



The State of Ghanaian Resilience

Understanding the Dimensions of Vulnerability and Adaptation in Three Districts in Ghana

Prepared by The West Africa Resilience Innovation Lab (WA RILab)

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To accomplish a task of this magnitude has been a challenging and exciting undertaking; it required mustering a certain brand of resilience. This report is the result of painstaking research involving a broad range of experts, including community-based development activists, governance institutions, community political representatives and traditional and opinion leaders, as well as ordinary community members. These stakeholders practice their trade and eke out a living under the constraints of rapid urbanization and food insecurity in the face of climate variability.

In seeking to understand the nature and scope of the resilience challenges communities face, we have drawn from a variety of sources, including research studies in this field. These are duly acknowledged.

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ABBREVIATIONS AND ACRONYMS

FGD	Focus group discussion
KII	Key informant interview
NADMO	National Disaster Management Organisation
RAN	Resilient Africa Network
RILab	Resilience Innovation Lab
SADA	Savannah Accelerated Development Authority
TaMA	Tamale Metropolitan Assembly

SUMMARY

Developing countries and poor populations everywhere remain most vulnerable to the impacts of climate change. Cities in sub-Saharan Africa are experiencing unprecedented population growth and expansion of physical boundaries. Ghana's cities are vulnerable to climate change stressors because of the country's high dependence on rain-fed agriculture, forestry, and hydro energy sources. Floods and droughts reduce water resources, agricultural production, and food security, pushing "environmental refugees" to the cities and swelling slum communities. These stressors mainly affect women, children, the elderly, and the poor.

OBJECTIVE

The Western Africa Resilience Innovation Lab conducted a qualitative study of factors that affect resilience to climate change-related shocks and stresses in three administrative districts of Ghana in order to develop resilience dimensions and metrics and identify possible innovations and interventions to improve resilience. Ashaiman Municipality in the Greater Accra region is affected by rapid urbanization and climate-induced phenomena such as floods. The Tamale metropolitan area exemplifies rapid urbanization and its implications for food security in the context of climate variability. Navrongo Municipality in the Upper East region represents climate change-exacerbated food insecurity.

METHODS

A grounded theory approach was used to guide the development of a theory of change and understanding of resilience dimensions. Data were collected through community consultations in 25 focus group discussions with community residents of various professions and 18 key informant interviews with local government representatives, traditional and opinion leaders, civil society actors, and representatives of humanitarian agencies in the study areas. NViVo was used for data management and analysis. The data analysis involved identifying initial codes, forming code families/categories to develop resilience dimensions, and refining those dimensions. The RAN resilience framework was used to identify the causes of climate change-related stressors, the factors underlying these causes, their primary and secondary effects and the capacities of the communities to adapt to the shocks.

RESULTS

The main shocks and stresses resulting from rapid urbanization and food insecurity in the three study communities are related to security, migration, population pressures, and poverty. The dimensions of resilience identified in the Ghana study include *Wealth, Security/Protection/Governance, Natural Resources/Environment, Human Capital, Social Capital, Psychosocial Wellbeing, Infrastructure, Health/Health Services, Governance, and Spirituality*. Each dimension was defined and described in terms of adaptive strategies, coping strategies, vulnerability factors and causes and effects. Based on the findings, the research team developed context-specific resilience frameworks to conceptualize the

linkages (cause/effect chain) among the dimensions and identify entry point dimensions for interventions that would have a positive effect on overall resilience.

Recommended interventions to address the effects of rapid urbanization and food insecurity in the face of climate variability in the study communities include: building more environmentally friendly toilets and biogas systems to generate compost for school farms and backyard gardens, installing water-efficient irrigation facilities and harvesting rainwater, using “waste” such as rice husks, millet straw, and shea butter slurry for energy, promoting the consumption of nutritious local foods, providing credit and encouraging village savings and loans schemes, enforcing legislation to prohibit littering and the use of non-biodegradable packaging materials, improving security, building low-cost housing with improved technologies such as compacted straw, relocating residents from risky areas, and using innovative strategies to increase functional literacy for employment. The findings of this study will be shared with the respective communities for validation and a forum will be created to select feasible interventions.

CHAPTER ONE: INTRODUCTION

Over the past few decades, the burden of disasters has increased (Alexander, 1997). The profile of disasters includes 1) natural disasters because of natural and unpredicted variability in the environment, 2) technological disasters resulting from human activities, and 3) hybrid disasters, with a mix of natural and technological causes (Ghana Demographic Health Survey, 2008). Most disaster situations are increasingly underpinned by human factors, contributing either to the causes or effects of the disasters. The result of disaster is often sudden shocks that disrupt the livelihoods of communities, infrastructure, and institutions (Stangenelli, 2006).

However, even without sudden shocks, communities face slow onset events and persisting stresses that affect their well-being. The effects of climate change are one such phenomenon. Climate change is set to slowly increase the stresses that communities face, especially affecting economic production (FAO, 2013). This and other slow onset events take a significant toll on long-term resilience.

There is therefore an increasing focus on risk reduction through prevention, mitigation, and preparedness (Norman, 2013; Norman, Aikins, & Binka, 2013a; Catholic Relief Services [CRS], 2002). Risk reduction programs should therefore have a strong component of building the resilience of affected and potentially affected communities to overcome their vulnerabilities and cope with shocks and stresses in a way that enhances their wellbeing and capacity to respond effectively to future shocks and stresses (Rivera & Settembrino, 2010).

Vulnerability to climate change is the degree to which systems are susceptible to and unable to cope with adverse impacts. Vulnerability to climate change therefore differs according to social groups and sectors (Yaro, 2010). Climate change impacts are unevenly distributed because temperature and precipitation occur unevenly and resources and wealth are unevenly distributed. Even within regions, impacts, adaptive capacity and vulnerability vary. Therefore, discussions of vulnerability often highlight the importance of poverty and inequality or differential resource access (Nicholls et al., 2007).

Developing countries and poor populations everywhere remain most vulnerable to the impacts of climate change. While sustainable development and poverty reduction are global priorities, climate change threatens to undermine the progress that has been made to date. The scale of recent migration in West Africa has increased tremendously as a result of the Economic Community of West African States (ECOWAS) Protocol on free movement and establishment, with challenges for development in the sub-region. Challenges that affect the resilience of communities include rapid urbanization, climate change, and food insecurity (Yaro, 2010).

At the state level, long-term supportive interventions are needed that focus on management capacities to ensure sustainable integrated resource management. Providing early warning information and targeting the poorest households with starter packs and access channels for livelihood diversification, providing community social and economic infrastructure, including insurance, providing microcredit and skills for diversified livelihoods, and promoting woodlands may increase the resilience of those most negatively impacted by climate change. In addition, research into appropriate, affordable building technology, integration of disaster risk management in development strategies, and strengthening knowledge can enhance capacity for disaster risk management (Dietz et al. 1999; UNISDR & Actionaid International, 2008; World Bank Group, 2011).

Providing quality infrastructure for all areas will limit the risks of urban flooding. Land-use management also limits settlements in high-risk areas. Resilience can be strengthened through disaster preparedness (including warnings, measures to limit damage, and, if needed, help for people move quickly to safer areas), proper planning and coordination of disaster response (e.g., rescue services and appropriate emergency and health care services), and reconstruction to help those who have lost their homes and livelihoods. Resilience depends on the affordability and availability of safe housing in safe sites as well as an enabling policy environment for climate change adaptation planning and civil society action. For instance, at district and municipal levels, adaptation can be enhanced by incorporating climate change adaptation policies in district development planning and building human resource capacity for effective implementation of these policies (Derbile, 2013; Derbile & Kasei, 2012).

What is not adequately addressed in the literature is the effectiveness of adaptation mechanisms in enabling livelihoods in the context of climate change, the role of indigenous knowledge systems in adaptation to climate change, and implementation of mitigation measures at individual and state levels.

1.1. Affects of Climate Change on Urban Populations

Urbanization is a phenomenon in both developed and developing countries. *The American Heritage® New Dictionary of Cultural Literacy* defines urbanization as the process by which cities grow or societies become more urban. Tisdale (1942) defines it as a process of population concentration. However, many definitions consider urbanization a radical shift from a rural to an urban society, essential as a corollary of industrialization that goes hand in hand with the role of human settlements as engines of economic growth and promoters of scientific, sociocultural and technological development (Nelson et al., 2009; McGranahan, Balk, & Anderson, 2007; Mitchell, 1956).

The proportion of the world's urban population is expected to increase to about 57 percent by 2050 from 47 percent in 2000 (Cohen, J. E. (2001). The same source indicates that between 2010 and 2025, African cities will account for up to 85 percent of the population. The share of the African urban population, about 36 percent, is projected to increase to 50

percent by 2030 and 60 percent by 2050. This rapid expansion has changed the continent's demographic landscape but failed to bring about inclusive growth, which has contributed to the proliferation of slums, a sign of the combination of urban poverty and rising inequality. Rural-urban migration and natural population growth rates in cities are the major causes of the increasing rate of urban growth and slum proliferation in Africa (Baqui, 2009).

Rapid urbanization finds expression principally in outward expansion of built-up areas, converting prime agricultural land into residential and industrial uses. It also leads to the construction of high-rise buildings and vertical commercial development in specific zones. Some researchers consider the expansion of cities into mega-urbanized centers as negative (Norman, 2013), while others postulate that cities could become hubs of change and transformation, turning crisis into opportunity.

In sub-Saharan Africa, cities are experiencing profound transformation, with unprecedented expansion and growth in population and physical boundaries. The rising middle class from this process is leading new patterns of production and consumption, with serious implications for climate change (Satterthwaite, 2008). Urban areas are particularly vulnerable to climate change because built-up surfaces contribute to higher temperatures than in surrounding areas and create local air circulation that produces "urban heat islands" (Roaf, Crichton, & Nichol, 2009). Dust particles caught up in the circulation act as nuclei on which moisture in clouds condenses, forming rain droplets that can develop into major thunderstorms. Climate change also works in an indirect way to aggravate urban flooding and drought.

The impact of climate change on cities varies depending on their location. Climate-related impacts on coastal cities such as Accra, Tema and Sekondi-Takoradi differ from those on inland cities such as Ho, Kumasi and Tamale. Coastal cities are affected by rise in sea level, inundation, storm surges, and perennial flooding, whereas inland cities are faced with higher ambient temperatures, shrinking water tables and associated urban water shortage (Moser, 2010).

The third Intergovernmental Panel on Climate Change (IPCC) assessment report confirmed that impoverished people are most at risk of climate-change shocks (IPCC, 2001; IPCC, 2007a; IPCC, 2007b). Those most likely to be affected are the poor, both in rural and urban areas, who are unable to access the resources needed to adapt. Already many are forced to live in hazardous places, building their homes and growing their food on floodplains in towns and cities (Rain, Ryan, Ludlow, & Antos, 2011). Others construct their shelters on steep and unstable hillsides.

In the face of rapid urbanization, most of Africa's one billion people depend heavily on rain-fed agriculture and other natural resources. The growing frequency and severity of extreme events such as droughts, floods and heat waves, along with shifting rainfall patterns, threaten to overwhelm the natural resilience of African communities, threatening livelihoods and food security. Widespread poverty, fragile ecosystems, weak institutions, uncoordinated

policy frameworks and fragmented climate information systems increase Africa's vulnerability to climate change.

1.2. Challenges to Resilience in Northern Ghana

While literature on the contribution of urbanization to climate change in Ghana is limited to Accra and cities along the coastal belt, effects on inland cities including Tamale and Navrongo can be understood in the broader context of sub-Saharan Africa. Ghana's government has recognized that the increasing pace of urbanization, unaccompanied by sound urban development and management practice, is a major problem facing the country's socioeconomic development. The authors note that the government needs to ensure that urbanization make a positive contribution to development and is equitably distributed among settlements of varying sizes.

Ghana's first Initial National Communication (INC) to the United Nations Framework Convention on Climate Change (UNFCCC) in December 2000 outlined three major physical impacts of climate change—temperature changes, rainfall changes, and sea level changes—that will lead to changes in geophysical, biological and socioeconomic systems (Yaro, 2010). According to the World Bank Group (2011), mean annual temperature in Ghana has increased by 1.0° C, at an average rate of 0.21° C per decade. The rate of increase has been higher in the three northern regions than in the south since 1960. The average number of “hot” days per year increased by 48 and the average number of “hot” nights by 73 between 1960 and 2003. During the same period, the average number of “cold” days per year decreased by 12 (3.3 percent of days) and the average number of “cold” nights by 18.5 (5.1 percent of days). Annual rainfall is highly variable on inter-annual and inter-decadal timescales and long-term trends are difficult to identify. Rainfall was particularly high in the 1960s and particularly low in the late 1970s and early 1980s, decreasing up to 2006, with an average precipitation of 2.3 mm per month — 2.4 percent per decade (Yaro, 2010).

Studies to predict climate trends for Ghana include the World Bank Economics of Adaptation to Climate Change Study (for 2010–2050) and the 2000 UNDP Climate Profile of Ghana (2060–2090). These studies found that the mean annual temperature is projected to increase by 1.0 to 3.0° C by the 2060s and by 1.5 to 5.2° C by the 2090s. The projected rate of warming is highest in the northern inland regions. Under the Ghana Dry climate scenario, temperatures are projected to increase by 2.1–2.4° C in the three regions of the north, by 1.7–2.0° C in the Western, Central and Volta regions and by 1.3–1.6° C in the Brong-Ahafo Region. All projections point to significant increases in the frequency of “hot” days and nights, but the range of projections between different models is large. Total annual rainfall is projected to decline by 1.1 percent in 2020 and 20.5 percent in 2080. Seasonality is projected to change, with early termination of rainfall in the transitional zone, and is likely to convert the current bimodal regime to a unimodal one (The World Bank Group, 2011).

These trends seem to indicate an uncertain future for Ghana. In the north of the country, the 2007 floods demonstrated how climate change undermines development investments, with

317,000 people affected, 1,000 km of roads destroyed, 210 schools and 45 health facilities damaged, 630 drinking water facilities damaged or contaminated and a cost of direct emergency funding of around \$25 million. In 2010, floods in the north killed more than 30 people and displaced thousands (Government of Ghana, 2010). The country faces not only changes in average weather patterns, but also changes in the frequency, intensity and timing of weather events (Yaro, 2010). In 2007, 112 mm of rain fell in 24 hours in Tamale, 20 percent of the annual average in one day (Government of Ghana, 2010). This implies that climatic conditions are shifting in both intensity and impact. Ghana's climate is already unpredictable and the country can expect more intense weather events such as torrential rains, excessive heat and severe dry winds as a result of climate change (The World Bank Group, 2011). Each impact represents a setback to national development.

Droughts and floods have characterized Ghana's recent past, causing loss of life and property, slower economic growth and a crisis in power generation from the hydroelectric dam. These effects have affected urban life the most. Ghana's cities are vulnerable to climate change stressors because of the country's high dependence on rain-fed agriculture, forestry and hydro energy sources. Evidence shows that climate change has affected the supply of water in urban areas including Tamale and Navrongo. Flooding is a serious environmental issue affecting Accra and with rising sea levels may become an even greater problem. It is expected that an increased level of cyclonic storms to a great extent and storm surges to a lesser extent will be associated with future climate change and may increase flood occurrence in spatial patterns similar to those of the present (Rain, Ryan, Ludlow, & Antos, 2011) Significant flood events were recorded in 1973, 1986, 1995, 1999, 2001 and 2002.

Yaro (2010), in his assessment of climate change impacts in Ghana, observed that the direct and indirect impacts of climate change are specific to different socio-geographic zones and livelihood groups and sectors. Climate-enhanced social exclusion is on the rise as the number of "environmental refugees" increases with each climate hazard such as flood and droughts. Yaro identified the main vulnerable groups as widows, the disabled, the elderly, children, youth, divorced women and the poor in general. Nonetheless, Ghana does not have an inclusive policy for people with disabilities, the aged, or children.

In northern Ghana, the establishment of the Savannah Accelerated Development Authority (SADA) in 2009 was a major response to effects of climate change associated with floods and drought. SADA's main aim is to promote sustainable development using the notion of a forested and green north to catalyze climate change reversal and improve the livelihoods of the most vulnerable citizens. The strategy intends to provide opportunities for poor peasants, especially women, to own assets in economic trees, sustain their food crop production and protect the fragile eco-system of the northern savannah by managing the flood-prone riverbeds better. However, SADA has been perceived as a conduit for siphoning public resources into private business, with little to show for its statutory mandate.

Along with property damage, floodwaters spread pollution from solid waste, industrial waste and sewage, an important health and environmental issue particularly in poor areas (Rain, Ryan, Ludlow, & Antos, 2011). Since 1995, floods have caused increasing damage in Ghana, particularly in coastal areas. The cities of Accra and Kumasi have been particularly severely affected, with many forced to leave their homes (Rain, Ryan, Ludlow, & Antos, 2011). The National Disaster Management Organisation (NADMO) responds to flooding disasters every year. The June 2010 floods demonstrated how climate change can reverse development investments, with a total of 24 deaths, more than a 1,000 homes destroyed, millions of dollars in property losses, 5,000 people evacuated in Tema and a bridge linking Ghana and neighboring Togo collapsed, cutting off travel between the two West African countries (Ministry of Environment, Science, and Technology [MoEST], 2012).

Several factors contribute to the flooding problem. The massive growth of Accra has increased the extent of impervious surfaces (roads, rooftops, sidewalks, bedrock outcrops and compacted soil) that prevent infiltration of water into the soils. This leads to increased discharge that overloads drainage channels. Also associated with rapid urbanization are flaws in the drainage network such as undersized, unconnected or improperly channeled drains (Okyere, Yacouba, & Gilgenbach, 2012). In addition, poor development controls and limited garbage collection and disposal block channels and sewers, slowing drainage. Substantial uncontrolled development occurs in low-lying or unsafe areas, often immediately adjacent to and even directly over drainage channels (Rain, Ryan, Ludlow, & Antos, 2011).

Forecast of trends in extreme climatic events mainly focus on rainfall and temperature because of the type of modeling applied. How this ties to climate related hazards, particularly floods that affect urban areas, is an area with little research and information. Moving forward, forecasting of climate change can be tied to its possible impacts; for example, urban floods, and this will call for consideration of non-climate parameters including the current state of infrastructure and social and economic conditions. Such an approach will create more awareness and engender a more proactive policy response for dealing with climate-related vulnerability in urban settings.

Climate change affects different sectors of the national economy. The 2008 national sectoral climate change vulnerability and adaptation assessments revealed the substantial impact of climate change on the national economy, with clear evidence that many key economic assets—the coastal zone, agriculture and water resources—were affected, as well as social development in terms of poverty reduction, health and women's livelihoods (Environmental Protection Agency (EPA), 2011). As a country that depends mainly on rain-fed agriculture, Ghana is highly vulnerable to changes in climate variability, seasonal shifts, and precipitation patterns. Areas vulnerable to climate change are water resources, agriculture and food security, biodiversity, human health, coastal zones, land management, national revenue, hydropower production, tourism and women and the poor (Environmental Protection Agency (EPA), 2007). In 2010, Vice President John Dramani Mahama stated that the country could not allow climate change to erode the gains made and that the only way to

go forward developmentally was is to address its impact and to seize any opportunities it presents (Government of Ghana, 2010).

Flooding arising from climatic variability is an obvious and immediate threat to economic growth, energy supply, roads and transport, food and agriculture, education, health, water and sanitation, and social protection. The northern floods in 2007 (NADMO, 2009) demonstrated how climate change can damage development-related investments. According to Aid International (2006), urban floods spread disease, interrupt schooling and destroy houses, assets and income. Yaro (2010) observed that climate change mainly affects agriculture, water, physical infrastructure, health and the environment in Ghana. Among other things, it leads to malnutrition resulting from food insecurity, health problems and conflicts because of resource scarcity and degradation, and contributes to the decision to migrate.

Generally, households in regions with low annual rainfall are most vulnerable to climate change. Reduced water resources and/or drought affect agricultural yields and consequently food security. Northern Ghana and the south-eastern coastal strip, where rainfall is generally low and does not support agriculture all year round, would be hardest hit by climate change. Following projections of sea-level rise of Ghana's coast, coastal communities are also at risk of inundation and its associated impacts. Coastal populations may suffer from contaminated food and water, and the spread of parasitic and enteric diseases through stagnant floodwaters (Kandji, Verchot, & Mackensen, 2006).

A review of the literature illustrated the relationship between climate change and the industrial and services sector (power supply, agriculture, and economic and technical infrastructure) and the health and education sectors. The vulnerability of each of these sectors and the interrelationship of the vulnerabilities of the various sectors remain to be better understood.

