term	**All MMDAs/LUSPA/** MLGRD/ NDPC/RCC
	c. Ensure active participation of traditional authorities and other stakeholders in plan formulation and implementation	Short-Term	**All MMDAs**/LUSPA/ MLGRD/ NDPC/**RCC**
2.	Designate the GAMA region as a Joint Development Planning Area (JDPA) and constitute and resource a Joint Development Planning Board (JDPB) for GAMA (National Development Planning Act , 1994), in accordance with ongoing work by MLGRD	Short-Term	**NDPC/MLGRD/ LUSPA/** All MMDAs /RCC
3.	Invest in comprehensive update of land use plans (including the 1991 Master Plan), sector plans, using all available satellite imagery and procuring additional as necessary (complementary to ongoing drafting of Integrated Sanitation and Drainage Master Plan under GAMA project, with MLGRD and World Bank)	Short-Term	**All MMDAs/LUSPA/ MLGRD/** MESTI/RCC
4.	Create consolidated repository/observatory for maps, spatial data, land use data, at one institution (e.g., LUSPA, building on the existing LUPMIS framework or CERSGIS)	Short-Term	All MMDAs/**LUSPA/ CERSGIS/** MLGRD/NDPC
5.	Address the human resource gaps at local planning level by making provision for use of LUSPA planners in a consolidated manner across the 16 MMDAS	Short-Term	**All MMDAs**/LUSPA/ MLGRD/ **LGSS**/RCC
6.	Implement the Consolidated Sanitation and Drainage Master Plan when completed (under GAMA project)	Medium-Long Term	**All MMDAs/HSD/ MWRWH/ MLGRD**/RCC
7.	Implement the GAMA Regional Spatial Development Framework (when completed); Ensure its correlation with the upcoming Integrated Sanitation and Drainage Master Plan	Medium-Long Term	**All MMDAs**/LUSPA/ MESTI/ **MLGRD**/RCC
8.	Continue to address weak institutional capacity issues of MMDAs; LGSS to carry out mapping exercise to identify gaps in existing structures	Medium-Long Term	**All MMDAs/LGSS/** LUSPA/ MLGRD/NDPC
9.	Implement measures to improve MMDA financial capacity, e.g., expanding property rates through regular valuation exercise, etc.	Medium-Long Term	**All MMDAs/MoF/ MLGRD**/LGS/ RCC
10.	Continue data gathering and data management at central repository for planning purposes	Medium-Long Term	**All MMDAs/LUSPA/ RCC/ CERGIS**/MESTI/MLGRD
11.	Improve regulatory framework for urban transport (at MMDA level, Act 462)	Medium-Long Term	**All MMDAs/MoT/** MLGRD/NDPC

[87] Bolded stakeholders signify lead or most critical stakeholder to advance actions.

12.	Institute a GAMA waste management authority (under or affiliated to JDPB)	Medium-Long Term	**All MMDAs/ MLGRD/** RCC/MESTI
13.	Modernize and improve coordination of traffic signals in GAMA region	Medium-Long Term	All MMDAs/**GHA/ DUR /MRH/** MoT/ MTTD
14.	Develop, rehabilitate and modernize the rail-based mass transport system.	Medium-Long Term	**GRDA/GRC/**MOT/ RCC
15.	Develop and implement a strategy for improved agriculture production based on land use planning to create economic, employment opportunities and food security and allow for use of green field areas in vulnerable basins to be protected	Medium-Long Term	**All MMDAs/MOFA/ WRC/**HSD/ RCC
16.	Develop and implement a comprehensive and integrated Transport Master Plan for GAMA (incorporating motorized and non- motorized transport facilities; coordinated with developments in low-income settlements), fully integrated with existing Drainage and Sanitation Master Plan	Medium-Long Term	**All MMDAs/MLGRD/ MOT/ MRH/** GHA/DUR/ GAC/GCAA/**RCC**

B. Adopt Integrated Flood and Coastal Zone Management

No.	Priority Action/Investment	Timeframe	Affected MDAs/MMDAs [87]
1.	Finalize/Complete the Drainage Master Plan (GAMA-level); to feed into Land Use Plan	Short-Term	**All MMDAs/HSD/**GHA /DUR/ **MWRWH/RCC**
2.	Allocate appropriate resources to adequately and routinely maintain the hydraulic infrastructure (not just in emergency response after floods)	Short-Term	**All MMDAs/HSD/**GHA /DUR/ **MWRWH/MOF**
3.	Identify and secure areas to increase retention capacity and reduce runoff; develop green areas on floodplains	Short-Term	**All MMDAs/HSD/** WRC/ MWRWH/ RCC
4.	Protect raw water sources and implement drainage basin plans and riparian and coastal buffer zone policies	Short-Term	**All MMDAs/WRC/** HSD/ MWRWH/ RCC
5.	Improve solid waste collection (in critical areas)		
	a. Formulate modalities to appropriately integrate informal and formal sectors in waste management	Short-Term	**All MMDAs/MLGRD/** RCC/MoF
	b. Formulate Recycling strategy	Short-Term	**All MMDAs/EPA/ MLGRD/**MESTI/ RCC
6.	Implement urgent actions in the Drainage Master Plan being developed	Medium-Long Term	**All MMDAs/HSD/GHA / DUR/ MWRWH/**RCC
7.	Integrate land use planning/risk management mapping as a tool to prevent flooding, urban design; including transport and housing policies and programs to be coordinated with flood and coastal zone management	Medium- Long Term	**All MMDAs/HSD/GHA / DUR/ MWRWH/**RCC
8.	Improve solid (and liquid) waste collection and disposal capacity for the entire GAMA region (include formal and informal sector)	Medium- Long Term	
	a. Optimize collection and treatment of solid waste transfer stations to increase the handling capacity to support Kpone land fill (Short term)	Medium- Long Term	**All MMDAs/MLGRD/** RCC /MOF
	b. Mainstream waste recycling and material recovery in waste management operations	Medium- Long Term	**All MMDAs/EPA/ MLGRD /** MESTI/RCC/ MOF
9.	Increase drainage capacity of primary drainage system, followed by secondary and tertiary systems	Medium- Long Term	**All MMDAs/EPA/ MLGRD /** MESTI/RCC/ MOF
10.	Identify and implement erosion control measures in GAMA's coastal area	Medium- Long Term	**All MMDAs/HSD/ GHA / DUR/** MWRWH/ RCC

11.	Implement Drainage Master Plan investments GAMA-wide	Medium- Long Term	**All Coastal MMDAs/ HSD/ MWRWH**/RCC
12.	Implement Coastal Protection Plans / erosion control measures to all GAMA's coastal area	Medium- Long Term	**All MMDAs/MLGRD/HSD / MWRWH**/RCC/ MOF

C. Enhance Resilience in Vulnerable Communities

No.	Priority Action/Investment	Timeframe	Affected MDAs/MMDAs [87]
1.	Identify vulnerable settlements/communities in GAMA	Short Term	**All MMDAs**/MLGRD /MWRWH/ RCC
2.	Formulate a comprehensive slum upgrading and redevelopment strategy: Include a program to address main vulnerabilities of poor/informal settlements (housing/basic services)	Short Term	**All MMDAs/MLGRD / MWRWH/** RCC
3.	Formulate a GAMA-level housing strategy (coordinated with land use and infrastructure plans)	Medium-Long Term	**All MDAs/MWRWH /**MLGRD/RCC
4.	Incorporate skill-building initiatives and job-generating activities, and exit strategy for social protection programs	Medium-Long Term	All MMDAs/**MGCSP/** RCC
5.	Implement a program to address main vulnerabilities of poor/informal settlements (housing/services) Improve access to basic services (water, sanitation, solid waste collection, transport, drainage)	Medium-Long Term	**All MMDAs/MLGRD /MWRWH/** RCC
6.	Scale up successful pilots under the land administration project	Medium-Long Term	All MMDAs/**MLNR/ LC/ LUSPA/** RCC
7.	Implement a GAMA-wide inclusive housing strategy (coordinated with land use and infrastructure plans)	Medium-Long Term	**All MMDAs/ MWRWH /**MLGRD/ RCC