The Government of Ghana also recognizes that the human impact of climate change falls mainly on the urban poor living in low-lying and flood-prone areas, the rural poor who rely on groundwater for water supplies, and women and children (Government of Ghana, 2010). Ghana has made significant progress in poverty reduction in recent decades, but poverty persists in the north and in urban slums. In cities, including Tamale and Ashaiman, impoverished groups are the most at risk of poor outcomes from hazards because of unimproved housing, housing in unsafe locations, local deficits in services and infrastructure for safety and improvement, less adaptive capacities to support household shifts for survival and less legal protection in the form of insurance and/or governance. Low-income groups have few options but to live in areas others would find too dangerous, such as makeshift housing for new migrants in hazardous areas (Derbile, 2010).

The majority of the population of Ghana is asset poor, relying heavily on natural-resource-based activities (Allison et al., 2009; Challinor, Wheeler, Garforth, Craufurd, & Kassam, 2007) that make them vulnerable to climate-change effects. Further, unequal access to

resources exacerbates those risks to those who socially or politically marginalized, such as those differentiated by gender, age, status, tribe, politics and policies (Benneh, Songsore, Nabila, Amuzu, Tutu, & Yaugyuorn, 1993).

The impact of climate change on women is observed with much concern as it relates to Ghana's economy. Aside from their contribution to the gross domestic product (GDP), women are responsible for household water, fuel and food and depend on natural resources for their livelihoods. The anchors of women's economic and social life are being eroded by climate change (Fosu-Mensah, Vlek, & MacCarthy, 2012). Urban women's adaptive capacity to climate change is affected by limited access to land and credit for possible livelihood diversification strategies (Satterthwaite, 2008).

How differentiated social and economic groups are affected by climate change remains a grey area requiring further research. Ghana's north-south divide in terms of public and private investment may be exacerbated by climatic stress in northern regions, where temperatures are already relatively high (Derbile & Kasei, 2012; Derbile, 2013).

Climate change and its associated effects such as reduction in water resources, low agricultural production and food insecurity are potential push factors of migration, particularly in agrarian communities. Migration to towns and cities swells existing slum communities that are susceptible to climate change stressors such as storms, droughts and floods. Migrants arriving in the cities, many of them young women who make a precarious living as porters, are exposed to new vulnerabilities on the streets and add to the pressure on existing services (Gyampoh et al., 2007). Internal migration can either be seasonal or long-term. In Ghana, seasonal labour migration and movement of pastoralists within, and from Northern Ghana, reflect differences in the timing of the rainy season (Gyampoh et al., 2007) and fluctuating work opportunities in commercial agriculture. It is unknown what percentage of the movements can be attributed to climate.

In urban areas, the extent of vulnerability to climate change is moderated significantly by the strength of the urban economy, as a strong economy may provide a diverse range of possible coping mechanisms and the extent of public and private investment in disaster management for protection against the worst effects of a climate shock (Yaro, 2010).

Building urban community resilience to climate change can be accomplished through mitigation and adaptation strategies. Individual response strategies tend to be adaptive rather than mitigative. For the urban vulnerable groups affected by climate change, Gyampoh et al., (2007) proposed that failure to adapt could lead to significant deprivation, social disruption and population displacement and even morbidity and mortality. The challenge is to identify adaptation strategies that favor the most vulnerable groups. Adaptation to climate change within the various livelihood systems in an agroecological zone is an important means of obtaining sustainable livelihoods (Owusu, Waylen, & Qiu, 2008).

According to Yaro (2010), adaptation potential is a function of the social relations and processes that mediate access to resources within an ecological zone. Social relations reflect the interests of diverse groups, often influenced by cultural, economic and physical change in the quest to achieve sustainable livelihoods and exert influence. Livelihood diversification is one of the key factors for mitigating the effects of climate change and an effective long-term adaptation strategy in all zones in Ghana. For medium-term interventions, Yaro suggests more infrastructure and institutional capacity to build resilience among the weak and poor.

The implications of climate change on rural agriculture have dire consequences for food security and vulnerability of the urban population, but this is seldom addressed in the literature. Rural areas and northern Ghana remain a main source of major food supplies (tubers and cereals) for urban populations, but the chain effects and implications require better understanding. The potential for urban agriculture, particularly irrigation, is seldom a subject of research except regarding the health aspects of the production.

Over the years, farming communities and other natural resource dependent communities in Ghana have found ways of coping with changes in climate. Most of what is known about adaptation strategies relates to rural areas. These adaptation or coping strategies vary from community to community (Gyampoh et al. 2007), although communities in the same agro-climatic zone often exhibit similar coping strategies. For instance, farmers in the Atankwadi basin around Navrongo plant multiple indigenous drought-resilient crop varieties and employ different rounds of seeding and or staggering planting between multiple farms as part of their indigenous knowledge system for adapting to drought (Derbile, 2013). Gyampoh et al. (2007), in a study on using traditional knowledge to cope with climate change in the Offin River basin in Ghana, identified the coping strategies of water rationing, rainwater harvesting and traditional taboo/forbidden days. Gyampoh et al. (2007) found out that traditional people cope with risk arising from excessive or low rainfall, drought and crop failure by growing many different crops and varieties with different susceptibility to droughts and floods. They also diversify their livelihoods through hunting, fishing and gathering of wild food plants. While much is known about local adaptation strategies and the role of indigenous knowledge in adaptation in rural areas, little is known about knowledge systems of adaptation in urban areas, even where populations practice agriculture.

Researchers should set an agenda for monitoring and evaluating the implementation of Ghana's recent climate change policy to provide a better understanding of the role of the state in mitigation and adaptation. Literature on urbanization and climate change in Ghana mostly focuses on the city of Accra. The nexus between urbanization and climate change remains a grey area at both the city and national levels.

1.2. Background of the Qualitative Assessment

The ResilientAfrica Network (RAN) is a USAID-funded program that brings together a network of 20 African universities in 16 countries to build resilient African communities

through innovative solutions. RAN is one of seven university-led development labs under the Higher Education Solutions Network (HESN) in the Office of Science and Technology (OST) of USAID. The core partners in the Network are: Makerere University (the lead institution), Stanford University, Tulane University and the Centre for Strategic and International Studies (CSIS). The RAN program is implemented through an operational-level network of four university-based Resilience Innovation Labs (RILabs) in sub-Saharan Africa. The West Africa RILab is located at the University for Development Studies in Ghana and networks with the University of Education in Winneba and the Kwame Nkrumah University of Science and Technology in Ghana (KNUST), Cheikh Anta Diop University of Dakar in Senegal and the University of Bamako in Mali.

The West Africa RILab, consistent with the RAN theory of change, seeks to strengthen resilience by adopting a data-driven approach to identify resilience dimensions and priorities in five communities in three countries: Ashaiman, Tamale and Navrongo in Ghana; Pekin in Senegal; and Tiebani in Mali. The aim is to identify evidence-based innovation solutions to strengthen the resilience of African communities to priority shocks and stresses. The selection of districts was based on the frequency, magnitude and effects of the shock/stress, vulnerability of the population and existing adaptive capacities in the communities, as well as potential ways that RAN can contribute to mitigating the vulnerability factors. These factors were explored and validated in a thematic literature review of resilience priorities in the West Africa region.

Development and humanitarian aid historically have been addressed on a project-by-project basis within different sectors. Although these efforts have saved lives and met immediate program objectives, they have not increased the capacity of affected populations to withstand future shocks and stresses (i.e., built permanent resilience). This is the reason why the same shocks and stresses often result in the same consequences on affected communities when they recur. RAN adopts an evidence-based approach to resilience programming that involves collection and analysis of data from communities to identify resilience priorities, which then feed into RAN's innovations agenda. This innovations agenda will be widely disseminated to stakeholders in development programming and used by the RILabs to develop innovative solutions that build the resilience of target communities. As a university-led program, RAN engages students and faculty members in resilience building innovations and gathering the evidence needed to support such solutions.

To add value to existing models for resilience building, RAN's approach to resilience programming is driven by evidence, as a basis for developing an innovations agenda that responds to resilience challenges identified and prioritized by communities. To generate the evidence base for its innovations agenda, RAN data collection includes 1) context analyses through review of the literature on resilience of target communities to validate the thematic areas of focus, 2) analysis of datasets from authoritative sources to further validate the choice of thematic areas of focus and 3) community consultations through qualitative studies to further understand the latent drivers of resilience in the target communities. These data collection activities validate RAN's theoretical framework for understanding resilience of

communities that was developed by Tulane University and problem sets that will be used to call for innovations to address challenges in the target communities. RAN conducted this qualitative study of three resilience surveillance communities in Ghana to contribute to the evidence for understanding the underlying drivers of resilience.

Developing a framework for understanding, measuring and monitoring resilience in vulnerable communities in sub-Saharan Africa requires a thorough understanding of the dimensions of resilience in the geographical areas of focus. RAN's four RILabs each proposed priority themes and geographical areas of focus but needed to understand the range of vulnerability factors, underlying drivers of vulnerability and adaptive capacities of the target communities. It was also important to understand underlying causes of shocks/stresses and their corresponding diverse effects on people in the affected communities. This qualitative data would inform the development of quantitative tools to measure resilience in target communities.

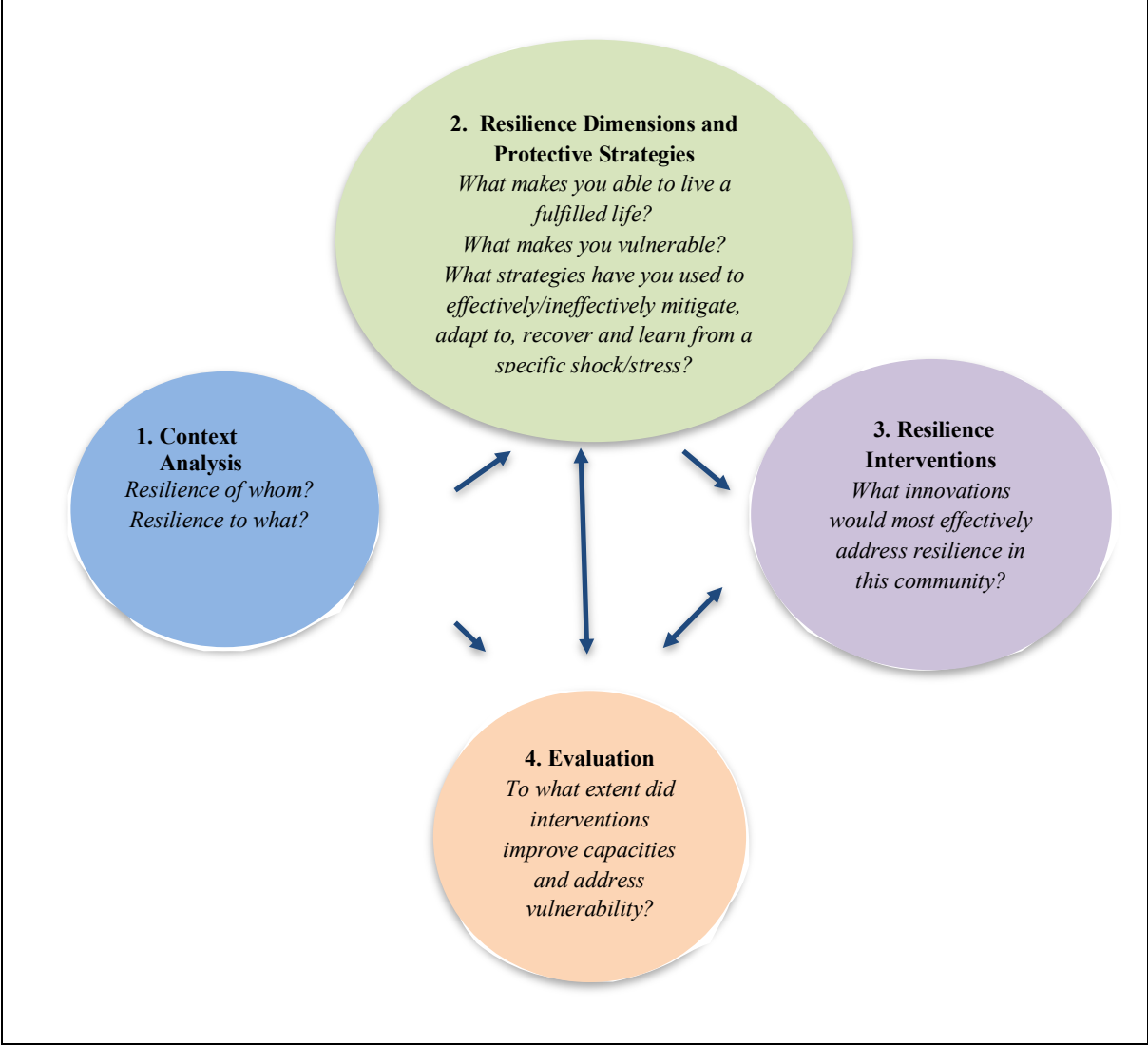
Available information was only anecdotal, guided by a preliminary literature review based on a narrow range of resources. While many frameworks have been used to assess resilience, there is no unifying framework for all contexts in sub-Saharan Africa. There was therefore an urgent need for a more in-depth understanding of specific shocks and stresses; their severity/magnitude; their primary and latent causes and effects on the target populations; factors that make people, infrastructure and institutions vulnerable to the shocks and stresses; and existing adaptive factors to understand the ecology of resilience in each of the target populations. Each RILab therefore conducted a literature review and a rapid assessment (community consultation of key informants) to validate its thematic area of focus.

Strengthening systems' resilience is to ultimately improve their wellbeing. This necessitates understanding contextual factors, resilience dimensions and protective strategies and how to design interventions that build on systems' capabilities to strengthen their resilience, all of which results in improved wellbeing. RAN defines resilience as the capacity of people and systems to mitigate, adapt to, recover and learn from shocks and stresses in a manner that reduces vulnerability and increases wellbeing. A resilience framework is a conceptual tool that guides the following:

- Understanding shocks and stress that affect populations and systems and the factors that render them vulnerable to those shocks and stresses
- Understanding what makes people and systems resilient (what makes them capable to live fulfilled lives and protective strategies-how they mitigate and respond to shocks and stresses)
- Identifying resilience dimensions and indicators and assessing system resilience
- Identifying entry points and prioritize interventions to strengthen capacities and reduce vulnerabilities to build systems' resilience

To accomplish this, the RAN Resilience Framework involves a four-step process from analyzing the context to understanding and prioritizing resilience dimensions, developing relevant interventions and evaluating their effectiveness in increasing resilience (figure 1).

Figure 1. The RAN Resilience Framework



Step 1: Context Analysis

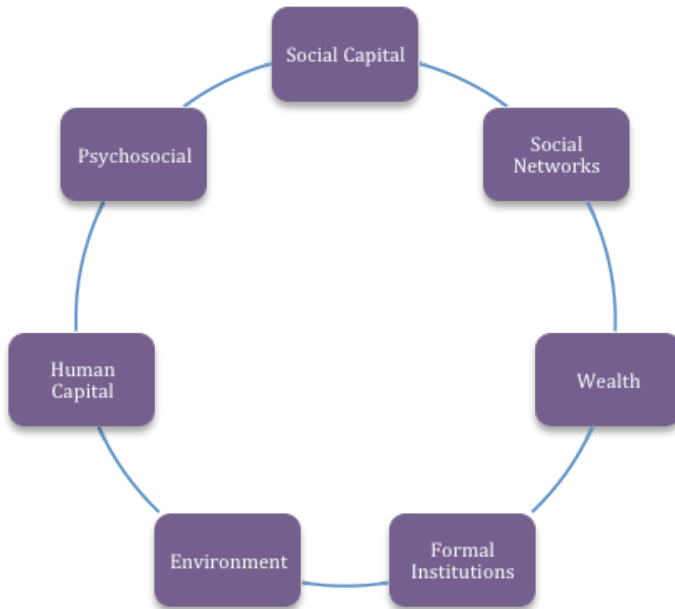
The first step in RAN’s resilience framework is to define “resilience of whom” and “resilience to what.” This will identify the priority shocks and stresses for resilience programming, as well as the unit of application for programming (i.e., individuals, households, communities, or systems). This step requires a thematic literature review and a qualitative rapid assessment involving consultation of target communities.

Step 2: Elaborating the Resilience Dimensions and Protective Strategies

The second step is to explore the drivers of resilience in target communities. This involves further exploration of factors that make communities capable, latent factors that keep

communities trapped in vulnerability and existing adaptive capacities in the communities. These factors will be used to develop dimensions of resilience that cut across all regions as well as specific dimensions (figure 2 shows example) suitable for the unique contexts in the four regions of sub-Saharan Africa.

Figure 2. Examples of Resilience Dimensions



By understanding and analyzing the strategies used from past and future experiences, RAN will identify key dimensions of resilience that are the most influential to strengthen a system’s capacity to mitigate, adapt to and learn and recover from a certain challenge/stressor. Step 2 involves collecting primary qualitative data. The dimensions identified in step 2 are used to develop indicators, which are translated into quantitative tools to measure the prevalence of the different resilience factors in the target populations.

Step 3: Resilience Interventions

Having prioritized dimensions and thus entry points for interventions in step 2, RAN will identify, incubate, test and scale innovations that target capabilities and reduce vulnerabilities to strengthen a system’s capacity to address a specific challenge/stressor. Stanford University has provided technical support to RAN by creating the enabling environment in all four RILabs to identify and incubate innovations and a team-based Massive Open Online Courses (MOOC) platform to test and scale innovations.

Step 4: Resilience pathways and outcomes

This step assesses the results of interventions aimed at strengthening resilience and the way improved resilience ultimately improves wellbeing. Questions include whether the interventions increase capacities and effectively address the targeted vulnerabilities. RAN will develop an evidence-based management strategy to assess progress toward achieving

the three strategic objectives by monitoring outputs and outcomes. Data collection methods will comply with assumptions required for statistical rigor (e.g., random samples for survey methods) and empirically assess the impact of innovations and the online courses.

The general objective of the rapid assessments is to gain a deeper understanding of the variability of resilience factors to priority shocks and stresses in the target populations of ResilientAfrica Network's participating regions, as a basis for informing development of resilience dimensions and metrics.

The specific objectives of the assessments are:

1. To understand the variability of different effects of priority shocks and stresses that communities face
2. To explore the factors associated with vulnerability of people, infrastructure and systems to the negative effects of shocks and stresses, as a basis for developing resilience dimensions and metrics
3. To understand the latent factors that lead people to persist in vulnerability as a basis for developing resilience dimensions and metrics
4. To explore how communities currently manage, mitigate and adapt to priority shocks and stresses as a basis for developing resilience dimensions and metrics

The findings of this study will be shared with the research communities to help validate the results and better understand their context in the communities. It is also important to explore a full range of innovations that can be scaled up to address the challenges posed by rapid urbanization, food insecurity and climate variability. A good forum could help create opportunities for these interventions to be discussed, their relative strengths and weaknesses assessed, and best options selected for potential programming.

CHAPTER TWO: METHODOLOGY

The RILabs received support from Tulane University's Disaster Resilience Leadership Academy (DRLA) and RAN's secretariat for the qualitative data collection and analysis in the three communities in Ghana. This support included workshops, field data collection, virtual support and guidance notes. Appendix 1 lists the members of the West Africa RILab research team.

2.1 Study Setting and Study Population

This study covers three administrative capitals in Ghana: Ashaiman in the Greater Accra Region, Tamale in the Northern Region and Navrongo in the Upper East Region.

Ashaiman is the administrative capital of the Ashaiman Municipal Assembly, which was created in 2008 and forms part of 16 metropolitan areas, municipalities and districts in the Greater Accra Region. The Municipality shares boundaries with Tema Metropolitan area to

the east, Ledzokuku-Krowor Municipality to the South, Adentan Municipality to the north and La-Nkwantanang-Madina Municipality to the west.

Tamale is the administrative capital of the Tamale Metropolitan Assembly (TaMA), one of six metropolitan assemblies in the country and the only one in the northern part of Ghana. TaMA has three sub metropolitan areas—Tamale Central, North and South and shares boundaries with six other districts, Savelugu-Nanton to the north, Yendi Municipal Assembly to the east, Tolon-Kumbungu to the west, Central Gonja to the southwest, and East Gonja to the south. The metropolis has a land size of 750 km², about 13 percent of the total land area of the Northern Region. The estimated population in 2012 was 444,074, of which 221,979 were females and 222,095 males.