D. Improved Disaster Preparedness and Response

No.	Priority Action/Investment	Timeframe	Affected MDAs/MMDAs [87]
1.	Undertake a detailed multi-hazard risk assessment for GAMA and establish a risk information system at GAMA level to be shared with MMDAs	Short Term	**All MMDAs/HSD/NADMO /**Gmet/ WRC/**GNFS/** MLGRD / RCC/ MWRWH/
2.	Assess flood and coastal surge risk, warning and response system	Short Term	All MMDAs/**HSD/NADMO/** Gmet/ WRC/ MLGRD/RCC/ MWRWH
3.	Develop early warning and response plans for most vulnerable communities	Short Term	**All MMDAs/HSD/NADMO / Gmet/** WRC/ NFS/MLGRD / RCC/ MWRWH/
4.	Identify actions for improved fire response and preparedness and cholera/health-related outbreaks	Short Term	**All MMDAs/NADMO/ GNFS /** RCC/ MLGRD/**MOH /** MWRWH/
5.	Establish a disaster risk management and climate change adaptation coordinating entity across MMDAs at the GAMA-level, with additional budget and staff in the MMDAs (National Development Planning Act, 1994)	Short Term	**All MMDAs/NADMO/** GNFS/**RCC/** MOH/MOI
6.	Strengthen/implement flood and coastal surge warning system:Implement early warning & response plans for the most vulnerable communities	Medium-Long Term	**All MMDAs/HSD/ NADMO /** Gmet/RCC
7.	Implement actions for improved fire response and preparedness and cholera/health related outbreaks	Medium-Long Term	**All MMDAs/GNFS/ NADMO/** MLGRD/ RCC
8.	Develop and implement flood and coastal zone management plans	Medium-Long Term	**All Coastal MMDAs/HSD/ MWRWH/** RCC
9.	Develop and implement MMDA-level DRM plans and allocate contingency budget	Medium-Long Term	**All MMDAs/GNFS/** RCC/**NADMO/ HSD**/MLGRD/

10.	Formulate and implement a building regulatory reform agenda following Sendai's Framework	Medium-Long Term	**All MMDAs/MWRWH/** NADMO / NFS/RCC/MOH/ MOI/MESTI
11.	Develop/implement critical climate change and disaster risk and preparedness awareness campaigns for citizens and schools	Medium-Long Term	**GES/NCCE/MOE/All MMDAs/** EPA/NADMO/RCC
12.	Undertake seismic micro-zonation, mountain and gully erosion study to identify mitigation options	Medium-Long Term	**MESTI/MWRWH/** MLGRD/RCC
13.	Link disaster and climate risk assessments with master planning exercise	Medium-Long Term	**All MMDAs/LUSPA/ NDPC/** HSD/ MWRWH/RCC
14.	Undertake and implement disaster risk financing and insurance study	Medium-Long Term	**MoF/GIC/**MESTI/MWRWH/
15.	Establish a local disaster and climateW fund to support risk mitigation measures	Medium-Long Term	**All MMDAs/MLGRD/** RCC/**MOF/** MESTI

4. Moving Forward

GAMA is well-positioned to undertake the challenge of enhancing resilience at the metropolitan level. There is strong commitment from leading Ministries to address the many hazards facing GAMA that can set back development gains. The rapid urbanization that GAMA is experiencing should be seen as an opportunity. It highlights the pull of the region as an engine of economic growth and an important gateway into West Africa. The findings and recommendations of this report will help GAMA address urban challenges, but most importantly, they highlight the need for a long-term vision for the region that includes projected population increase and climate change adaptation.

The city already has ongoing efforts that will help in the implementation of the different recommendations. Such efforts include the Ghana Plan of Action on Disaster Risk Reduction being undertaken by NADMO as well as the Community Resilience through Early Warning project and the Flood Early Warning Systems (FEWs). Bringing transformative change will require changes in behavior and a focus on catalysts—CSOs, government officers, universities, and think tanks. The World Bank is supporting follow-up activities in 2017, two of which are described below to keep the momentum going on urban resilience:

Accra Climate and Flood Resilience Strategy: The objective of Accra Climate and Flood Resilience Strategy is to prepare a diagnostic on resilient urban development informing a locally-owned investment framework for better managing climate and disaster risks in Greater Accra Metropolitan Area (GAMA). The Greater Accra Climate Risk Mitigation Strategy will depart from the many studies and assessments related to climate change adaptation and disaster risk reduction in Ghana.

Accra DRM Poverty Survey: To better understand the relationship between climate change, hazard exposure, and poverty in GAMA, a household-level survey is being carried out in April/ May 2017 which will focus on how disaster and climate risks affect poor households, so resilience measures for the most vulnerable can be developed. This household survey will focus on the impact of the 2015 flood – how did the flood affect livelihood and household welfare of residents in urban slums and whether there is any difference in the impact of the flood between the poor and the non-poor. Also, this household survey will identify coping mechanisms used by the poor so appropriate mitigation actions can be identified.

Going forward, a dedicated program for strengthening resilience in Accra can be formulated to support ongoing efforts on improving resilience in GAMA (See Box 5). This will include improving overall drainage and other structural measures to mitigate flooding on one and softer, institutional, policy, and financial measures to improve metropolitan governance, coordination, risk-sensitive land use planning, data management, and flood warning and preparedness on the other hand.

Greater Accra is at a cross roads today. Business-as-usual will lead to higher impacts from future disasters. Alternatively, investment in improving resilience will lead to a thriving, competitive and inclusive city region.

Box 5: Example of a Potential Intervention on Greater Accra Resilient and Integrated Development

Proposed Objective: Improve flood management capacity in Greater Accra and strengthen resilience and living conditions in the most vulnerable communities.

Expected Results: Improved drainage and flood management in MMDAs, with a focus on most vulnerable communities. This will boost new investment in the area and improve quality of life with potentially transformative impacts within one basin and beyond; Increased government capacity at all levels to monitor and manage inland and coastal flooding risks; Reduced vulnerability of people and households, infrastructure, and public assets in risk-prone areas; reduced income loss (livelihood, property and business) from flooding.

Potential Areas of Interventions

I. Integrated Urban Flood Risk Management

1a: Drainage and flood management improvements: In the short term, this will include urgent actions to prepare for recurrent floods, such as dredging, de-silting, waste collection improvements and rehabilitation of damaged drains. In the medium-to-long term, it will support drainage improvements and rehabilitation within the critical basin, along with the development of green spaces (parks and flood retention areas) and other associated improvements such as waste management, and water quality improvement. It will also include comprehensive planning, monitoring, coordination, operations and maintenance system for core infrastructure.

1b: Support to most vulnerable communities: This will include upgrading basic Infrastructure and services prioritized by most vulnerable communities: developing and retrofitting drains, pavements, schools, health centers, and potential support to lower-cost housing options. The work will be targeted within the critical basin and in sync with integrated drainage and flood management improvement investments under 1a and the GAMA project.

II. Strengthening Capacity for Disaster Preparedness and Response in Greater Accra Metropolitan Area

2a: Flood Early Warning & Response System Improvement in GAMA: This will include improving hydromet (hydrological and meteorological) services at the national level (GMET, HSD, WRC), and coordination, warning and response systems at GAMA and MMDA levels. It will also include preparation of Disaster Risk Information System, disaster risk management, and emergency preparedness plans (response, recovery and reconstruction).