Navrongo is the administrative capital of the Kasena Nankana Municipal, which has six (6) urban/area councils (Navrongo Urban Council and Manyoro, Kologo, Naaga, Pungu and Doba Area Councils). It shares boundaries with Kassena-Nankana West District to the north, Bolgatanga Municipal to the east, Builsa and Kassena-Nankana West districts to the west and West Mamprusi District of the Northern Region to the south. The total population was 156,090 in 2010 (KNEDA, 2012), with 80,542 (51.6 percent) female and 75,548 (48.4 percent) male.

The study population included people in purposefully sampled communities in each district and representatives of agencies involved in humanitarian and development programming in the study areas.

2.2. Study Design

The study was a qualitative rapid assessment, employing focus group discussions (FGDs) and key informant interviews (KIIs). A grounded theory approach was used to guide the development of a theory and dimensions for understanding resilience in target communities in study areas within the West Africa RILab.

For this assessment:

- **Resilience** was defined as the capacity of people and systems to mitigate, adapt to, recover and learn from shocks and stresses in a manner that reduces vulnerability and increases well-being (RAN definition).
- **Risk** was defined as the probability of suffering damage (to life, property, economic situation and environment) from a hazard for a given area and reference period.
- A **shock** was defined as a sudden occurrence resulting in a significant challenge to livelihood.
- A **stress** was defined as a slow-onset or chronic occurrence resulting in a significant challenge to livelihood.
- **Vulnerability** was defined as the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

- **Adaptive capacity** was defined as the combination of all the strengths, attributes and resources available within a community, society or organization that can be used to avert some or all of the negative effects of a shock or stress.
- **Physical infrastructure** refers to built structures, e.g., buildings, roads, bridges, schools and churches/mosques.
- **Livelihoods infrastructure** means holdings on which households or communities depend for income, e.g., gardens, crops and stored produce.
- **Institution** was defined as the leadership or governance structure for the affected community.

The themes of the rapid assessment were:

1. Further clarification of the main shocks/stresses affecting the study populations, their frequency, their primary effects in the target communities and their secondary effects (risks)
2. Factors that make people, infrastructure and institutions vulnerable in these communities (vulnerability factors)
3. Factors that make people, infrastructure and institutions fail to permanently resist, reduce or eradicate the vulnerability factors (drivers of vulnerability)
4. Factors that, to varying degrees, empower the respective communities and their institutions to resist the effects of these shocks in their settings (adaptive factors)

The Institutional Review Board of the Navrongo Health Research Centre provided scientific and ethical clearance of the protocol. A stakeholder interface meeting involving community leaders, local authorities and civil society actors was held to share and validate the findings of the study.

2.3 Sample Size and Technique

This being a qualitative study, the sample size is not meant to achieve generalizability but rather phenomenological saturation. The sample size for the FGDs was three focus group discussions of at least eight participants in three communities of each of the study districts. The selection of the study communities in each district was guided by the thematic focus and the communities' vulnerability to the resilience challenges identified in the literature. Traditional leaders and other opinion leaders were identified and asked to select group participants. The minimum sample size for the key informants was 25, with eight interviews in two of the districts and nine in one district. The key informants were selected purposefully after consultation with the respective district assemblies. Table 1 lists the study districts, communities and number of focus groups and key informants.

Table 1. Focus group discussion and key informant interviews

District	Community	Focus groups	Key informants
Navrongo	Gia Manyoro Doba	6	8
Tamale	Nyohini Kanvili Dungu	6	8
Ashaiman	Moni-Obaanye Obaakakye Lebanon Zone 5	6	9
Total		18	25

2.4. Data Collection Procedures

The data gathered were qualitative in nature and meant to help the RILab team obtain more detailed information and also clarify the resilience dimensions identified in the literature review. The main data collection methods used were FGDs and KIIs. Four teams were constituted for the community consultations: a faculty team, a field-based data collection team, a supervision team made up of postgraduate students and a translation and transcribing team. The data collection teams were oriented on community entry and the ethics of community-based data collection. They were also trained on how to use the data collection tools and conduct the interviews in the local languages, namely Dagbane, Kasem/Nankani and Twi/Ewe. The tools were pre-tested after the training and all challenges were adequately addressed before the data collection began.

The field research teams conducted three FGDs in each of the three selected communities. Community-based focus groups included eight members each and included male and female groups. Individuals from the community with knowledge of the resilience challenges were identified with the support of traditional leaders. After the appropriate community entry procedures, the research teams, with the help of community traditional leaders, composed the focus groups and set the venues, dates and time for the meetings. The research team members explained the purpose, effects and benefits of the study and duration of the discussions and obtained collective oral consent. To guarantee civil discourse, group members were urged to respect each other's views and avoid personal attacks during the discussions. The discussions were audio recorded.

The KII procedure involved compiling lists of key informants and addresses. Two key informants each were selected from local government authorities, civil society actors, traditional leaders and other opinion leaders in each study district. Lists of civil society organizations were obtained from the district assemblies. The data collectors relied on these

lists to arrange individual visits to conduct the interviews. The data collectors explained the purpose, duration and benefits of the study. Oral consent was obtained before conducting the interviews. No key informant declined an interview.

This assessment had limited or no inquiry into individual experiences because it was not inherently designed to measure attributes of individuals. Issues were discussed with the community as the reference. Questions that were asked of key informants referred to the geographical area and population as a whole, and not to individuals, and therefore did not entail any invasiveness to human subjects.

All participants gave full informed consent at the time of recruitment. The assessment team ensured privacy and confidentiality. Anonymous identifiers were used during the FGDs so that no names were tagged to particular responses. It was not possible to keep key informants anonymous because their status was part of why they are selected. All data generated from the assessment were used solely for the purpose of the study, and all information was kept confidential.

The data collection process was supervised by selected faculty to ensure that the interviews and discussions were carried out according to the prescribed standard. One supervisor was designated for each of the study districts. Field supervisors visited field workers in the field and helped them resolve field challenges. Data from the FGDs and KIIs were recorded using digital voice recorders. Thereafter, they were transcribed and then translated into English.

2.5. Data Analysis

The data were analyzed using the NVivo qualitative data package. The analysis was done in two stages, manifest content analysis followed by latent content analysis. The transcripts were read and re-read by a team of three officers, who then assigned codes and came up with a coding structure (open coding). Data meaning units were then aligned under their respective codes. This was followed by axial and selective coding to develop higher codes and sub-themes. Sub-themes were reviewed further to develop overarching themes (typologies). Typologies were then used to derive constructs and dimensions in the resilience assessment framework for the respective districts.

CHAPTER THREE: RESILIENCE TO RAPID URBANIZATION IN TAMALE

Over the past two decades, the Tamale metropolis has undergone rapid urbanization and a tremendous population increase. This phenomenon, compounded by climate change and other challenges of urbanization, has adversely affected the food security situation in the metropolis. This section examines the issue of food security and rapid urbanization as they relate to climate change and resilience in the Tamale metropolis. The qualitative analysis of results from Tamale focused on nine dimensions (*Wealth, Human Capital, Health/Health*

Services, Infrastructure, Security/Protection/Advocacy, Natural Resources/Environment, Social Capital/Community Networks, Psychosocial Wellbeing and Governance), based on transcripts from FGDs and KIIs.

3.1. Wealth

In the RAN framework, the dimension of *Wealth* describes both financial and non-financial assets measured by income, expenditures and consumption. It also includes access to credit and important resources such as shelter and durable goods. Wealth can describe livelihoods from formal and informal employment and other income sources and general household- or community-level choices and activities that provide food, health, income and other benefits. In addition, this dimension looks at food security defined as the physical, physiological and financial access to sufficient and nutritious food.

In the Tamale metropolis, the concept of wealth is broadened to cover access to a strong social safety network of relatives in the extended family system. In this sense, human beings constitute wealth, as cash and non-cash transfers from relatives contribute to the acquisition of financial and non-financial assets. In addition, social insurance in the form of well-brought-up children, nephews and nieces is a guarantee of this form of wealth. Land, which is generally a natural resource in this social context, is often sold for income and therefore classified as wealth. Finally, access to regular income in the form of employment is perceived as wealth in the Tamale metropolis.

3.1.1. Adaptive Strategies

Adaptive strategies include the ways community members engage in subsistence farming for household consumption and sell extra produce for income. The extended family system also serves as collateral for households who are unable to earn their livelihoods. Land is sometimes sold to raise money for the upkeep of family members.

In this community, the people farm to feed their family, and some of the farm produce is sold at the market for money. (Male FGD participant, Kanvilli)

Northern Ghana has vast land, and the landowners sell it to make a living since they do not have other sources of income. (Male key informant, Tamale)

3.1.2. Coping Strategies

Migration of youth to southern Ghana in search of jobs is a coping strategy under this dimension. As a result of poverty, children are sometimes compelled to engage in trading to supplement household income. Women get loans from microfinance institutions for trading. However, the high interest rate demanded by such financial institutions makes repayment difficult, reducing resilience in this dimension. The sale of farmland to build houses means that farmers have to travel far to farm.

Well, there are no farmlands again. All the lands have been sold to people for houses to be built. How can we farm again? If you have to farm, you would have to go to a different community. (Female FGD participant, Kanvilli)

3.1.3. Vulnerability Factors

High illiteracy rates among community members make them vulnerable to poverty. A high fertility rate also means more children to take care of, which can exacerbate poverty. Lack of resources for modern agriculture keeps people from engaging in large-scale farming and predisposes them to food shortages from poor yields.

If you are not able to buy fertilizer, which is prominent in all our farm activities, you won't have proper yields. (Female FGD participant, Kanvilli)

People give birth to so many children in this community that they are not able to adequately take care of them. The economy is hard, and yet the practice of giving birth to too many children still lingers on. (Male key informant, Tamale)

3.1.4. Causes and Effects

Climatic change has led to erratic and poor rainfall, leading to poor crop yields. Poor yields mean that many households do not have enough food for household consumption or sale for income. This aggravates poverty because most residents rely on farming for their livelihood. The inability of households to earn adequate income means that children have to drop out of school to find other means of survival. Some engage in petty trading such as selling iced water. Many who engage in trading are not able to break even because of lack of customers.

Why I say our biggest challenge is poverty is because our businesses are not moving on well. Quite a number of us do trading. You can go bring goods to sell and you would not get people who would buy the goods, even though they want them. In some cases, the goods even expire or go bad. (Male FGD participant, Nyohini)

Inability to earn income further fuels migration to southern Ghana in search of non-existent jobs.

A lot of the children are school dropouts because there are no resources to support them to further their education. That is a big worry for us. (Female FGD participant, Kanvilli)

Another cause of poverty is the sale of farmland to real estate developers.

Now our farmlands have been taken over, and we also haven't learnt other jobs to enable us to survive. If we had gotten jobs with UDS [University for Development Studies] as laborers or even security men, we would embrace that very much. It's

our farmland they have converted into the university. (Male FGD participant, Dungu)

Therefore, people who have not acquired skills outside of farming do not have alternative sources of income, which can exacerbate poverty. In addition, people who are able and willing to work may be unable to find stable employment. They are forced to compete for limited local opportunities or travel to other places in search of jobs.

The children travel because there is increase poverty in the communities. People travel in anticipation of jobs. There are no jobs in this community. Let me tell you, when Fatawu bicycles established their food vending, unless you came and saw the number of people in the queue looking for jobs there! They could only employ those they can, but they cannot employ all of them. (Female FGD participant, Nyohini)

3.2. Human Capital

This dimension refers to skills, knowledge and labor that together enable people to pursue different pathways to promote livelihood and wellbeing. Elements of the dimension are education, skills training, employment and mentoring opportunities and access to the infrastructure that promotes human capital development in the study area.

3.2.1. Adaptive Strategies

The community is endowed with strong youth who often provide unskilled labor for community-based development projects. This adaptive strategy can solve some community problems and reduce stress from urbanization and climate change.

We also have (unskilled) labor we can provide to support whatever development agenda comes. (Male FGD participant, Nyohini)

3.2.2. Coping Strategies

Exodus to other places for better job opportunities is an unfavorable strategy for community development, as it reduces available human capital. The aged are often the ones left in the community.

A lot of the youth do go out of the community in search of greener pastures. A lot of youth are no longer in the community. They have all migrated to do kayakaya [work as porters], and this is a result of the lack of jobs. (Male FGD participant, Dungu)

3.2.3. Causes and Effects

A high rate of illiteracy makes many people unable to get jobs after they finish school. They are therefore compelled to engage in unproductive activities. The study found that unemployment makes the area vulnerable to conflict and its effects on livelihoods.

Young ladies and guys after school do not have work. We even learn that very soon the teaching that our youth are engaged in will not be paid any longer. The stoppage of the allowance in the training colleges will affect our children very adversely. (Female FGD participant, Nyohini)

Lack of schools in the area was also mentioned as a cause of poor capital development.

Another problem is the inadequate educational facilities and also the resources to go through the educational levels. We don't have a junior high school in the area. (Male FGD participant, Dungu)

3.3. Health/Health Services

This dimension includes the varied aspects of physical health (health status, epidemics, injuries, physical and financial access to health services, quality of health services and health personnel). It also includes considerations of proxies for good health, such as access, systems and practices related to water, sanitation and hygiene (WASH). In the Tamale metropolis, however, health is narrowly defined to mean the absence of illness. People who are not physically ill consider themselves healthy.

3.3.1. Adaptive Strategies

Adaptive strategies employed by people in the Tamale metropolis regarding health and health services relate to land use. For example, advocating for land, a scarce resource, for the construction of public WASH facilities and providing clean drinking water and resources for waste management are sound health-related activities. Other activities include subscribing to the national health insurance and having reliable sources of income to be able to cater for health needs.

With the health insurance, what I have to say is that it is very useful when you are admitted to the hospital. It is only then you will realize that the health insurance is very useful. The health insurance will be able to cater for all your hospital bills. Thus, if you do not have health insurance, you may have to sell all your property to be able to settle your hospital bills on discharge. Even though the health insurance does not cover that much medication, when you are admitted in to the health facility, you will realize that it is very useful. It covers the bed and use of the facility items in the hospital. (Female FGD participant, Nyohini)

I think that potable water supply should be the priority in this community...We said after getting jobs we will also need potable water supply in this community. Our major problem is the water. If you do not have water to drink and bathe, how can you carry out your daily activities? (Ibid)

3.3.2. Coping Strategies

Coping strategies to deal with health issues in the Tamale metropolis include adjusting household finances to pay for clean drinking water. Even having piped water may not guarantee clean water. Limited access to toilets makes some people resort to outside urination and defecation, which can contaminate water sources and spread disease among children and animals.

In addition to a difficult economy, there is the urbanization-space challenge in lack of adequate toilet facilities in most houses and in the community. This may lead to stress and even conflicts, for example, when community members need to go to the toilet urgently, attend to nature's call and therefore compete for the inadequate toilet facilities around. The lack of grasses and shrubs makes it very challenging for our children to defecate. Imagine in all this large community; we do not have any public toilet facility. (Female FGD participant, Nyohini)

Yes, people defecate in bowls and rubber bags and throw it over their houses. Imagine someone trying to do this and the rubber bursts; won't it soil the person? If the person has a toilet, he will just go and defecate there. (Ibid)

3.3.3. Vulnerability Factors

Primary health and health vulnerability factors in the Tamale metropolis include inadequate availability of health facilities and qualified personnel, the high cost of good health services, the lack of ambulance services for emergency health cases and poor linkages between health facilities. In addition, lack of potable drinking water for over 30 percent of the people in the city, inadequate toilet and waste disposal facilities and problems associated with health insurance are underlying vulnerability factors for this dimension. Contamination of surface water sources increases vulnerability to sanitation-related diseases.

Coming to the issues that bother us as a community in relation to our health and wellbeing, we used to have taps at vantage points where we go to fetch water in the community. These are no longer there. We have problems with regards to health. In the present day, when you fall ill and you don't have health insurance, it is a big problem. Not all of us have health insurance. We have already mentioned the poverty situation in the community. (Male FGD participant, Nyohini)

The first problem would be the water and sanitation problem of the district. Inadequate water supply and poor sanitation. This has a lot of implications for the health of the people. The water table here is very low, and hence wells and boreholes do not survive in the district at all. With the sanitation issues, we have open defecation, which is a problem. Financing household toilets is an issue considering the financial situation. A lot of the people here do not have household toilets. They don't even take permits to construct their buildings. The district works department is doing its best to stop the situation. Most of the houses do not have collection bins for

their waste, and hence you find waste littered around the community. They can't afford the services of Zoomlion, which is a problem for us all (Development Planning Officer key informant, Tamale).

3.3.4. Causes and Effects

An expanding population overstretching health services, and this affects health care delivery. Weak logistics at health facilities constrain their ability to provide quality services. The lack of proper drainage systems leads to flash floods and flooded homes, potentially spreading water-borne illnesses. The underlying drivers of limited health and WASH facilities may be the lack of public funds and available land in the city for the construction of these facilities. Tamale is a city of farms and gardens, where vegetable production is common. Because of improper disposal of waste, this enterprise is facing quality and marketing challenges.

Health wise, we would say nutritional levels of children under five are on the low side. Our health centers are there, but they don't have sufficient logistics to enable them to provide good services for the people. The literates and those who can afford to move out of the district to access healthcare. This also affects our data on health issues. (Deputy Planning Officer)

Lack of toilet facilities compromises good hygiene practices. Most houses in the Tamale Metropolitan Area have no toilet facilities, and there are no refuse disposal areas, so that waste is not properly contained. Enforcement of bylaws on sanitation is also inadequate, inhibiting a more formal waste disposal system.

I think toilet facilities are our most pressing need in this community. Toilets will contribute very much to the sanitation situation in this community, as people would stop open defecation. (Female FGD participant, Kanvilli)

The lack of toilets is a major problem here. We don't have a toilet facility in the community. You would have to walk a distance before you can access a public toilet. (Female FGD participant, Kanvilli)

Another problem has to do with household toilets. There are some communities where the people have toilet facilities in the various households. That isn't the case here. The Assembly tried something like that sometime back, but it didn't work out. Our children who cannot go to the public toilet ease themselves around, which has health implications for us all. (Male FGD participant, Nyohini)

3.4. Infrastructure

This dimension looks at infrastructure such as housing, access roads and utilities. Poor electricity supply emerged as a shock that residents in this community endure in their daily activities. In the Greater Accra region, electricity was linked to security threats, but this was

less true in this study area. This dimension is also closely related to *Wealth*, as difficulty transporting farm produce to urban areas results in post-harvest losses.

3.4.1. Adaptive Strategies

Community members have poor road networks and solicit external support to improve the roads. Some people have started constructing their own roads to improve access to the community.

We are also doing our best and trying to see where we can get support towards these challenge of bad road network - (Male, FGD, Kanvilli)

On the issue of the roads, those of us who are affected and have the resources have started building gradually because we asked for it - (Male, FGD, Nyohini)

3.4.2. Coping Strategies

Building temporary houses using materials that are easily destroyed during rainstorms is common in both northern and southern Ghana. People also move from rural to urban areas because of lack of access roads to the villages.

Though there are houses around, some people cannot afford them, so they have put up their rooms using local material, and these are not strong, so when there are rainstorms, their houses are carried away. (Male key informant, Tamale)

3.4.3. Vulnerability Factors

Urbanization has led to people transforming farmland into residential areas. This has reduced the land available for crop production near urban areas. Migration of people from rural areas to urban centers increases demand for housing, which may be unavailable or expensive.

People move from the rural areas to these urban centers because of a poor road network and for jobs, and this is increasing the demand for housing facilities here. (Male key informant, Tamale)

3.4.4. Causes and Effects

The high cost of rent in the urban center makes it difficult for people to afford housing. As a result, many live in temporary structures built with flimsy, cheap and/or readily available materials. Because of poor road networks, it is difficult to transport food from rural to urban areas. This results in post-harvest losses and further deepens poverty among people who depend on the sale of farm products for income. When fires break out, access to some buildings is a challenge because access routes are blocked by unauthorized structures. According to respondents, this has health implications because injured people would have to be carried to the roadside because of inaccessible routes.

I still want to add to the one who mentioned the access roads in the community. Let me tell you, there was an instance we had a fire in a particular house. We the locals could not control or put off the fire. The fire service came but could not gain access by roads into the community. The fire service was very helpless. The fire burnt everything in that particular house. This was because this our community generally lacks access roads. (Female FGD participant, Nyohini)

This dimension further affects trading in the community, as people are unable to commute to neighboring communities to trade. This also has implications for the wealth and health status of the traders.

Even when we go to the market, it is very difficult to get back home. You would not get a vehicle to bring you back. They all complain about the road. You would get home very tired. (Female FGD participant, Kanvili)

The poor road network also slows down development and reduces trading in the community.

The problem of our lack of access roads affects movement of people, goods and services within the district, and this slows development in those areas and affects other economic activities. (Male key informant, Sagnarigu)

3.5. Security/Protection/Advocacy

The three broad aspects of this dimension are 1) security, which includes exposure to crime, violent conflict and sense of security; 2) protection, which includes human rights, social protection and awareness of opportunities for enhancement, justice, probity and accountability; and 3) advocacy, which includes the sufficient availability of advocacy measures aimed at promoting security and protection. In the study area, this dimension looks at security of property and individuals. The dimension further looks at people's sense of safety in the community and conflict emanating from land disputes.

3.5.1. Adaptive Strategies

Advocating for more authority for chiefs and other traditional leaders is a widely used adaptive strategy. Building on alliances with NGOs that promote peace in the community allows chiefs and traditional leaders to expand their ability to assist communities and reduce the effects of shocks. Disagreements between chieftaincy and other leaders were a common source of conflict that NGOs help mitigate in this study area.

We all know conflicts are very bad for development. Usually when conflicts happen, we do our best to talk things out and emphasize unity for development, and some NGOs are assisting us in this direction. We try to settle our disputes amicably. We discuss them and try to see the way forward. The chiefs and elders know about all our problems. (Female FGD participant, Kanvilli)

3.5.2. Coping Strategies

Frequent conflicts in chieftaincy, particularly regarding succession, trigger movement and migration among community members. Turnover of and high demand for land can cause land litigation issues that may further deepen conflict.

We have had a few conflicts in the area. Chieftaincy issues have come up and land litigation issues as a result of urbanization. People are rushing for lands for development, and there is a lot of pressure. Before there was no competition for lands here, but because Tamale Metro is getting choked, there is a spillover, and since Sagnarigu is close, you have people buying land at exorbitant amounts just to be close to the central town. (Deputy District Coordinating Director).

3.5.3. Vulnerability Factors

Low literacy and unemployment increase vulnerability; literacy blinds you to job opportunities and affects your ability to innovate. Lack of opportunity is locally understood to trigger desperate behavior. This dimension is thus closely related to the dimensions of *Wealth* (poverty) and *Human Capital* (unemployment).

You see, when people have nothing going because they have no jobs, people can give them small money and they start misbehaving. The unemployed youth often start these conflicts; after all, they have nothing to lose. (Male key informant, Tamale)

3.5.4. Causes and Effects

Conflicts in Tamale were related to three main underlying causes—poverty, unemployment and conflict over chieftaincy succession. Unemployment and poverty were repeated themes in this study area.

The main cause of these conflicts is unemployment. The youth have work to do, and the "big people" use them to foment conflict. If they have jobs, everybody would be busy and have no time to plan conflict. (Female, FGD participant, Nyohini-Tamale)

Lack of clear documentation of chieftaincy succession plans was mentioned as one of the factors responsible for frequent conflict.

With the chieftaincy issues, that is a nationwide problem. Because a lot of the time, things aren't properly documented. Conflicts do arise as to who should be the next king, and all that is the problems of succession. (Male key informant, Sagnarigu-Tamale)

Frequent conflicts affect the development of the area and subsequently deepen poverty.

Chieftaincy conflicts affect the community's development. Many investors fear to

invest in communities where conflicts are rampant. Settlers in the area, most of whom are government workers and other civil societies, flee to settle in other communities and never return, thereby adversely affecting businesses and economic growth and development. (Male key informant, Sagnarigu-Tamale)

It [conflict] prevents investors from coming into this community. When people fight, no one will like to invest his or her money in such communities. The presence of the conflict made most of our children migrate out of this community to Accra and Kumasi for other things and for greener pastures. (Female FGD participant, Nyohini)

The major means of stopping conflicts is to get jobs for our youth. When everybody is busy at his or her work place, there will be no time to come together, let alone to even plan a conflict situation. Everybody will be busy at work. Otherwise, when they just cluster together in groups, they will be forced to discuss unproductive topics like conflicts. (Female FGD participant, Nyohini).

The result of these conflicts is that many people feel insecure, which relates to instability in other areas including business development and innovation. Investors are discouraged from doing business in unstable areas, limiting job opportunities for residents. This leads to poverty and its associated effects. Some workers resist being posted to conflict areas, and those already working in conflict areas request transfers.

There are inter-community conflicts, and this is one of the factors that affect their inability to solve their problems. For instance, because community A and B have a conflict, people from A wouldn't want to cross over to B to farm, even though there are no farmlands in A. This slows down development. (District Planning Officer, Tamale).

3.6. Natural Resources/Environment

This dimension represents the physical and biological environment, including soil, water, air, minerals, forest, flora and fauna and their related ecosystems. It also includes the management of natural resources to maintain and enhance their value and performance through various means and the recognition of the value of natural resources and ecosystems. Finally, the dimension means identifying natural resource concerns that are critical to the livelihoods and lives of people, especially vulnerable people. In the Tamale metropolis, natural resources include gravel deposits, loamy soils (*tamalelele*) and smooth sand on riverbanks. These are important, high-value building materials that contribute significantly to the livelihoods of people who own or have access to these resources.

3.6.1. Adaptive Strategies

As adaptive strategies for sustaining natural resources, communities in the Tamale metropolis work toward reducing poverty and food insecurity by using sustainable farming

methods and natural resource utilization. Bush burning, unsustainable farming practices and excessive use of agrochemicals are discouraged.

Poverty is the primary driver of the exploitation and degradation of natural resources. Therefore, strategies aimed at poverty alleviation, efficient energy utilization methods (efficient wood cooking stoves) and alternative income generation activities are important adaptive strategies to ensure the sustainability of natural resources.

Poverty is a primary effect of these problems. If I used to have a parcel of land I farmed on and the chief has sold it to someone else, how do I take care of the family and myself? In all this, poverty is the bedrock of the problems. We can also talk of the level of education of the people. We see that the illiteracy rate is so high. Another issue is that most people depend solely on one livelihood, which is agriculture. When agriculture fails, most of us don't have the diversity to venture into other areas. Another factor is that those of us in northern Ghana have only one rainfall season, unlike our brothers down south who have a bimodal rainfall pattern, whereas ours is mono-modal. And even our rainfall pattern is under threat. If the person fails with his planting, then the family has to manage with gifts or other sources till the next farming season. This brings about so many challenges. (Care International Staff, Tamale.)

3.6.2. Coping Strategies

To cope with shocks and stresses on natural resources, including water stress and land and fuel wood scarcity, people without sufficient access to water have to pay for extra water to supplement domestic water demand.

Well for instance, in the case of the water problems, we go to those who have taps to fetch and sometimes have to pay. Sometimes, too, they aren't willing to sell at all because they say usually the water bills are too high. You can't also force them to sell. (Female FGD Participant, Kanvilli)

Some residents rely on divine intervention through prayer or sacrifice by their chiefs and elders to pacify the gods for positive weather or natural events such as rainfall. For those who believe in these practices, adverse environmental phenomenon such as droughts, floods and windstorms happen according to God's will.

...[only God can] make the rains come or not come. It is only God who has the prerogative to decide when it rains. This is the manifestation of the powers of God in our lives. (Male FGD Participant, Nyohini)

The recent expansion of Islam in the Tamale metropolis limits the practice of prior African religions.

3.6.3. Vulnerability Factors

One of the vulnerability factors related to *Natural Resources/Environment* in the Tamale metropolis is water stress, including aquifers, streams and wells drying up in the dry season. Reduced rainfall levels and distribution make people in Tamale vulnerable to the effects of scarcity of water and other resources. Landlessness, excessive use of agrochemicals by farmers in the peri-urban areas of the metropolis, lack of proper drainage systems, sparse tree cover in the city and increasing population leading to high demand for housing are other factors that contribute to vulnerability. Population growth means more mouths to feed, and this leads to clearing of vegetation to create farmland for food production.

True! As you have come into the community, do you find any grass around or vegetation around that can be used to feed the animals? In rearing them now, you have to buy their feed, the drugs, to be able to cater for them. With our poverty situation, how would you do that? It would be very difficult. For those who have learnt to be artisans, they won't get space to set up their shops to run their businesses. That isn't there. How would they survive? You see that the problems worsen by the day. (Male FGD participant, Nyohini)

Our other challenge is lack of water in this community. Even if there was water there, there is no land for one to do farming. People have built very close to the dam. We now do not have thick forest where we can harvest firewood. It has been cleared by the indiscriminate felling of trees for firewood and other purposes. Increasing population and development have also contributed to the loss of those forests. Look, we do not even have space for the construction of a public toilet facility in this our vicinity. We do not have any allotted land for the construction...For the agricultural lands, we have none. (Male FGD participant, Nyohini)

Given that poverty is a basic driver of vulnerability, lack of access of individuals and households in the Tamale metropolis to income generating activities such as vegetable gardening, which was common around some suburbs (e.g., Choggu and Gumbihini), increases vulnerability. Those most severely impacted by poverty (migrants, women and other marginalized subgroups) are particularly vulnerable. Lack of information, insufficient coordination of resources and the absence of efficient technologies further deepen vulnerability.

Our vulnerability stems from the fact that we don't have access to information. Another issue has to do with issues of technology with regard to farmers. We still depend on the hoe and cutlass. Because of this, farmers aren't able to get maximum yield per unit area of land. There's also a lot of new information out there, but how do the farmers get access to the information? We are lucky to have FM stations, but how many of them would dedicate 30 minutes of their time to educate our farmers on practices and new technology? (CARE International staff)

3.6.4. Causes and Effects

The causes and effects of vulnerability related to natural resources in the Tamale metropolis can be categorized as follows:

1. Loss of soil fertility, which encourages increased uses of chemical fertilizer to increase crop production
2. Poor drainage systems that exacerbate flash floods and destruction of property
3. Excessive population growth and urbanization, which contribute to loss of land and vegetation in and around the metropolis
4. General poverty and lack of alternative sources of income, contributing to exploitation of natural resources
5. Indiscriminate construction of housing and public infrastructure on waterways, causing drainage problems.

In the spiritual sense, environmental disasters in the Tamale metropolis reflect lack of cohesion and collaboration among community members, who may blame problems on others' belief systems or practices instead of structural or governance failures

A lot of evildoing in this community may also contribute to the irregular pattern of rainfall. Fights/conflicts and evildoing in the community, fornication and killing of innocent children... (Female FGD participant, Nyohini)

3.7. Social Capital/Community Networks

This dimension refers to formal and informal relationships and connectivity among individuals, households, groups and communities. In this study area, it includes the social safety networks that involve relatives and traditional social support systems that support people in times of crisis. The activities of NGOs in the community are also social capital.

3.7.1. Adaptive Strategies

The formation of youth groups in the community is a local solution for working collaboratively to address problems. Regular meetings with community members to discuss how to solve problem or discuss other developmental issues emerged as one of the adaptive strategies in this study area.

We have youth associations who have come together to contribute to solve problems of the community members. (Male key informant, Kanvilli)

The formation of youth groups in the community has helped to solve most of the problems in the community; the youth meet to discuss among themselves and suggest solutions to problems affecting the community. (Male key informant, Nyohini)

The extended family systems also offer support in times of distress.

For funerals, it is the family members who assist; they put resources together to see how they can make a funeral for the dead. (Female FGD participant, Nyohini)

3.7.2. Coping Strategies

Some community members have migrated to other parts of the Ghana, reducing the available social capital in the community.

Well, with the present situation, people from the villages and hinterlands migrate here in search of greener pastures. Those here also migrate to places like Accra and Kumasi, also in search for greener pastures. Everybody wants a better place for opportunities. Also when the rains set in, you have people also coming into town to farm, and some move to the villages to also farm. (Male FGD participant, Nyohini)

3.7.3. Vulnerability Factors

Poverty, lack of employment opportunities and economic hardship make people vulnerable to the negative effects of this dimension.

3.7.4. Causes and Effects

Youth migrating in seek of land, jobs or other resource reduces the human capital required to form social networks to assist in community development.

The young people who are supposed to be in the villages working are not there. At the end of the day, the poor old man and woman cannot even farm a quarter of an acre. And these are the people who are supposed to feed you and me sitting in the offices here. So this is creating a lot of problems for us. The young ones are rather in Techiman, Kumasi, Accra and other places doing menial jobs. (Key informant, Tamale)

3.8. Psychosocial Wellbeing

This dimension of resilience describes situations that have short- and long-term threats, risks and stresses unless humanitarian support and adaptation and coping strategies are provided in a timely manner. The dimension therefore includes issues relating to helping affected people convalesce, resume normal life and avoid the pathological consequences of traumatic events. Specifically, dealing with fear and worry resulting from social and economic insecurity in the Tamale metropolis are components of this dimension.

3.8.1. Adaptive Strategies

Community support in times of psychosocial distress emerged as an adaptive strategy in this study area. The community also has some facilities for recreational activities, and these help ensure their psychosocial welfare.

We have recreation centers; [it's] just that we do not have the youth who will be engaged in recreation. They have all gone on migration to the south. (Female FGD participant Nyohini)

Another adaptive strategy is working hard and believing in God's intervention. This has positive psychosocial effects on individuals.

If you have patience and good behavior and appreciate that what God have given you, he can take at any time, it will help you have a good relationship with all your community members. (Female FGD participant, Nyohini)

3.8.2. Coping Strategies

Migrating to southern Ghana was mentioned as one of the coping strategies employed to reduce the effect of psychosocial stress. However, this is unsustainable as there are also psychosocial stressors in southern Ghana.

Many of the youth go the cities as a way of overcoming this stress. (Female FGD participant, Nyohini)

3.8.3. Vulnerability Factors

People are not aware of or do not understand the positive effects of recreational activities on their health and do not take advantage of opportunities that may be of benefit. Some erroneously believe that employment is better in other parts of Ghana, particularly in the south, and move to those areas before realizing that job opportunities are not plentiful, housing is challenging and resources are limited. These combined cause great psychosocial stress.

Times are really hard, so people do not think about recreational, activities but it is important...I think ignorance is also a factor. (Male key informant, Tamale)

3.8.4. Causes and Effects

The long-term impacts on psychosocial stress are potential development of mental illnesses or difficulties in functioning that start to severely limit or impact people's lives.

Some people can develop psychological problems as a result of that... you see, nowadays we see a lot of people with mental conditions, it is because of these psychosocial stressors. (Male FGD participant, Nyohini)

3.9. Governance

The *Governance* dimension involves processes and frameworks within which political, economic, security and administrative authority are exercised in a country. It also includes formal and informal mechanisms, processes and institutions through which legal rights and

interests are exercised, obligations met and differences mediated. Finally, *Governance* constitutes the functioning of relevant groups at various levels and issues of accountability, transparency, inclusiveness and responsiveness by government.

In Ghana and in the context of the Tamale metropolis, traditional governance is composed of the chiefs of the metropolis, tribal chiefs and elders. Political parties in both power or opposition groups exercise the functions of governance. In addition, local governance systems through assemblymen and unit committees also exercise some level of leadership. In the suburbs of the metropolis, the assemblymen, with the help of the youth in the community, play an important role in the governance system, especially in applying principles of justice.

3.9.1. Adaptive Strategies

The people of the Tamale metropolis perceive development as a key determinant of unity. In this context, local government leaders such as assemblymen help steer the development agenda. In every community, youth lead the development process and advocate for the involvement of local government and traditional leaders. Thus in the communities, the youth and community members are at the forefront of development. To promote the role of governance in the provision of public infrastructure, people in the Tamale metropolis vote political parties with social democratic manifestos into power.

Talking about the school, where you will reach and have high cost, we are pleading with the government to try and assist us to pay such fees. We do our best by voting them into high office, and they should reciprocate [with] respect and care for us. (Female FGD participant, Nyohini)

The educated ones must meet the assembly to put forward our grievances. The assemblyman must have us at heart. This is because we the human beings elected the assemblyman, and he needs to respect and appreciate our contribution (Female FGD participant, Tamale)

3.9.2. Coping Strategies

To cope with governance-related shocks, people vote into power assemblymen who come from the community and show commitment to its development agenda. Development interventions are implemented only after the local leaders and communities have deliberated on them. There is also a spiritual dimension to coping with governance challenges.

We keep praying to God to change the situation for us and bring us development. We pray that whoever would be able to assist us to develop, God should bring the person to us so that we are able to benefit from their efforts. This is where we live. What do we do? We just manage and complain and see what would happen for us. (Female FGD Participant, Kanvilli)

3.9.3. Vulnerability Factors

People in Tamale stated that lack of proactive leaders who empathize with local challenges is a vulnerability factor in *Governance*.

We haven't been able to solve our problems because we don't own the land and the leaders also aren't supportive. We are very worried and affected by all the happenings. This isn't what we want for ourselves and our families, but what can we do? I am not sure the leaders are affected by the problems the way we are. If they were, they would have been more proactive so that the issues can be addressed. Firstly, leaders aren't able to agree on what issues to address at a time. They all have different priorities, and this brings about the disunity. (Female FGD participant, Kanvilli)

Another vulnerability factor is the lack of proper supervision of public projects, as well as corruption in the execution of such projects.

Corruption is also an issue. People want to line their pockets with public resources, hence this poor work by contractors. We also don't factor in the population growth. For instance, if you are building a water system for Tamale, you have to consider the rate of population growth and how that should affect your plan. But we see that buildings are just put up with no consideration at all of these factors. (NGO representative, Tamale)

3.9.4. Causes and Effects

Disunited or uncommitted governance affects development in the communities.

...the chief, because he does not go out to do his day-to-day activities and is always indoors, he doesn't know the challenges we face every day. He has only been installed, and he is in the room. We the people, we move around and we know the problems and how they affect us. (Female FGD participant, Kanvilli)

God hasn't given us a good chief and leaders. (Male FGD participant, Nyohini)

Another limitation in the *Governance* dimension is misappropriation of public funds to give to political party supporters instead of those who need development funds, as well as problems of political nepotism and favoritism. Bureaucracy is common in local governance structures and is another cause of vulnerability in this dimension.

Another issue that makes us have these problems with poverty is that when support comes for us farmers to enable us to have better yields, it's those who already have the resources and wealth that get the support. The needy do not get this support. Hence the poor get poorer and the rich richer. The help doesn't get to the needy. For instance, sometimes you are told you are going to receive a certain amount, say five

hundred cedis, and you might get just a hundred or two hundred cedis. How can we do anything profitable with this kind of support? (Male FGD participant, Nyohini)

To further lay further emphasis on the point, sometimes they bring support for us to be able to farm two or three acres, and an individual would take the whole support and go farm about two, three, or five hundred acres alone for his own benefit. Those who really should have benefited would never even hear of this support. This results in poverty for those without access to this support. That means that for that year, they won't be able to cater for their families the way they should and brings so many other problems. That is what you call corruption. (Male FGD Participant, Nyohini)

Finally, conflicts between traditional and local government leaders, particularly when complicated by self-interest, complicate the ability of local government to address the needs of their communities.

I will give you an example. The assemblyman was able to push for us to get a KVIP. [latrine]. We located a spot for it and had to get clearance from the chief. The chief then told us the land was for sale and hence the assembly should pay for the land before the toilet could be put up. The assembly then said they didn't have the resources to acquire the land then. So that opportunity was lost. With this you see that the assemblyman and DCE [District Chief Executive] did their part. The DCE asked for our problems. The assemblyman said a toilet. This was to help especially the aged who do not have access to toilets and cannot also go into the bush to relieve themselves. Those who can are even driven away. This was a project that would help us the people significantly. They secured funds for it, and the chiefs refused to give out the land. (Male FGD Participant, Nyohini)

CHAPTER FOUR: RESILIENCE TO RAPID URBANIZATION IN ASHAIMAN MUNICIPALITY

The qualitative analysis of results from Ashaiman focused on nine dimensions (*Wealth, Security/Protection/Advocacy, Psychosocial Wellbeing, Health/Health Services, Human Capital, Natural Resources/Environment, Infrastructure, Governance and Social Capital/Community Networks*), based on transcripts from FGDs and KIIs.

4.1. Wealth

Wealth in this context refers to both financial and non-financial assets. It covers access to credit for businesses by community members, access to housing materials and food security in this study area.

4.1.1. Adaptive Strategies

Irrigation farming is one of the adaptive strategies community members employ to improve their wealth. Dams are used for irrigation farming during the dry season. Produce from farming is important to ensure food availability. Proceeds from the sale of farm produce are a reliable source of income for community members.