2b. Support for Metropolitan Planning, and Coordination for MMDAs in GAMA: This will include support for creation of Joint Development Planning Areas (JDPA) with particular emphasis on flood risk management, and close coordination across sectors. It will also include support for risk assessment, integrated and risk-sensitive land use planning, infrastructure and services master planning; building regulations, zoning, operation and maintenance finance and technical review at GAMA and MMDA levels. It will also provide incentives and grants to MMDAs in GAMA to support metropolitan coordination, and local Disaster Risk Management and Emergency Preparedness Plan priorities, including but not limited to advocacy and training on early warning and response, simulation exercises, data sharing and planning, building retrofitting, emergency coordination center and equipment, and recovery and response support.

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VI. ANNEXES

Contents of the Annex section:

Annex A: Overview of historic major floods in Accra, 1955—2015

The table presented in this section describes major floods that affected Accra. It includes individual dates and the location, lives and assets affected. The information is based on NADMO records and Daily Graphic publication of June 5, 2015

Annex B: Description of main objectives of the Ghana Water Resource Management Programme

Annex B presents the intended outcomes of the Ghana Water Resources Management Programme (2017–2019), including a baseline and short and medium-term targets.

Annex A: Overview of historic major floods in Accra, 1955—2015 [88]

Date	Description of impacts and damages
June 23 (21), 1955	Major impacted areas included Adabraka, Agbogbloshie, Galloway, Railway Station, Adiedienkpo, and large areas around the Odaw and Korle Lagoon. Train trapped, three lives lost, walls collapsed on pregnant woman and daughter. Many injured and properties lost.
June 2 – 3, 1959	Affected Selwyn Market area down Odaw stream, Old Accra Electricity station area, large areas of Achimota to the Guggisberg road bridge, and Korle Lagoon. Much property lost.
1963	Large areas affected along Odaw and other areas in the Accra Municipality. Five lives and properties lost.
July 4, 1968	Accra records heaviest rainfall in 9 years; registered a record rainfall of five inches in the last nine years.
June 19 – 23, 1973	Communities flooded included Kaneshie South Railway Colony/Industrial Area, along major drains like Odaw/Onyasia, Nima, Awudome, Kpeshie and Klottey drains, Ridge Police station, Labadi, Dansoman, Bubuashie and North Kaneshie. Three lives lost, 500 people marooned and properties damaged. A car No. GS 2669 plunged into the Odaw River with driver.
1978	Odaw Basin and communities in the southern branches of the Odaw River. Life lost and properties damaged.
June 20, 1983	Affected Osu Klottey darin, Bank of Ghana houses and Awudome area. Houses pulled down and properties lost.
August 1, 1984	Affected Nima drain, Odaw stream, and Ring Road. Houses flooded and walls collapsed.
May 2, 1985	Affected Kwame Nkrumah Circle, Obetsebi Lamptey Circle, Aladjo Caprice Bridge, Ring Road/Industrial Area, Millet and Pepsi Factories. Also Modern Furniture, Mechanical Lloyd, Blackwood Lodge and Ghana Rubber Estates. Several bags of Millet soaked, 20,000 crates of Pepsi and much furniture destroyed.
May 4, 1986	Affected Kwame Nkrumah Circle, Aladjo, Avenor, Odawna and many areas. Three lives lost, P&T switching equipment damaged. Damages valued at 3.6 billion Cedis.
June 1987	Aladjo, Avenor Caprice bridge, New Abossey Okai, Mataheko, Nima drain and Standfast Street. Properties lost, walls collapse, and houses pulled down.
May 3, 1988	Affected Tesano Wabco Estates, Kaneshie, Nsawam Road, Sun Lodge Hotel. Walls/gates broken, properties destroyed.