It is because there is a dam in the community that supports the irrigation facility, it was even more lucrative and ensured a more reliable source of income in the past than presently. Those days, there were a lot of farming activities making use of the water from the dam. I can even boldly tell you that the water from the dam is now being underutilised. (Male FGD participant, Moni-Obaanye)

However, respondents stated that the dam sites that are used for irrigation farming have been encroached on for human settlement, reducing the potential of irrigation farming in the community.

Yes, if you should run to the street lights over there, you would see human settlements that have encroached on these lands that could otherwise have been used for irrigation farming. The situation was different 10 years ago. (Male FGD participant, Moni-Obaanye)

Some Ashaiman community members engage in trading, while others collect discarded plastic bags from sachet water to sell to companies engaged in recycling this waste for money. All these activities are done to increase household income. Some respondents also indicated that most people sell building materials and some sell motorbike parts. Some women operate chop bars for income, while others sell charcoal.

Most women have also taken to selling sachet water as a means of earning a living. (Male FGD participant, Moni-Obaanye)

As for the unemployment issue, what has happened is that the youth (especially the women) go around picking up sachets (the empty ones) and they sell it to the people who come to buy it. Some youth (men) also gather scraps and sell for money. (Male, FGD participant, Moni-Obaanye)

Some community members deploy their skills such as drumming and dancing to earn a living as they roam public places providing entertainment.

4.1.2. Coping Strategies

In this study area, the findings revealed that some youth engage in prostitution as a mean of survival. Others engage in armed robbery. Teenage pregnancy is reported to be widespread, related to young women selling sex for money. Some respondents felt they had no option but to endure this stress while hoping that their situation improves. There is a perception of a

relatively cheaper cost of living in Ashaiman Municipality and a high cost of relocating to other places.

The youth here, especially women, engage in prostitution. Some go having sex with men to make a living - (Female FGD participant Moni-Obaanye)

When the women come to the urban area to look for job and do not get one, some resort to prostitution, so we have a lot of prostitutes here. Some even rent rooms and practice prostitution in the rooms. (Female FGD participant, Moni-Obaanye)

Some community members migrate with their cattle and other ruminants into the urban centers and try to squeeze them into the limited space available. Often the livestock are left to roam the streets and compete with people and vehicles for space, compounding an already chaotic situation.

4.1.3. Vulnerability Factors

Several factors undermine efforts at building and maintaining resilient and sustainable livelihoods. The most pressing factor is poverty.

Poverty is a major problem in this community... if you have money, you will be able to solve your problems and even send you children to school. (Male FGD participant, Moni-Obaanye)

The majority of the people are from other parts of the country, and some are foreigners.... but because of poverty, they engage in criminal activities. (Male key informant, Moni-Obaanye)

Second, the study revealed that the lack of formal education among community members makes them unemployable in the formal sector, as most of the jobs available require some degree of literacy.

You see, because people are not educated, it is difficult to get jobs. If the job is even available and they ask for your certificate and you do not have one, you cannot be given the job. So all boils down to education. (Male FGD participant, Moni-Obaanye)

Another factor that makes people vulnerable and affects their resilience is lack of access to credit to support their businesses. In a focus group discussion, it emerged that most of the women had the knowledge and skills to produce tie-dye but did not have capital to start the business. Though community members acknowledged the willingness of some financial institutions to provide them with credit, the high interest rates charged by these micro-credit schemes and the absence of collateral makes it difficult for the traders to access this facility.

We the women in this community do one thing or the other. We are traders, but the money is the problem. The banks are demanding collateral, and we do not have it. The interest rates are also a problem, so if you can help with some loans...(Female FGD participant, Moni-Obaanye)

I am a trader; I sell provisions. The capital too is not big...I went to the bank for a loan, and they asked for collateral, which I don't have, so if you people can help us improve our business, it will help without the collateral. (Female FGD participant, Moni-Obaanye)

4.1.4. Causes and Effects

The main cause of poverty is that the population has outgrown available jobs. The perception that there are job opportunities in the cities has resulted in many people migrating in search of jobs that are not available.

I say Ashaiman is the fastest growing community in West Africa, but there are no job opportunities here, so this makes us poor [exacerbates our poverty]. (Male key informant, Moni-Obaanye)

People come here from all over the country to search for jobs, but the jobs are not there, so the people are more than the available jobs in the system. (Male FGD participant, Moni-Obaanye).

4.2. Security/Protection/Advocacy

This dimension describes exposure to personal and property crime and perceived insecurity. It also looks at self-protection and efforts by community members to protect each other. The dimension further describes efforts to influence people, policies, structures and systems to bring about positive change and the state's ability or inability to fulfill its duties to protect communities. This dimension is closely related to *Psychosocial Wellbeing*.

Contract killing emerged as a new security phenomenon in this study area, creating a general perception of insecurity, particularly in the Moni-Obaanye community.

Well, for now as we are speaking, it is the armed robbers that are tormenting the area. If even you ask any small child around, they would tell you how the place is being disturbed by their activities. That is the current problem that we are suffering. It is giving us sleepless nights. (Male key informant, Moni-Obaanye)

4.2.1. Adaptive Strategies

The community has formed watchdog committees to protect against armed robbers and other criminals. These committees, which are locally organized groups of young men, patrol the

community and collaborate with the police by reporting crime and helping them locate criminals and arrest and prosecute suspects.

With respect to the robbery, the assemblyman has engaged us, and we have formed a neighborhood [watch] committee. (Female FGD participant, Moni-Obaanye).

Armed robbery emerged as a major security concern in both FGDs and individual in-depth interviews. Reporting criminals living in the community was also mentioned as an adaptive strategy. To ensure safety, respondents said that people avoid going out late at night or staying out late. Those who can afford them use burglarproof mechanisms to prevent easy access to their homes by criminals.

Now what we are doing is, the whole area is dark. That is the problem of illumination. So we're telling all landlords to at least get one or two bulbs around [their] houses so that the place will be illuminated, since no thief will like to operate in light. (Male FGD participant, Moni-Obaanye).

The community also mobilizes social capital as a strategy to deal with the security situation. Neighbors exchange telephone numbers so that they can contact each other easily in times of distress. Some also have whistles that they blow to alert their neighbors when there is an emergency.

We tell community members [that] when you hear your neighbor shouting, go to his or her aid, come out and help. (Male FGD participant, Moni-Obaanye).

Another adaptive strategy is fixing security lights in homes to provide light in the night. This strategy was adopted because street lights were unavailable in the community. The dark environment at night promotes the activities of criminals.

Since we do not have street lights and the place is always dark in the night, we the Landlords Association have decided that every house should have security lights to deter criminal activity in the community. (Male FGD participant, Moni-Obaanye)

4.2.2. Coping Strategies

Relocating to other vicinities perceived to be relatively safer was mentioned as a coping strategy. There was a general feeling among community members that punishment was not severe enough to deter unwanted behaviors. The police were also perceived not to be proactive and even suspected of complicity with the criminals. This has led to a loss of confidence in the police. Community members suspect that police sometimes turn on their sirens to alert the criminals to escape.

You people who can afford it, leave this community because of the criminals because it is not safe to live here anymore...As for the police, they are not helping. You call them, and they put the siren on. By the time they arrive at the scene, the criminals are gone. (Female FGD participant, Moni-Obaanye)

4.2.3. Vulnerability Factors

This area has a large migrant population, which makes it easy for criminals to infiltrate and blend into the community. Lack of streetlights also creates a fertile ground for criminals to operate in the night. The police post was reported to be far from the community, so that response to distress calls is not always quick.

The place is always dark in the night, and this is good for the criminals because they can easily hide and rob you without anybody seeing them. If you resist, they will cutlass you. (Female FGD participant, Moni-Obaanye)

The police station is very far from the community, and this is not helping the community, because anytime you call them, it takes long for them to come. (Female FGD participant, Moni-Obaanye)

4.2.4. Causes and Effects

High unemployment among youth exacerbates criminal activity, as young people turn to crime to make a living. In this way, lack of employment is a cause of insecurity. Insecurity was also reported to affect commerce in the community, as traders are compelled to close early in the evenings to avoid attacks by criminals. This dimension is linked to *Wealth*, as most of the community members work as traders, and any decline in trade affects their income.

To me, it is...the lack of jobs in the community that has led to the increase in armed robbery. They therefore form gangs because they don't have jobs and engage in armed robbery. We wish that we could get something for these kids to do so that we can also have peace in this community. (Female key informant, Ashaiman)

As for the biggest problem for now, [it] is the armed robbery situation, because if you want to do something, like you have some money and you want to go out and buy something, when you wake up as early as 5 o'clock in the morning, they would take your money from you. So if the armed robbery ceases, people would go through their daily activities [peacefully]. (Male FGD participant, Moni-Obaanye)

The young men come in search of jobs, but they don't find any. They then turn to armed robbery, which is one of the main reasons why we landlords decided to meet this evening to look at ways of defending ourselves and protecting the community against armed robbery, because it is the main problem in the community these days.- (Male FGD participant, Moni Obaanye)

Some respondents attributed the increasing incidence of crime and armed robbery in the community to parental neglect. However, this neglect was also linked to poverty, as many parents are unable to provide for the livelihood of their children.

Parental neglect is also a factor that leads to armed robbery. For instance, sometimes you see very young children roaming in the community around 10:00 pm doing nothing, which I think is not the best. I think what brings about parental neglect is poverty or hardship. (Female FGD participant, Moni-Obaanye)

4.3. Psychosocial Wellbeing

This dimension describes psychological and social stress community members have to endure because of perennial flooding, especially during the rainy season. Building in unapproved areas and around choked drains increases the stress of community members in times of floods. This dimension is somewhat related to *Security/Protection/Advocacy*.

I don't have my peace of mind in this community due to armed robbery. This is because my next-door neighbor has been attacked, so I do not know when it will be my turn. Thus, there is fear among those of us living in this community. (Key Informant Women's leader, Moni Obanye).

4.3.1. Adaptive Strategies

Relocating people living in flood-prone areas to safer housing is one of the strategies adopted by the study communities to reduce the psychosocial effects of disasters.

We try to relocate people who are living in flood-prone areas to reduce their exposure to flood when it rains. (Male key informant, Ashaiman)

Communities desilt choked drains through communal labor to minimize this stressor.

We try to clean the drains, so that when it rains the place does not become flooded for us to suffer, but the problem is people's attitude of dumping rubbish anywhere. (Male key informant, Moni-Obaanye)

4.3.2. Coping Strategies

Appealing to the government for relief items for people whose houses have been affected by floods is a coping strategy in response to flooding in the study area. According to Ashaiman respondents, this is often not sustainable, and in many instances, the delay in arrival of relief items exacerbates the negative effects of this shock.

When there is a flood, we appeal to NADMO for assistance...but you know, it sometimes takes time for the relief items to come, so the people have to suffer until we get something. (Male key informant, Moni-Obaanye)

4.3.3. Vulnerability Factors

The study area does not have recreational activities, which are relevant to psychosocial wellbeing.

Ashaiman does not have a recreational center, not even a library. The only library we were putting up has been converted [into offices] by the Municipal Assembly. (Male key informant, Ashaiman)

4.3.4. Causes and Effects

Poor refuse disposal predisposes the community to floods. When refuse is dumped into drains, it blocks the passage of water and therefore when it rains the water would have to change its course which leads to floods. During floods, affected individuals lose property and have to spend money to replace lost property. This dimension is therefore closely related to *Wealth*.

Flood increase the poverty level of people...when people's houses are destroyed, they have to spend the little money they have to rebuild. (Male key informant, Lebanon Zone 5)

4.4. Health/Health Services

This dimension describes all issues that relate to health and wellbeing—health status, injuries, ill health and diseases. The dimension also considers the capacity of communities to prevent poor health outcomes, which includes access to clean water, sanitation and adequate personal hygiene. Waste management problems have adversely affected the health of community members. Sanitation is a major aspect of health and featured in all interviews and discussions.

This dimension is closely related to *Protection/Security*, as community members who resist armed robbers may suffer wounds that require medical treatment, this example illustrates how dimensions are interrelated (e.g., unemployment to crime, crime to physical injury, physical injury to medical care access and medical care access to personal health.)

4.4.1. Adaptive Strategies

People organize occasional communal labor to clean up the community to improve sanitation. The District Assembly provides refuse disposal bins and collects waste from these bins for a fee. However, waste is not regularly collected.

[Regarding] the issue of the sanitation, Bosum (A Private Waste Management Company) has given us some blue waste bins, which they come to pick up every 3 days, but now they are not regular. (Female FGD participant, Moni-Obaanye)

The study also revealed that community members access health care from health facilities in neighboring communities as an adaptive strategy, as the health facility for the municipality is considered too far from the community.

We go to the Tema Polyclinic when we are sick. Here cholera and malaria are common in this community, so people fall sick easily and have to go to the clinic. (Female FGD participant, Lebanon Zone 5)

There are ongoing health education sessions on the need to maintain clean and healthy environments through advocacy campaigns on radio and television, through posters and during community durbars.

4.4.2. Coping Strategies

Lack of household toilets leaves people with no option other than to use public toilets. These toilets are under pressure because of increasing population. The study further found that some community members defecate into polythene bags and add that to the refuse. This has serious public health implications, especially when the waste is not collected at the appropriate times.

If we can also get a public toilet in the community, it will help because people receive themselves in polythene bags and throw them away anywhere, just because homes with toilets here charge 40 pesewas before they allow other people to use their toilets, which many people can't afford... (Female FGD participant, Moni-Obaanye)

4.4.3. Vulnerability Factors

Personal attitudes around health, sanitation, and hygiene affect the choices individuals make to improve their community as a whole. When people do not recognize problems, they may fester and increase in severity until they are large challenges. For example, an inadequate number of trucks for the Ashaiman Municipal Assembly to cart waste from communities (related to *Governance* and *Infrastructure*) means that temporary disposal sites are often full. The lack of toilet facilities in many homes and the absence of public latrines further make the people in this community vulnerable to ill health.

What my sister is saying is true. Left with me, if Ghana could have made byelaws and enforced them on this sanitation issue, it would have been better because the waste issue) is becoming worse. (Female FGD participant, Moni-Obaanye)

Food vendors often sell their goods close to drains over-filled with waste or sewage, which may increase the spread of disease. The haphazard patterns of settlement may make it difficult to determine the best and safest locations for food vendors, making it difficult to implement improvements.

Some people sell food next to drains, and flies easily settle on the food, but people buy it because they do not have places to cook where they are living. (Male key informant, Ashaiman)

In addition, lack of health facilities in the community impedes access to health care. The only health facility that serves the people is located far from the community.

[Health facilities] are not accessible here in this community. The whole of Ashaiman does not have a hospital. We can only rely on one polyclinic, which is in my community and serves the whole of Ashaiman. (Male key informant, Ashaiman)

4.4.4. Causes and Effects

Many people with high vulnerability are migrants who have come to the city in search of jobs. When jobs are not readily found, they must adapt to other means of survival. Women were reported to resort to prostitution for survival, increasing their risk of disease and unexpected pregnancies.

Our main problem here as a result of this rapid urbanization is the rush of young girls from other parts of the country, especially the nearby metropolises such as Osudoku, Volta Region and Akuapim area. The young girls come here in search of jobs, which are nonexistent. Most of these young girls at times fall victim to [unscrupulous] young men who take advantage of them and impregnate them. So one problem is teenage pregnancy, which is rampant. (Male FGD participant, Moni-Obaanye)

And talking about teenage pregnancy, what is happening is because there are no jobs in the community, some of the young girls have to put up with the young men, and you know what will happen out of that. By so doing you have these teenage girls getting pregnant. (Male FGD participant, Moni-Obaanye)

Community members' ambivalence to proper sanitation is thought to exacerbate sanitation problems and health-related challenges.

I think the poor sanitation situation in this community can be attributed to some of us. For instance, some people deliberately dispose of their refuse in drains instead of dustbins. If each and every one of us were to keep his or her environment clean, these sanitation problems would not arise. (Female FGD participant, Obaakakye)

Lack of enforcement of byelaws (related to *Governance*) encourages indiscriminate disposal of waste.

I think it is the lack of enforcement of laws by the Municipal Assembly that worsens the sanitation situation. (Female FGD participant, Obaakakye)

Expensive rent coupled with landlords' demand for 2 years' rent in advance pushes people to build informal structures to live in. This worsens the health situation because the construction areas are prone to disasters.

High rent demanded by landlords is responsible for the slums that are developing in this community. (Male key informant, Ashaiman)

4.5. Human Capital

This dimension describes skills and knowledge to earn livelihoods and the state of formal education and how these impact livelihoods and survival. It also includes access to quality formal education and development of employable skills.

4.5.1. Adaptive Strategies

Community members said they were compelled to send their children to public schools in neighboring communities. However, distance from the community was of major concern.

We send our children to the private school...if you do not send your child to school, then you are destroying his or her future. (Female FGD participant, Moni-Obaanye)

4.5.2. Coping Strategies

Some community members refuse to send their children to school because of the expensive fees required to maintain a child in the private schools.

Some people refuse to send their children to school because of the distance and cost, and you see we have a lot of street children as a result. (Male FGD participant, Moni-Obaanye)

You see, illiteracy is high here because some people do not send their children to school. (Female key informant, Ashaiman).

4.5.3. Vulnerability Factors

Lack of government schools (related to *Infrastructure*) in Ashaiman and the expense of private schools (related to *Wealth*) make it difficult for people to send their children to school.

Because of poverty, there is high school drop-out rate, and many children do not go to school, so how do they develop to become good [productive] citizens in future? (Male key informant, Ashaiman)

4.5.4. Causes and Effects

Poverty among residents in the community leads to parental neglect, and children become school dropouts. Lack of formal education further limits children's human capital potential. This creates a vicious cycle of poverty, because they lack the knowledge and skills that are often required for employment in the formal sector and even to complete in the informal sector.

You know, we do not have government schools here. We only have private schools, and because there is no work in the system, you will see people are unable to send their children to the private schools. (Male key informant, Ashaiman)

Secondly, all the schools here are private, and you know they charge. So if we get government schools here, then at least all these children who are at home will go to school and at least they can achieve their aim in life. (Male key informant, Ashaiman)

It is about encouraging the young ones into vocational and technical skills training and not to concentrate much on "I want to be a [university] graduate." If we all become graduates, who will employ whom? Who will build your house? Education is good, but we should help the young ones by encouraging them to enter into vocational and technical skills training programs. (Male key informant, Moni-Obaanye)

4.6. Natural Resources/Environment

This dimension typically describes the availability of natural resources such as water from dams that is used for irrigation farming in the study area. Communities reiterated the new thinking that "resources are not – they are created." This underscores the need to look at unconventional resources and potential innovations.

In Ashaiman here, waste is a huge resource. (Female key informant, Ashaiman Municipal Assembly)

4.6.1. Adaptive Strategies

People use water harnessed by the dam for irrigation farming and domestic purposes.

The dam is used for irrigation and people are able to grow vegetables, which is helping the people in this community - (Male, KII Ashaiman).

4.6.2. Coping Strategies

Encroaching on dam sites for the construction of houses reduces available land for irrigation farming. This is a serious setback to the full utilization of the dam as a resource for the benefit of the community.

You know we have the irrigation development authority here. We have a dam which we use to cultivate these foods for the market, but because of rapid urbanization, housing is taking much of the land, so the land is reducing further, leading to a reduction in agricultural produce such as rice, animal husbandry and poultry. (Male key informant, Ashaiman)

4.6.3. Vulnerability Factors

Increasing population with diminishing available land for settlement leave community members with no option but using farmland for residential purposes.

Ashaiman is expanding and people are selling the land at the dam site to private estate developers. (Male key informant, Ashaiman)

4.6.4. Causes and Effects

Increasing population has led to expansion of settlement areas to dam sites. This encroachment reduces the size of the dams and the amount of water available for irrigation farming. This in turn reduces productivity and income from the sale of farm produce. Serious encroachment on irrigable land further reduces the amount of land available for farming.

4.7. Infrastructure

This dimension includes roads, market centers, drains, community school buildings and health posts—facilities and amenities that make life easier and better for the people in a community.

4.7.1. Adaptive Strategies

The area has private schools that community members use to fill the educational gap left by the absence of government schools.

We have only private schools here, so we send our children to those schools but you know it is not everyone who can afford [the exorbitant fees]. (Female FGD participant, Moni-Obaanye)

Even though rent was said to be high, respondents said it is comparatively much lower than the rent charged in neighboring communities, especially the industrial city of Tema. This is why many people prefer to stay in Ashaiman and commute to other communities make a living.

4.7.2. Coping Strategies

Many people live in kiosks as their homes. Almost all the lands that have been sold out to estate developers but migrants can't afford the high rent charged.

I also think the relatively cheaper rent in Ashaiman as compared to that in say, Tema is a factor that is making us stay here despite all these problems. Also, here in Ashaiman, those without money to rent rooms have access to kiosks. (Female FGD participant, Obaakakye)

4.7.3. Vulnerability Factors

The main vulnerability factor in Ashaiman is lack of land for development projects, as most of the lands have been sold out.

Ashaiman has no land left for infrastructural development because the landlords have sold all the lands to private developers. (Male key informant, Ashaiman)

Lack of refuse disposal sites and toilet facilities makes people dispose of waste indiscriminately, which increases vulnerability to flooding. When refuse is disposed of indiscriminately it chokes drains, which increases the community's vulnerability to floods when it rains.

4.7.4. Causes and Effects

Respondents mentioned that poor leadership by people in authority and lack of proper planning schemes in building and development projects means that infrastructure projects are not fairly distributed among communities. Lack of drains causes floods when it rains. Poor planning makes it difficult to construct access roads in the community.

The drainage system is very poor in this area, thus when it rains it creates a lot of problems in the area such as floods. (Female FGD participant, Obaakakye)

The roads in this community are not good...but sometimes you do not blame the government, because people have built in unapproved areas, making it difficult for you to construct roads because they would ask for compensation. (Male key informant, Ashaiman)

Another cause of psychosocial stress is the cost of rent in the community. Many landlords request 2 years of rent from tenants. People who cannot afford this have resorted to renting temporary structures such kiosks to live in.

[Some people] are not able to afford to rent decent housing so they resort to putting up wooden structures to live in, and this is what makes this place a slum. If you look

at the central part, you will see that there are a lot of slums. (Male key informant, Ashaiman)

4.8. Governance

This dimension describes the state of institutions, formal systems of governance and their responsiveness to the needs arising from vulnerabilities and rapid urbanization. It includes institutional responses to rapid urbanization and its effects on livelihoods, as well as traditional institutions, which are instrumental in communal response to address the challenges of rapid urbanization.

4.8.1. Adaptive Strategies

The Ashaiman Municipal Assembly has provided waste bins to reduce the insanitary situation and improve waste disposal in the community. The district hires waste disposal companies to collect waste and transport it to the final disposal site.

When I came I saw that one problem is environmental problems in terms of waste. In fact because of the influx of people a lot of waste is generated both solid and liquid waste so this is one major problem that we are facing. The Municipal Assembly is also trying in conjunction with the Zoomlion [a waste management company] to clean up the system. We [the Municipal Assembly] provide them with bins and collect the waste to the final disposal site - (Male, KII, Ashaiman).

The Assembly, with government assistance, is building drains in the community to improve the drainage situation. This is expected to reduce flooding when it rains.

The drainage situation too, you know it rains heavily over here for some time; the drains are not enough. When it rains like a lot of damage is done, so the assembly has been constructing storm drains. If you take a look around the town you will see that construction of draining is going on and this goes along side with poor nature of the roads. If you look at the main road, you will see that it is under construction - (Male, KII, Ashaiman).

According to respondents, the district is also constructing two police stations to improve security in the community.

We are also constructing two more police stations to beef up security and increase police presence in the municipality - (Male key informant, Ashaiman Municipal Assembly)

4.8.2. Coping Strategies

Community members perceived that formal governmental institutions were not proactive in helping them overcome hazard-related stressors. FGD participants generally perceived that

the Ashaiman Municipal Assembly created problems rather than taking positive action. Occasional agitations and street demonstrations were the main weapons for countering this institutional weakness.

You know, they always come and say they construct drains and yet they do not. Look at the one over there they [Municipal assembly] started and have not completed it - (Women, FGD, Moni-Obaanye).

4.8.3. Vulnerability Factors

The vulnerability issue in Ashaiman is lack of respect for traditional leaders, their associated customs and the knowledge of the elderly in the community. This is thought to correspond to a breakdown in shared values and loss of social order. The lack of respect for customs and traditional leaders among youth is a driver of poor governance.

4.8.4. Causes and Effects

A breakdown in the communal living spirit damages the social tradition of each person contributing to the wellbeing of others. The effect is that authorities are unable to control community members, making it difficult to mobilize developmental projects. The heterogeneous nature of the community further reduces the sense of collectiveness that is required for such initiatives.

4.9. Social Capital/Community Networks

This dimension describes social networks, informal networks, friends, temporary families and systems that provide the support community members seek to cope with and adapt to living in dangerously crowded spaces, sometimes without close family, and with limited livelihood opportunities. It also refers to the collective survival instinct to mobilize in times of shocks.

4.9.1. Adaptive Strategies

Ashaiman is an illegal settlement, and those who live there face a constant threat of eviction. As a result, support networks are tenuous. Even with this lack of stability, some strategies could be sustainable if they were institutionalized. For example, the formation of community watch committees increases a sense of security, even in instable areas. These groups usually are comprised of young men, who take turns patrolling the community. Their presence deters criminals and crimes of opportunity. The committees have a close collaboration with the police in the area. They report crime and tip off the police on criminal activity.

With respect to robbery, the Assemblyman has engaged us and we have formed a neighborhood [watch] committee. (Female FGD participant, Moni-Obaanye)

Neighbors exchange contact telephone numbers so that they can contact each other easily in times of distress. People are also encouraged to come out in numbers to assist their neighbors in times of need.

[We tell community members that] when you hear your neighbor shouting, go to his or her aid, come out and help. (Male FGD participant, Moni-Obaanye)

Another adaptive strategy is fixing security lights in homes to provide light during the night. This strategy is adopted because streetlights are unavailable in the community. Darkness at night promotes the activities of criminals.

The communal spirit is also often on display when community members organize to rid their neighborhood of filth, especially choked drains, when things get out of hand.

We try [to mobilize people] to clean the drains, so that when it rains the place does not become flooded for us to suffer, but the problem is people's attitude of dumping rubbish anywhere. (Male key informant, Moni-Obaanye)

4.9.2. Coping Strategies

To improve their sense of security and networking, people in Ashaiman move in groups and avoid staying out late at night or leaving early in the morning, especially when they are alone. People, especially landlords, increasingly realize that security lights discourage criminal activity. This, in the long run, improves personal security.

Since we do not have street lights and the place is always dark in the night, we the Landlords Association have decided that every house should have security lights to deter criminal activity in the community...no thief will like to operate in light. (Male FGD participant, Moni-Obaanye)

4.9.3. Vulnerability Factors

As migrants living in temporary shelters, residents of Ashaiman lack status and recognition. They may be engaged and interested, but the instability in their lives makes it difficult to organize for change and governance support. Marginalization and poverty exacerbate the feeling of living without the protection of any social network. The urban poor are particularly disadvantaged. Poverty means parents cannot fend for their children, who can easily become deviant. Deviance disrupts social capital formation and represents a breakdown of values.

Again, after the children complete basic education, the parents mostly are not able to send them to higher institutions. This then leads them to become koboloo [deviants], and finally they graduate into armed robbery. (Female FGD participant, Moni Obaanye)

Local vulnerability may be increased when police do not meet community expectations. When police do not act as expected, or do not adequately support the community water groups, there is a pervasive sense of insecurity.

It is not safe to live here [in this community] anymore... As for the police, they are not helping. You call them [when there is an emergency] and they put the siren on; by the time they arrive at the scene, the criminals are gone. (Female FGD participant, Moni-Obaanye)

4.9.4. Causes and Effects

The need to make a living encroaches on people's ability to care for their neighbors. The breakdown in the communal living spirit is especially harmful in areas of instability and insecurity. The heterogeneous nature of the community further reduces the sense of collectiveness that cushions people against the challenges of living in an urban slum.

The absence of recreational facilities such as gardens, playgrounds and a library in Ashaiman (an indicator of poor governance) means children have few opportunities to interact with their peers, learn from each other and build lasting social networks. The governance institutions, including the Municipal Assembly, are accused of disruption of recreational spaces.

Ashaiman does not have a recreational center, not even a library. The only library we were putting up has been converted into the Municipal Assembly. (Male key informant, Ashaiman)

CHAPTER FIVE: RESILIENCE TO FOOD INSECURITY AND CLIMATE VARIABILITY IN NAVRONGO MUNICIPALITY

The qualitative analysis of results from Navrongo focused on eight dimensions (*Wealth, Natural Resources/Environment, Security/Protection/Advocacy, Human Capital, Health/Health Services, Social Capital/Community Networks, Governance and Spirituality*), based on transcripts from FGDs and KIIs.

5.1. Wealth

This dimension is used in this context to refer to access to both financial and non-financial assets. This dimension also describes the livelihoods and assets of the local population, which include their sources of incomes and revenues, food situation and security, access to financial services and housing.

5.1.1. Adaptive Strategies

Animal husbandry and crop cultivation for both domestic use and to supplement income are common local practices. Women commonly cut and sell firewood, and both women and men work as laborers on building projects to earn income. Some community members get loans from financial institutions to engage in petty trading. Fishing in dams supplements income and food resources. Community members send their children to school so that future generations can learn additional livelihood skills.

If you go and cut wood or whatever, then it is up to you to do. I for one normally go to the bush and cut wood and sell it. I hawk fish, and as am sitting, I am losing a lot. (Female FGD participant, Gia)

We are serving in the Nogsenia market. You get up and you get concrete to carry or you get some wood to cut and sell. You then buy maize or gari [local food made of cassava] so that you will be eating. But now to say there is a house that uses their own waste to farm food throughout the dry season, it will be a lie. We all buy from the market to eat. (Male FGD participant, Doba)

Another adaptive strategy in this study area is forming welfare groups among women. The group members make contributions (*susu*) to assist one another. The *Wealth* dimension also includes some aspects of community networking, as the groups come together to engage in farming and sell the produce from the farm to members at reduced price.

Our women have unity. They chose me to be a man among them. We have contributions in the form of money, we have bank accounts, so when one of the women needs support, we give monetary support to the person so that we help ourselves. If not, there will be problems. (Male FGD participant, Manyoro)

5.1.2. Coping Strategies

Because the area has one rainy season a year, people migrate to southern Ghana during the dry season to take up other jobs for sustenance. The migration depletes the human capital in the community, as it is the youth and other strong people who migrate.

That is why we run to Kumasi, because there is no work. Even where there is concrete, you get there and your services are not needed. So that is why many of us run and leave our community. (Male FGD participant, Doba)

5.1.3. Vulnerability Factors

The increasing nuclearization of families in the area limits kin networks that traditionally assist extended families when resources are limited, for example, during times of food shortages. With smaller, more isolated family systems, these networks are not in place to support people during times of hardship. This may be particularly true for families who

migrate for jobs or resources. Erratic rainfall results in low yields, which along with animal and poultry death, diseases and theft of produce, make farming in these communities unattractive. Infertile land requires fertilizers for better crops yields, however, fertilizers are expensive and the majority of community members cannot afford them. In some instances, the fertilizer may not even be available for those who can afford it.

We all use to eat together with our siblings, nieces, nephews, etc. [We entered the house using one entrance!] but now there are many entrances to every house. This signifies the breakdown of the extended family system, which was the strength of an individual. Now people relate with just their immediate family, which is the nuclear family. So if you are poor in a nuclear family setting you are worse off because there is no support from extended relatives. So it makes people who are poor suffer in the community. (Male FGD participant, Doba)

5.1.4. Causes and Effects

The effect is that people invest a lot of energy into farming and yet get little for their efforts. This results in food insecurity and poverty, as no excess food can be sold to supplement household income.

Due to the late and irregular nature of the rains, it makes cultivation difficult. By the time the rains start, the time of planting is over. We cultivate sorghum and millet. Even when we still sow late, the rains fall almost every day, causing our crops to die or be stunted because they are very young. These are the things disturbing us and creating food shortages. (Male FGD participant, Doba)

According to respondents in this study, the lack of dams in some communities affects wealth because they are unable to engage in irrigation farming.

...even if our crops fail in the rainy season, we can rely on the dam water for gardening in the dry season. So truly, if we can even use buckets to fetch the water and water our gardens, this will help us. Once it is absent, it is a big problem. (Male FGD participant, Manyoro)

Another cause of stress in the *Wealth* dimension is the frequent death of animals in households where animal husbandry is critical to livelihoods. This is another source of support and resource in the community that is vulnerable to shocks and hazards.

If it is about death of the animals, some people get the veterinary officers to vaccinate the animals, but those who do not have money to get them, what will you do? Just some few days ago, about two of our sheep died. Particularly the time in which the animals die, we should try if we have the money...to vaccinate the animals. (Female FGD participant, Manyoro)

5.2. Natural Resources/Environment

This dimension includes natural resources (e.g., soil, water, air, minerals, forest, fisheries and flora and fauna land, forests, water) and associated services (e.g., erosion protection, storm protection) on which resource-based activities (e.g., farming, fishing etc.) depend. It also includes the management of natural resources: The practice of maintaining and enhancing natural resources through a variety of means, including forest and range management, agro-forestry, livestock rearing, water resource management, animal waste management and coastal and river bank protection. Recognizing the value of natural resources and ecosystems, prioritizing identification of natural resource concerns, and addressing those concerns is critical for ensuring the lives and livelihoods of women, men and children who depend on them.

5.2.1. Adaptive Strategies

The environment is suitable for livestock rearing, and many community members employ this as a strategy against food insecurity and climate variability. Also, fishing is done at the dams in the area for both household consumption and extra income to support the family. Irrigation farming is also carried out, making good use of the natural resources in the community.

...in most cases when the crops fail, if the dams have water, we do gardening to raise money for our children's school. (Male FGD participant, Gia)

Some community members plant trees behind their houses to serve as windbreaks. Respondents also mentioned a tree planting initiative under SADA in some communities in the study area. Inspecting roofs of houses and reinforcing roofs with stones before the start of the rainy season was also used as an adaptive strategy against rainstorms.

[In] my own house, every year when it gets to the rainy season, I get up and look at the nails that are raised. I get a carpenter to come and knock them back. (Female FGD participant, Gia)

5.2.2. Coping Strategies

Some depend on NADMO to provide them with relief items during such disasters. Using stones to reinforce roofs of buildings was also mentioned as a coping strategy in Tamale.

They have announced already that wind is coming, so we should all be safeguarded, so we have gone to carry heavy stones to put on our roofs to try to stop the storm from ripping off our roofs. We cannot prevent it completely, but even when you put too much on the roof and a lot of rain falls, it will push down the roof. (Female FGD participant, Gia)

Some NGOs are providing assistance for reforestation and animal husbandry in the study

area.

Some NGOs have come, like Novacado, to help farmers in the communities with livestock and planting of trees, fruit-bearing trees. With the animals for some time, the beneficiary farmer will have to also supply the offspring to others. (Male key informant, Navrongo)

In this community, some people put stones on their roofs to weigh them down during windstorms.

5.2.3. Vulnerability Factors

Frequent bush burning in the area destroys soil flora and fauna. This makes the area vulnerable to unstable rain patterns, which affect crops production. This vulnerability is also closely related to food security and wealth, as some rely on the sale of extra farm produce to supplement household income.

As the rains are not coming like that, it has brought lots of diseases, and even foods do not do well. Like groundnuts, the time that it will rain for the roots to enter the ground, well, it will not rain. (Male FGD participant, Gia)

Rapid deforestation from cutting trees for firewood and burning charcoal have depleted trees to protect houses from storms.

What has also caused the rain to change is the felling of trees. In the past, when we were children, there used to be trees everywhere. Like my elder brother said earlier, trees help the rain come. The white man calls it respiration [transpiration]. In the night, they release moisture to go to the sky, and when the moisture reaches the sky, it combines with the clouds and that helps rain fall. (Male FGD participant, Manyoro)

Most of the people roof their houses with thatch, which is easily ripped off, making them vulnerable to this shock.

People build their houses with bricks and roof with thatch, and these are not strong, so when the storms come, they destroy the houses.- (Male key informant, Navrongo)

5.2.4. Causes and Effects

Environmental degradation and climate change have resulted in changing rain patterns, which affect the production of food crops and deepen poverty, as the majority of community members rely on the sale of farm produce for money.

...if we had planted trees around our houses...the trees would be big enough to block the wind. In the past, there used to be storms, but the trees were there to minimize it, but now the wind moves freely. (Male FGD participant, Manyoro)

In addition, use of fertilizers and agro chemicals were mentioned as making the soil infertile for crop production, reducing crop yield and further affecting income.

It's actually true; the chemical fertilizers have spoiled our lands, including the weedicides we use. In the olden days, we used to rotate the lands that we cultivate. We do not do that anymore —we continuously farm on the same piece of land, so it loses its fertility (sagibe). (Male FGD participant, Doba)

Littering was suggested as a cause of unexpected deaths in animals.

The rubbers/polythene bags are everywhere, so when animals eat these rubbers it affects them. It also leads to the death of the animals. The veterinarians can't help in this situation. When you cut open the animal after death, you will see the rubbers/polythene bags in its stomach. (Male FGD participant Manyoro)

Another effect is that people spend their limited resources to build roofs that are ripped off and have to be rebuilt. Those who have no immediate resources for re-roofing depend on relief items from the government. Where this does not happen, then they become homeless.

The rain, too, does not fall early for us to sow, or it will fall later but too much and spoil our things. It can bring storms to remove our roofs, and you will then suffer. (Male FGD participant, Manyoro)

Those with external locus of control view storms as the result of spiritual influences, citing them as punishment against offending gods. In these cases, local rituals are practiced to mitigate future “punishment.”

For windstorms, it is the duty of the earth priest. In the olden days, fortunetellers would show the way. He would usually ask the seers what prevents the rains from coming. Have we offended the shrine, or what is the reason? If so, fowls and flour are used to sacrifice to appease the gods. (Female FGD participant, Doba).

5.3. Security/Protection/Advocacy

This dimension encompasses exposure to personal and property crimes. However, it was more used to refer to property crime and the area of theft of animals in the community. This dimension was also extended to include rapid road traffic accidents, which were of urgent concern to the community members. Road accidents often involve families and youth and are viewed as a loss when those with great potential are lost in these seemingly senseless

ways. Advocacy was not well entrenched in these study areas. In the Greater Accra region, this dimension had more to do with armed robbery in the community.

5.3.1. Adaptive Strategies

Housing livestock in houses offers some protection against theft, and this emerged as one of the adaptive strategies in this community.

Some of us have structures in our houses for these animals, and this is protecting them from theft. If you allow your animals to sleep at a place you do not know in the night, thieves will steal them. (Male key informant, Navrongo)

5.3.2. Coping Strategies

Community members allow their animals to roam about in the community, which may mean that they inadvertently feed on food crops grown by other families for purposes that do not include animal feed. In these cases, community members may grow frustrated and kill animals that are not confined to a protected area. Conflicts may result in households or farms when animals destroy property and others respond with frustration or violence.

We have the vaccine. Some of the animals you even see are free range. I normally ask people, look at this animal because I was at the cattle market it is not hearsay. You have animals [worth] around 15 million old cedis, some even up to 20 million old cedis. You do not even know where the animal sleeps. (Female FGD participant, Gia)

5.3.2. Vulnerability Factors

Animals that are unprotected may be stolen at night, which could have negative impacts on households depending on those animals.

Many people in this community leave their animals to roam about, and thieves steal them. (Male FGD participant, Manyoro)

5.3.4. Causes and Effects

Livestock are an alternative source of income for households. When animals are stolen, die unexpectedly or are killed, households lose important resources. In addition to financial loss, there may also be loss of food resources or labor for the household, depending on the role of the animal for the household.

We sell these animals for money, but when the animals are stolen, it means we have lost some money that could have been used to solve some problems. We sometimes sell the animals to send our children to school. (Male FGD participant, Doba)

5.4. Human Capital

This dimension looks at the education level of the people. It encompasses mentoring of children in the community. Education facilities were described as available in the community the problem had to do cost of fees, which were generally described as high.

5.4.1. Adaptive Strategies

Parents create mentorship opportunities for their children to acquire skills in their area of expertise. This form of socialization ensures that children without formal education are able to make a living with the skill that has been acquired.

5.4.2. Coping Strategies

Parents refusing to send their children to school as a result of cost of education emerged as a negative adaptive strategy. Migration to southern Ghana was also mentioned in both FGDs and KII as a negative adaptive strategy some people employ in this community.

There are others who migrate to the Kumasi and get money and will not come back home for life. Even those who eventually return, their coming is meaningless because they come empty handed. Also, people have no jobs after school. (Female FGD participant, Doba)

5.4.3. Vulnerability Factors

The majority of the community relies on farming for sustenance, and when farm yields are poor, there are no alternate sources of income, making children vulnerable.