[88] Based on NADMO records and Daily Graphic publication of June 5, 2015

June 7 – 8, 1988	Affected Obetsebi Lamptey Circle, Kwame Nkrumah Circle, Industrial Area, Millet Factory, Old Dansoman, Chemu Lagoon, Ring Road West, Ghana Reinsurance Company, State Insurance, Central Automobile, Abossey Okai, Kaneshie, Atico Junction, Mataheko, Aladjo, Maamobi, Ring Road South, North Industrial Area, BBC Builders and Industrial Engineers, Modern Furniture, and Mamprobi. One life lost, four houses, schools and sheds destroyed, many vehicles grounded, traffic disrupted, property and merchandises damage.
May 8 and 10, 1989	North Kaneshie, Mataheko, Zongo Junction, Walako Hotel, Bubuashie, Accra Academy, Industrial Area near Guiness Depot, Labadi and Labone Secondary School area. Children trapped and one died. Bridges and properties damaged.
November 27, 1990	Flooded Awudome, Nima, Kaneshie, Mataheko, Tesano, Aladjo, Nsawam Road, Achimota Railway Crossing, and Accra New Town. Bridges, houses and roads destroyed.
July 15, 1991	Affected Aladjo, Tesano, Avenor, Adabraka, Agege, Mataheko, Achimota and Taifa. Lives, houses, and bridges lost.
November 18, 1993	Nima and surrounding areas. Car, hair dryers, personal effects and concrete slabs washed away.
June 5-6, 1994	Affected Mataheko, Abossey Okai, Nima, Maamobi, Dzorwulu, Tesano, Kwame Nkrumah Circle, Aadjo, Asylum Down, Modern Photos, and Neoplan Station. Paloma Shopping Center damaged and lost 80 million Cedis;. Eight lives lost when Taxi cab (ARS 8127) plunged into Aladjo drains.
July 5, 1995	Flood havoc in low areas of the Accra metropolis. Affected commuters and vehicles. Flooding of the Achimota VRA substation resulted in power failures.
June 13, 1997	Downpour for two days affected various parts of Accra. Major rivers (e.g., Odaw and Onyasia) appeared on the brink of breaching their banks. Threatened to cut communication, affected roads and use, residents forced to desert their homes.
June 28, 2001	Affected Madina, Achimota, Dzorwulu, Avenor, Santa Maria and Adabraka Official Town. Worst in Accra since July 4, 1995. Submerged portions of the city; many houses and structures flooded.
May 5, 2010	Affected Central Accra, Ofankor and Begoro. Parts of the city and its streets deeply submerged.
February 24, 2011	Affected most parts of Accra and surrounding communities of Adabraka, Kisseman, Alajo Junction, A-Lang at Santa Maria, Oyarifa, Haatso, Adenta and the Tema Timber Market. Residential property submerged or washed away.
November 1, 2011	Accra area affected. 43,087 displaced or affected, 14 deaths recorded.
May 31, 2013:	Afffected Accra, including Kwame Nkrumah Circle, Darkuman Kokompe, the Obetsebi Lamptey Circle and portions of the Graphic Road, Santa Maria and the Dansoman Roundabout.
June 6, 2014:	Affected Accra city and its environs, including Adabraka, Awoshie, the Kwame Nkrumah Circle, Mallam, North Kaneshie, Abeka, Dansoman and Odorkor.
July 4, 2014:	Affected Accra, with greatest impact in areas such as Anyaa, Taifa, Dome, Nii Boi Town, Dansoman. Partial submersion of Kaneshie, Adabraka, Awoshie, the Kwame Nkrumah Circle, Mallam, Abeka, Dansoman and Odorkor.
June 3, 2015	Heavy floods in Accra affected 52,622 people and led to a fire explosion at a filling station which resulted in 150 casualties.

ANNEX B: Ghana Water Resources Management Programme (2017–2019)

No.1	OUTCOME DESCRIPTION	BASELINE (DEC. 2015)	2016 TARGET	TARGET FOR MEDIUM TERM		
				2017	2018	2019
	Relevant state agencies, District Assemblies and local communities supported to undertake reforestation programmes for watershed protection.	Created new buffer zones in Pwalugu, Djentiga 1 and 2, Kubore/Teogo and Yarigungu, and extended buffer zones in Mognori and Bazua in Upper East Region. 10.3 km of targeted 20.5 km on both sides covered	-Manage existing buffer zones in Upper East Region -Mark and begin extension of buffers to cover remaining 10.2km on both sides. -Initiate buffer zones in the Densu, Tano, Black Volta, Ankobra and Pra Basins.	Continue with creation and management of buffers in the six river basins	Continue with creation and management of buffers in the six river basins	Complete creation and management of buffers in the six river basins.