These days we do not get anything from the farm. You farm and then get nothing. So we are not able to get money to send our children to school. (Male FGD participant, Doba)

5.4.4. Causes and Effects

School fees are high, limiting the number of families that are able to send their children to school and/or maintain their education. As a result, even children who may currently be enrolled may not be able to continue or may have interruptions in their education. Drop out rates are high for all grades of school, and particularly for older grades if families may want to focus resources on younger children gaining basic skills.

The fees are high, so poverty is a contributor to why the children do not go to school. It is poverty, because a parent cannot afford the fees for the ward [child]. (Female FGD participant, Doba)

What is also stressful is that now the world is difficult. These children in school when they return home and ask for school fees we don't know what to do. Even if you get up and send a cow to the market, it doesn't pay. We are now stuck not knowing what

to do. If you see somebody better off and you borrow money, you can't pay it back. So if you are talking about stress, this is really stressful. (Female FGD participant, Gia).

5.5. Health/Health Services

The dimension looks both physical health and WASH. Epidemics and access to health services were of major concern to the community members. Zoonotic diseases (including anthrax) were an area of concern for cattle in this area. Anthrax infection could be passed to humans. Another areas that emerged in this study area included the abuse of alcohol and smoking, which affects health.

5.5.1. Adaptive Strategies

People avoid selling and eating meat from dead animals that are suspected to have died from anthrax.

When an animal dies from anthrax, we bury it, we do not eat it. (Male FGD participant, Gia)

5.5.2. Coping Strategies

Local NGOs (a social capital and community network) often provide resources families need such as toilets, boreholes, medicines and other resources.

5.5.3. Vulnerability Factors

The poor are vulnerable to poor health because of their inability to support their families nutritionally. They often turn to other sources of support for food and household items. Water supply is another health issue in the community.

Well water supply is a problem. We wish that the water situation would have improved. We need more water supplies to improve the situation. (Female FGD participant, Gia)

Climatic changes may be related to outbreaks of diseases such as cerebrospinal meningitis (CSM) in the community. Health remains a desirable outcome dimension. Health is supported through resilience dimensions such as social capital and community networks.

5.5.4. Causes and Effects

According to respondents, as a result of poverty, people are dying at a younger age. Alcohol abuse also results in frequent road traffic accidents, which are responsible for many deaths in the community, especially among the youth.

The road is wide enough. It is the fault of the riders here because I have gone to places and I have seen that they don't drive carefully. At times, the drivers are to

blame because of the speed, and when they drink, it becomes serious. They get into accidents and die. (Female FGD participant, Doba)

Many of the accidents are due to alcohol. If he [a driver] drinks and gets onto the road, he does what he wants. You see people dangling (walking unsteadily under the influence of alcohol), and before you realize it, they are knocked down. Some sit in the vehicles sleeping, while others are making telephone calls. (Female FGD participant, Doba)

Use of hard drugs for farming activities and excessive use of alcohol have health implications. Respondents in the study area also linked alcohol abuse to the frequent road traffic accidents, which particularly impact youth. Cigarette smoking was linked to bush fires.

The cigarette smoking causes bush burning. It can cause disease to you— infections. Drunkenness is also there. Hard drinks are also not good and can lead you to do things that are not good. When you drink and go and start felling trees, you don't care. You can also just burn the grass if you are drunk. (Male key informant, Doba)

5.6. Social Capital/Community Networks

This dimension describes forms of connectedness among individuals, households, and groups in the community. In this context, it is used to refer to community members forming groups that make contributions for the welfare of members. These groups also engage in farming to support one another.

5.6.1. Adaptive Strategies

Members are often given both financial and non-financial support in times of distress, and this helps reduce the stress. They are also entitled to credit from the group accounts to start trading.

But if you look at Manyoro here, we have different communities where there is unity. I am from Wanjagnia, a community in Manyoro. Our women have unity; they choose me to be a man among them in the group. We contribute to support a member [in distress]; we will go for the funeral if one should lose a relative and help. Again we farm groundnuts, which all members are serious about. I think this kind of unity is very beneficial to us all. (Male FGD participant, Manyoro)

We have this Northern Growth; they have to come to form farm groups. We assist the farmers and link them to financial institutions to collect inputs for farming, after which they pay back. (Male key informant, Navrongo)

5.6.2. Coping Strategies

Savings groups are often limited to women; men commonly refuse to be members of the groups. Others seek to join groups to collect credit but refuse to repay the money, which causes conflict and difficulty for the group and for the success of future programs.

That revenue [block farming funds] is a revolving thing which we use every year to buy more inputs. But if you run away with it, will we get to continue again? So that is the problem. (Male key informant, Navrongo)

5.6.3. Vulnerability Factors

Because of the poverty situation, loans are given without collateral. When an individual absconds, there are no resources that could be sold or claimed to defray the debts. Without collateral, the group must shoulder the burden by covering it with loan resources. This compounds poverty and limits members' ability to get future loans or support.

5.6.4. Causes and Effects

The inability or refusal of people to repay loans has resulted in a lack of money to assist people in need. This further aggravates the poverty level in the community, as well as discouraging people from giving credit to support farming.

Yes, the majority of our people are migrating out of the place for greener pastures. People run away with our monies, thus preventing your brother from enjoying the facility, and because of that, government is not minding us again. (Male key informant, Navrongo)

5.7. Governance

This dimension in this context specifically refers to the authority of traditional leaders such as chiefs, *tindanas* (landowners) and other people who are believed to wield authority in the community.

5.7.1. Adaptive Strategies

Communities consult traditional leaders in times of distress. These leaders use their power in their communities to settle disputes to promote peace among residents.

We have the tendabas and the chiefs, who are our leaders, and we consult them at times and need and they are helpful. (Male FGD participant, Gia)

However, concerns were raised regarding traditional leaders who over time lose their authority to formal political leadership. Respondents felt that this inhibits the sense of collectiveness, further limiting the ability to mobilize communal labor and resources to solve community problems.

5.7.2. Coping Strategies

Respondents expressed the perception that traditional leaders have abandoned the plight of their people because their authority has been taken over by formal political leaders. They felt that this was responsible for the many challenges in the community and was a reason the gods of the land were angry.

The landlord (home owner or head of family) too has to get up and pour libation on the shrines and communicate the results. However, if he does not do that, what can we his followers do? So the tradition dies in their hands. (Male FGD participant, Manyoro)

What I will say here is that poverty and unity is affecting us and this explains why these problems are affecting us and this explains why these problems are affecting us because we do not have respect for the chief and the earth priest and it is they who communicate with gods to intervene for us - (Female, FGD, Manyoro).

5.7.3. Vulnerability Factors

Respondents said that leaders were no longer accountable to the people. This makes it difficult for people to approach them and table their concerns. This is largely as a result of the change in the value system, in which the traditional values of reciprocity, love and respect for elders and leaders were once held in high esteem.

5.7.4. Causes and Effects

The district assemblies are limited in their governance roles by ongoing challenges. For example, poor crop yields and the frequent death of animals has had a negative effect on n taxes collected at the market by the Assembly for development projects.

You know, the assembly gets most of its revenue from the markets. And so, if no food is brought, no animals are brought, how will they get the revenue? Back at our place, chiefs come out to collect grain and yams to their houses that can help them also live. (Male key informant, Navrongo)

5.8. Spirituality

This dimension describes the religious or sacred symbols used to describe or explain events experienced as shocks by people and institutions. In these examples, negative events are viewed as a reaction to disobedience in the community that must be addressed through devotional or sacrificial traditions to appease a spiritual being. The manifestations of shocks are seen as punishments from the spiritual world, and only placation of those entities results in relief from the stressors.

5.8.1. Adaptive Strategies

In situations of spiritual stress, communities may perform certain rites that bring together community members to call for changes to a negative situation. This might include calling for rain during a drought. Social taboos and other beliefs set expectations, and when those expectations are not met, elders or spiritual leaders may attribute negative outcomes to the violation of taboos. This may be complicated by biological and scientific views of the world that attribute changes in weather and other patterns to larger structures not heavily influenced by individual or behavioral practices. Nonetheless, these communities abide by belief systems in which social actions are related to storms, rain patterns and vegetation.

5.8.2. Coping Strategies

When there are storms or drought, people rely on their traditional and spiritual leaders for solutions. At the individual level, people pray for the rains to fall, whereas at the communal level, rituals are performed to stop or reduce the impact of the shock.

We always pray to God for the rains to come. Our prayer is normally for it to rain, and when we plant, we pray that God should help our crops to do well. (Female FGD participant, Gia)

For windstorms, it is the duty of the earth priest. In the olden days, fortunetellers would show the way. They would usually ask the seers what prevents the rains from coming. Have we offended the shrine, or what is the reason? If so, fowls and flour are used to sacrifice to the gods. (Women FGD participant, Doba)

5.8.3. Vulnerability Factors

The upsurge in religious sects has contributed to a decline in the belief in traditional African religion. Therefore, the ability of the traditional leaders to convince the community has become weak and this make the community vulnerable to the stressors of insecurity and climate variability.

Now there are many churches here, and they preach against what our forefathers used to practice. With that in their mind, they would not respect the traditional authorities because they think what they do is evil. (Male FGD participant, Gia)

Respondents also believed that community members breaking traditional norms in the community make the traditional leader unable to perform their roles very well, which adds to the stressors in the community.

They are saying we should not perform funerals at particular times. We shouldn't make noise at some particular times and all those things. We are losing our traditional value system. Where there is a tangona [traditional god], we don't cut trees there (Male key informant, Navrongo)

When it does not rain, we put the blame on landlords who are not performing their responsibilities and the misuse of darkness of by ourselves. In the night everybody can go anywhere and misuse the place. There are taboos. Something that must be done indoors is now done outside. When such things happen, they said, it won't rain. They must do certain things before it will rain. (Male key informant, Navrongo)

Some people perceive windstorms as the results of the gods being forced to “fly” through storms to punish people for their infractions.

You see this space, you see this shrine, that's another shrine over there. You have farmed and blocked the pathway of the shrines. It has a path to go through, so it has to use wind to fly up, you see, its path is no longer there, and it is we who have blocked its way. The tangona will not get a path to move, so it is we the human beings who are spoiling ourselves. (Male FGD participant, Manyoro)

CHAPTER SIX: QUANTITATIVE ANALYSIS AND CONTEXT-SPECIFIC RESILIENCE FRAMEWORKS

This chapter discusses the findings of the qualitative resilience assessment conducted in the three urban communities in northern Ghana.

6.1. Tamale Municipality

The focus of the resilience analysis for the Tamale metropolis was rapid urbanization, with its implications for food security in the context of climate variability as a sub-theme. Resilience to vulnerability associated with rapid urbanization involves urban dwellers developing a comprehensive strategy with the help of government interventions that incorporates the various dimensions of resilience and disaster management into livelihood activities (Smith 2009). This section discusses the resilience dimensions involved in dealing with urbanization and its implications for food security and climate change in the Tamale Municipality.

Figure 3 presents the key dimensions for achieving resilience in Tamale metropolis. *Wealth* seems to be the most important resilience dimension across all categories of respondents. Men perceive the *Wealth, Human Capital, Natural Resource and Environment, Health and Health Services* dimensions, in that order, as having the highest potential for achieving resilience. For women, *Wealth, Health, Governance* and *Security/Protection/Advocacy*, in that order, are the most important resilience dimensions. Key development stakeholders in the metropolis see *Wealth, Governance, Infrastructure* and *Natural Resources/Environment*, in that order, as the most important resilience dimensions.

Figure 3. The importance of resilience dimensions among key development agents, men, and women in Tamale Municipality, Ghana

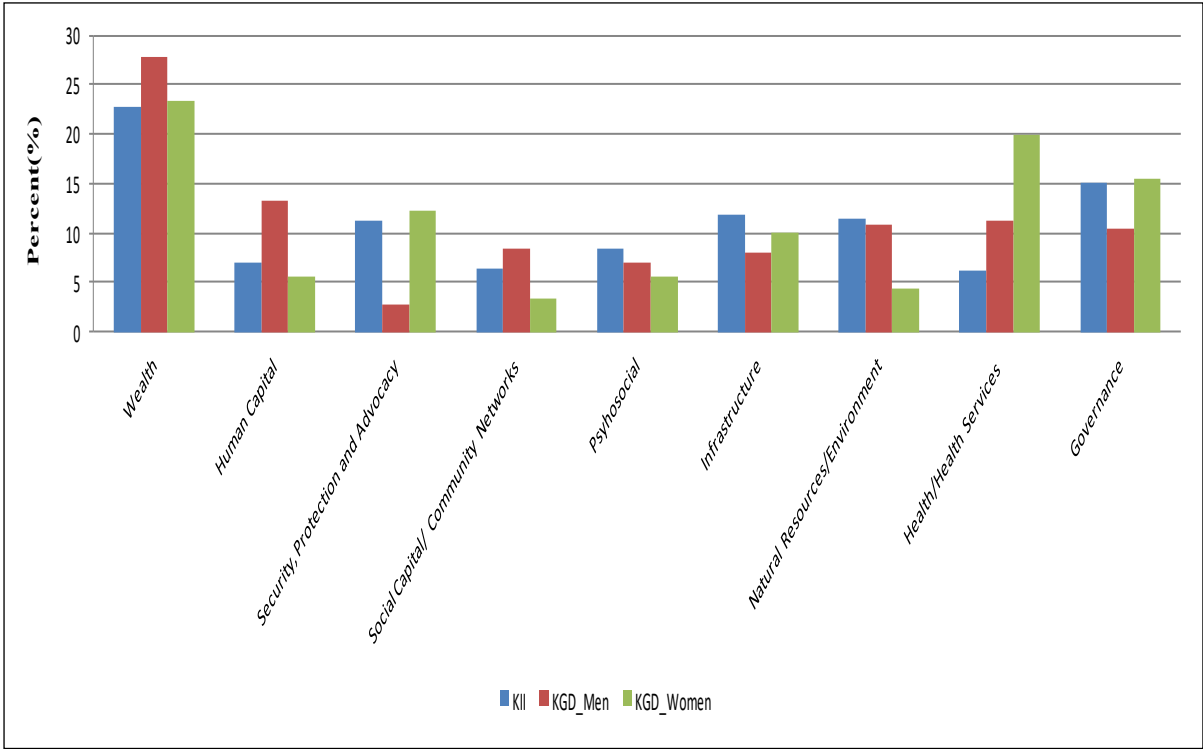


Figure 3 shows the individual shares of the various dimensions among key development agents. The concurrence of opinion on the role of wealth, employment and other income generation activities that create wealth in achieving resilience is expected. Even though sustainable resilience is achieved through the comprehensive and integrative use of the various dimensions, both financial and physical household assets or resources available to local governments are pre-requisites for building resilience through the other dimensions. It was unexpected that women saw *Governance* as the third most important resilience dimension. This may be because women in the Tamale metropolis do not have many opportunities for political influence and see the opportunities for change elsewhere. Efforts to engage more with women politically may increase their participation in local governance.

Figure 4. Frequency of occurrence of resilience dimensions mentioned by key development agents in Tamale Municipality, Ghana (percent)

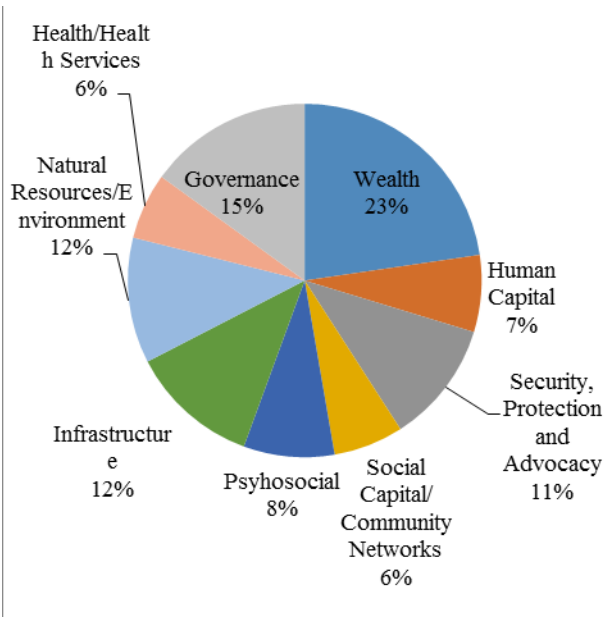


Figure 4 shows the individual shares of the various dimensions among male respondents.

Figure 5. Frequency of occurrence of resilience dimensions mentioned by men in Tamale Municipality, Ghana (percent)

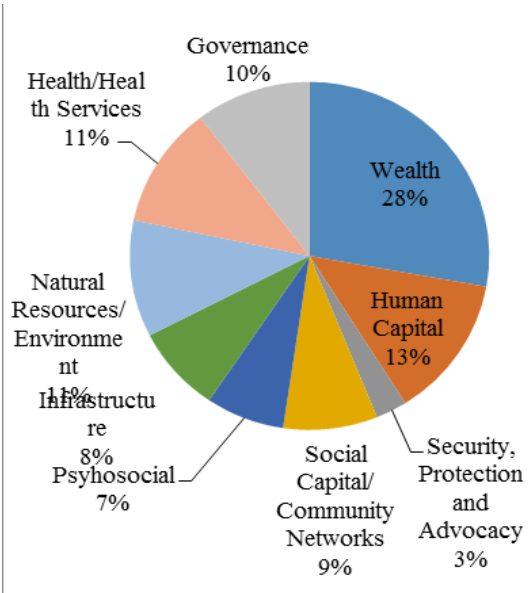
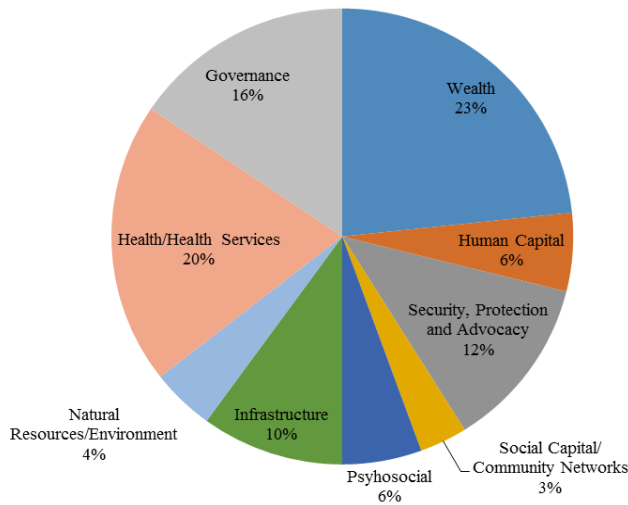


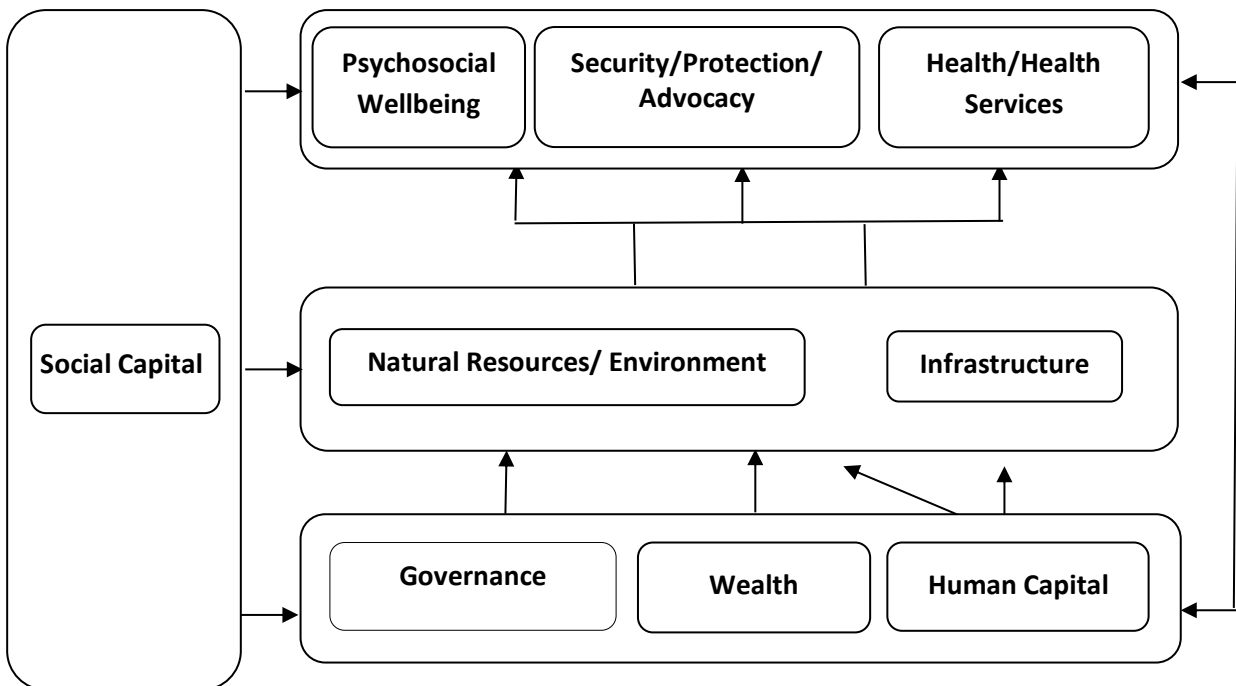
Figure 5 shows the individual shares of the various dimensions among female respondents.