No.2	OUTCOME DESCRIPTION	BASELINE (DEC. 2015)	2016 TARGET	TARGET FOR MEDIUM TERM		
				2017	2018	2019
	Access to water resource knowledge base improved to facilitate water resource planning and decision-making.	-Upgraded national database on water rights holders and monitoring compliance to effectively manage information on water resources -National water quality monitoring program established and exercises undertaken	-Undertake water quality monitoring and establish status of water bodies -Undertake groundwater monitoring in the three northern regions and establish their status	-Undertake water quality monitoring and establish status of water bodies -Undertake groundwater monitoring in the three northern regions and establish the status -Collate and update surface water data and information countrywide	-Undertake water quality monitoring and establish status of water bodies. -Undertake groundwater monitoring in the three northern regions and establish the status. -Collate and update surface water data and information countrywide	-Undertake water quality monitoring and establish status of water bodies. -Undertake groundwater monitoring in the three northern regions and establish the status. -Collate and update surface water data and information countrywide

No.4	OUTCOME DESCRIPTION	BASELINE (DEC. 2015)	2016 TARGET	TABLE FOR MEDIUM TERM		
				2017	2018	2019
	Climate change adaptation in water resource management enhanced for water security and improved livelihoods.	-Climate change resilience and adaptation in water resources management integrated into District Medium-Term Development Plans -Developed flood risk maps for White Volta Basin -Initiated improvement of Flood Early Warning System model for White Volta Basin -Completed development of response plan for Drought Early Warning System (DEWS)	-Complete climate change investment plan for White Volta Basin -District Assemblies to incorporate flood risk maps into physical and development plans -Complete improvement of Flood Early Warning System model for White Volta Basin -Initiate development of DEWS for White Volta Basin	-Initiate development of Flood Early Warning System model for Oti Basin -Complete development of DEWS for the White Volta Basin	-Complete the development of Flood Early Warning System model for Oti Basin -Initiate development of DEWS for the Black Volta Basin	-Initiate development of Flood Early Warning System model for Black Volta Basin -Complete development of DEWS for Black Volta Basin

No.6	OUTCOME DESCRIPTION	BASELINE (DEC. 2015)	2016 TARGET	TABLE FOR MEDIUM TERM		
				2017	2018	2019
	Strengthened regulatory framework for managing and protecting water resources for water security	Dam Safety Regulations developed and ready to be presented to Parliament	-Adopt the Dam Safety Regulations -Complete review of the raw water quality guidelines and criteria for key water uses -Review existing technical guidelines on aquaculture development in the Volta Lake (include zoning and siting) -Complete the technical component engagement on Buffer Zone Legislative Instrument	-Initiate implementation of Dam Safety Regulations -Develop guidelines to regulate spillage and dewatering into the environment -Initiate development of regulations on wastewater (in collaboration with Environmental Protection Agency (EPA) -Develop Buffer Zone legislative instrument	-Initiate development of regulations on wastewater (in collaboration with EPA) -Complete and adopt Buffer Zone legislative instrument	Complete and adopt regulations on wastewater (in collaboration with EPA)

No.8	OUTCOME DESCRIPTION	BASELINE (DEC. 2015)	2016 TARGET	TABLE FOR MEDIUM TERM		
				2017	2018	2019
	River Basin and national IWRM plans and strategies prepared and implemented	Completed review of Densu Basin IWRM Plan National and six river basin IWRM plans developed	Complete review of White Volta and Ankobra IWRM Plans Initiate development of IWRM plan for Black Volta Basin	Complete Black Volta Basin IWRM Plan and initiate implementation	Review Pra and Tano IWRM Plans Initiate development of IWRM Plan for 7th priority river basin	Complete IWRM Plan for 7th priority river basin and initiate implement-tation

WORLD BANK GROUP

GFDRR

Global Facility for Disaster Reduction and Recovery