Figure 6. Frequency of occurrence of resilience dimensions mentioned by women in Tamale Municipality, Ghana (percent)



The context-specific framework in figure 6 illustrates the relationships among dimensions in the context of rapid urbanization in Tamale, based on an analysis of the FGD and KII transcripts from this study. The dimensions are grouped and positioned according to underlying causes, immediate causes/effects, outcomes and supporting enabling factors. The arrows show linkages and cause/effect (driver) pathways between dimensions and dimension groups.

Figure 7. Resilience framework for rapid urbanization in Tamale metropolis, Ghana



The framework in figure 7 illustrates that *Wealth*, *Human Capital* and *Governance* are the underlying drivers of vulnerability in the Tamale metropolis. This means that people

perceive these dimensions as responsible for their vulnerability to stressors arising from urbanization, climatic change and food insecurity. The immediate causes and effects of this vulnerability include natural resource scarcity, mainly shortage of farmland a deteriorating environment and poor infrastructure. The outcomes of vulnerability fall under the dimensions of *Security/Protection/Advocacy*, *Psychosocial Wellbeing* and *Health/Health Services*, while *Social Capital/Community Networks* serve as factors supporting and enabling resilience.

Overall, the dimensions are interconnected in determining vulnerability and building resilience among communities in the Tamale metropolis. *Security/Protection/Advocacy* emerged as an outcome dimension because Tamale is generally a conflict-prone area and security relates to conflicts over chieftaincy and land with some influence of political maneuvering. Security may be a heightened issue for women and children because of their high vulnerability in times of conflict. Women also ranked *Health/Health Services*, which are directly related to conflict, as an outcome of concern.

6.2. Ashaiman Municipality

The community consultations in Ashaiman Municipality identified nine resilience dimensions (*Security/Protection/Advocacy*, *Natural Resources/Environment*, *Social Capital/Community Networks*, *Psychosocial Wellbeing*, *Infrastructure*, *Governance*, *Wealth*, *Human Capital* and *Health/Health Services*). The study team plotted the number of times each of the dimensions or related themes were referred to in the FGDs and KIIs.

Drawing on the frequency with which the various dimensions or related themes were documented in the data, we were able to assess the importance of the dimensions for the three categories of respondents included in the field surveys (key development agents, men and women). Plotting the frequency of occurrence of these dimensions or related themes indicated the importance of the resilience dimensions to those who participated in the focus groups are indicated. Figure 8 shows the relative importance of the nine resilience dimensions for key development agents, men and women in the Ashaiman Municipality.

Figure 8. Frequency of occurrence of resilience dimensions mentioned by men in Ashaiman Municipality, Ghana (percent)

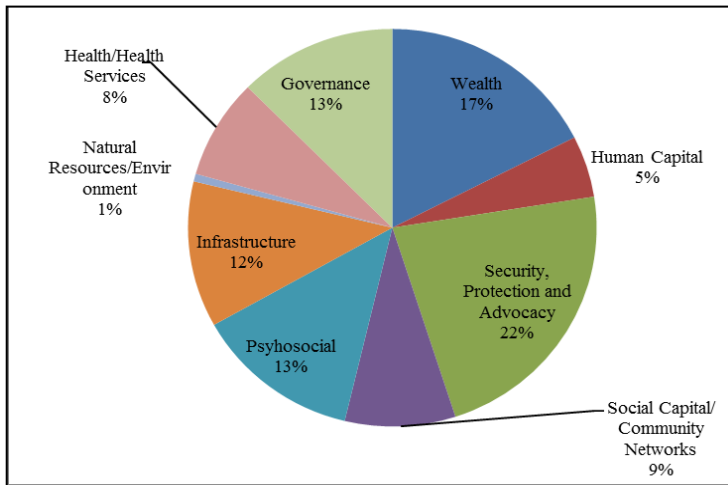


Figure 8 shows that women tended to prioritize three dimensions (*Wealth*, *Human Capital* and *Security, Protection and Advocacy*) as important for building resilience.

Figure 9. Frequency of occurrence of resilience dimensions mentioned by women in Ashaiman Municipality, Ghana (percent)

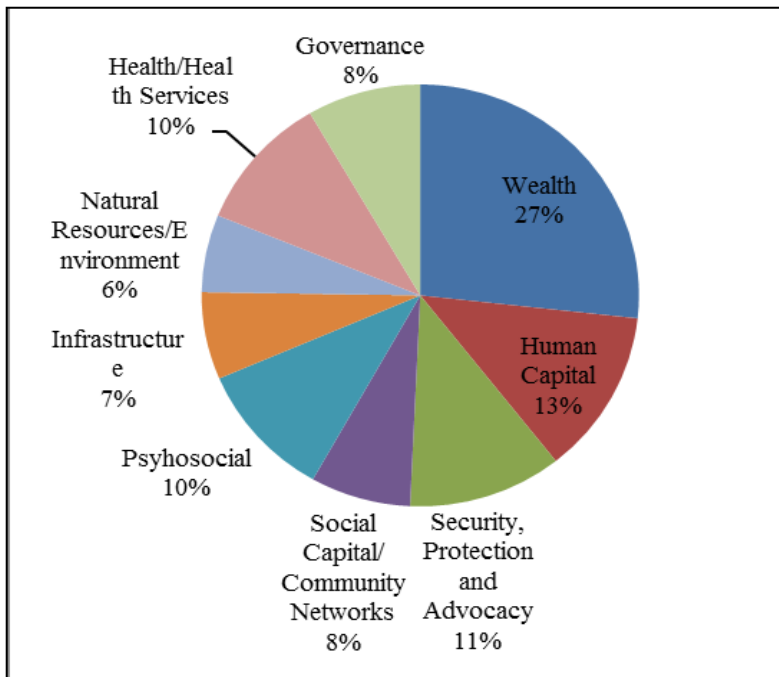
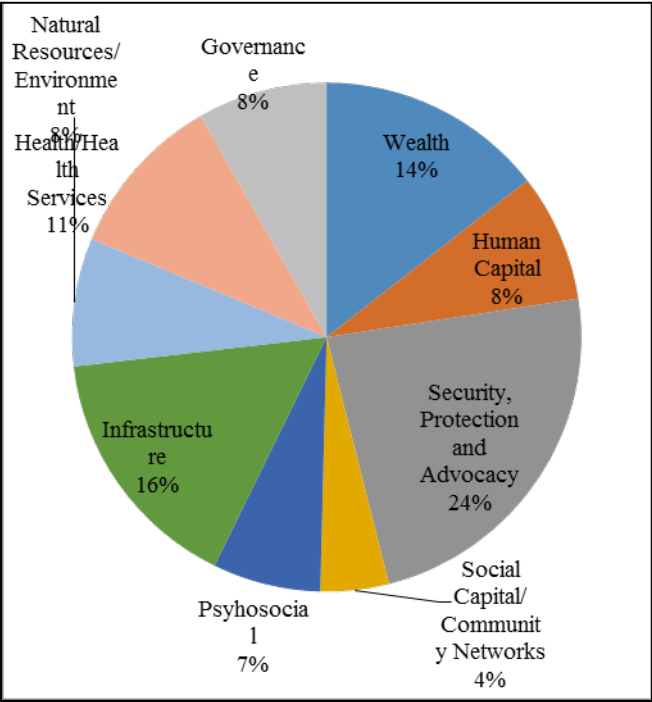


Figure 9 shows that in the opinion of key development agents, *Security/Protection/Advocacy*, *Infrastructure* and *Wealth* (employment and livelihood support) were the most important resilience dimensions.

Figure 10. Frequency of occurrence of resilience dimensions mentioned by key development agents in Ashaiman Municipality, Ghana (percent)



There are many possible reasons for the differing opinions of key development agents about the most important dimensions of resilience, for example, some gendered responses to resilience in the face of rapid urbanization. In a large city whose population is rapidly increasing due to migration, men are concerned with *Security/Protection/Advocacy*, *Social Capital/Community Networks*, *Psychosocial Wellbeing*, *Infrastructure* and *Governance*. Women tend to discuss household-level concerns such as wealth (income security), human capital (education of their children) and health resilience of the family.

All three categories of respondents agreed on *Security/Protection/Advocacy* for resilience to rapid urbanization. Perhaps inevitably, rapid urbanization causes security and protection concerns for a majority of the population. Migrants could be helped by a sense of security.

Figure 11. Resilience Framework for rapid urbanization in Ashaiman Municipality, Ghana

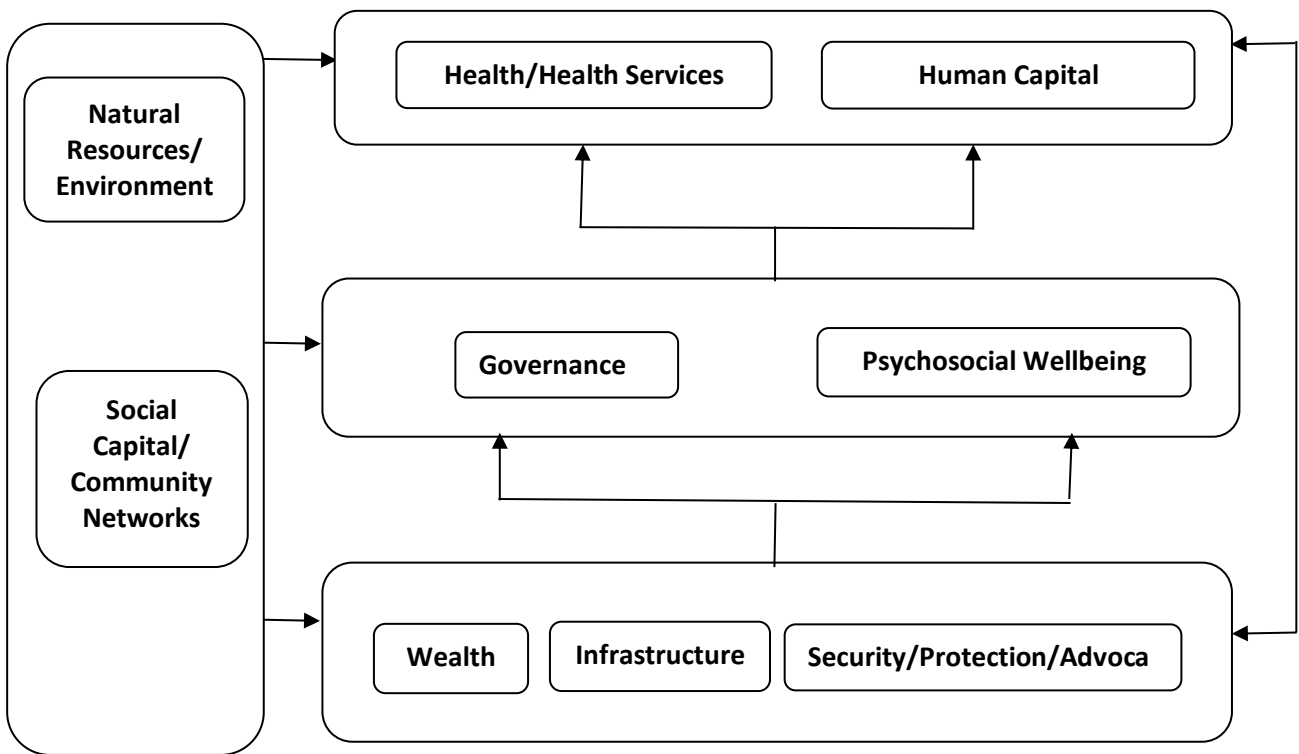


Figure 11 is the resilience framework for Ashaiman Municipality community that emerged from the qualitative study. *Wealth*, *Infrastructure* and *Security/Protection/Advocacy* emerged as the main drivers of vulnerability to rapid urbanization. Poverty often results in people resorting to armed robbery to make a living, and this creates security challenges in the community.

Poor education (*Social Capital/Community Networks*) among community members limits their potential for formal employment and becomes a major outcome issue for residents of Ashaiman, who are mainly there to make ends meet. Lack of employment opportunities can drive youth into criminal activity.

Poverty pushes some people into prostitution, putting women at risk of disease and unexpected pregnancies. Improved *Health/Health Services* and *Psychosocial Wellbeing* lead to improved *Wealth* and *Human Capital* as people are able to work to earn more money to send their children to school. Since the majority of women are unable to care for the children from such unplanned pregnancy adequately, the children also become street children, creating a vicious cycle of poverty.

Infrastructure and *Security/Protection/Advocacy* also emerged as having a direct link to both *Health/Health Services* and *Psychosocial Wellbeing*. The lack of housing facilities emerged as one of the causes of slums, as people resort to living in informal structures with the

attendant negative health implications. With the increasing armed robbery, people in the community live in perpetual fear.

The study revealed a reciprocal relationship among *Human Capital*, *Wealth*, *Health/Health Service*, and *Psychosocial Wellbeing*. However, *Natural Resources/Environment* and *Social Capital/Community Networks* emerged as supporting dimensions for wealth creation, as well as Human Capital, all of which help people maintain both physical and psychosocial health.

The resiliency role of *Natural Resources/Environment* is particularly interesting. People have been pushed from upcountry mainly as a result of lack of natural resources to support livelihoods, a situation that has been worsened by the effects of climate variability. As migrants in an urban slum, they do not benefit, nor do they expect, much from the area's natural resources, if there are any. Their hope is that any natural resources are important only if they provide opportunities for them to make a living, such as the dams along which most set up vegetable farms.

6.3. Navrongo Municipality

Among the resilience dimensions for the Navrongo site, *Wealth* was reported to be the most important determinant of resilience to food insecurity and climate change. In the context described earlier, this dimension was perceived to have the highest potential for achieving resilience among the three categories of respondents. Compositely, *Natural Resources/Environment* was also a key dimension. In most of the dimensions, men responded in higher numbers, prioritizing *Wealth*, *Health/Health Services*, *Security/Protection/Advocacy* and *Governance*, in that order. Women looked to *Wealth*, *Natural Resources/Environment* and *Governance*, in that order, for strengthening resilience. Key development agents prioritized *Wealth*, *Natural Resources/Environment* and *Infrastructure*, in that order (Figure 13).

Figure 12. The importance of resilience dimensions among key development agents, men and women in Navrongo Municipality, Ghana

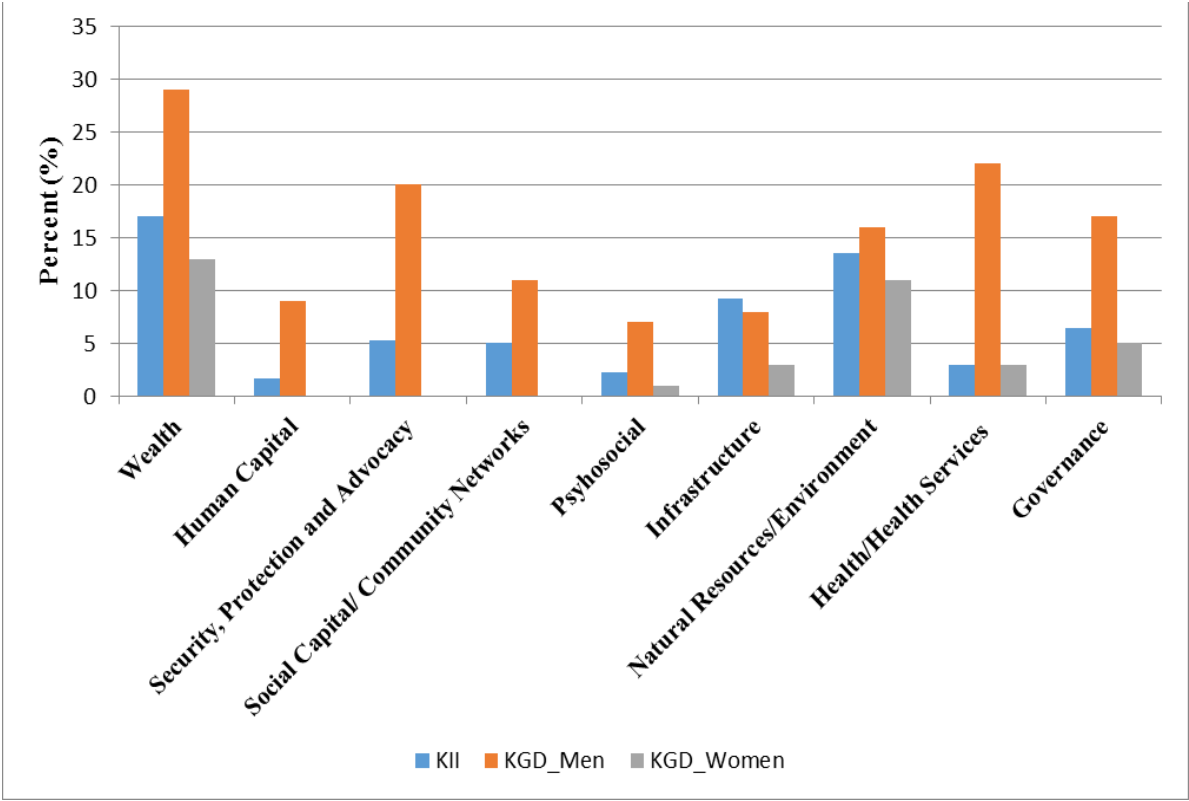


Figure 12 shows that six of the nine dimensions (*Wealth, Health/Health Services, Security/Protection/Advocacy, Governance, Natural Resources/Environment, and Social Capital/Community Networks*) were seen by men to be of highest priority in building resilience.

Figure 13. Frequency of occurrence of resilience dimensions mentioned by men in Navrongo Municipality, Ghana (percent)

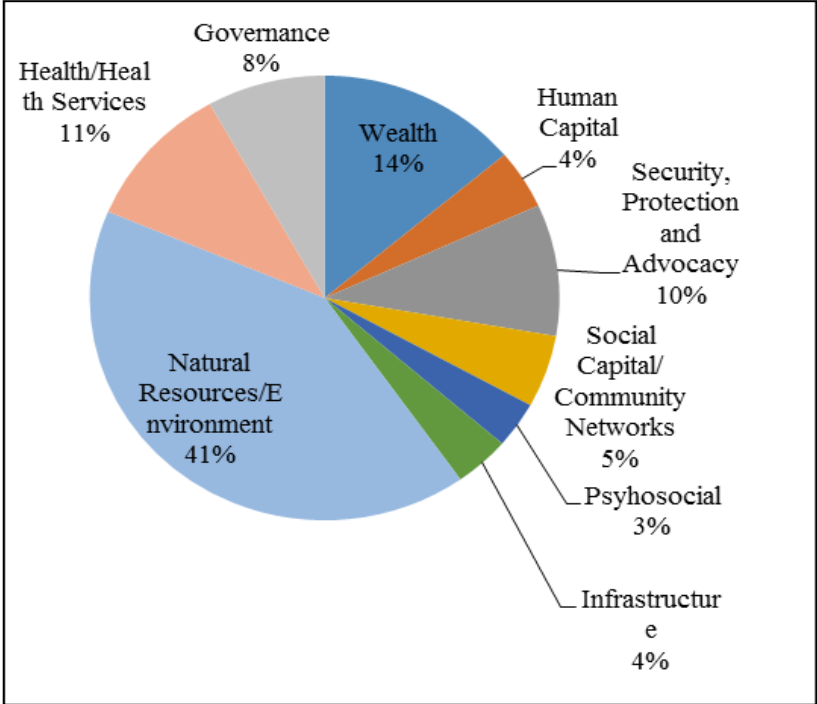


Figure 13 shows that women tended to prioritize *Wealth*, *Natural Resources/Environment* and *Governance*, in that order, as important for building resilience.

Figure 14. Frequency of occurrence of resilience dimensions mentioned by women in Navrongo Municipality, Ghana (percent)

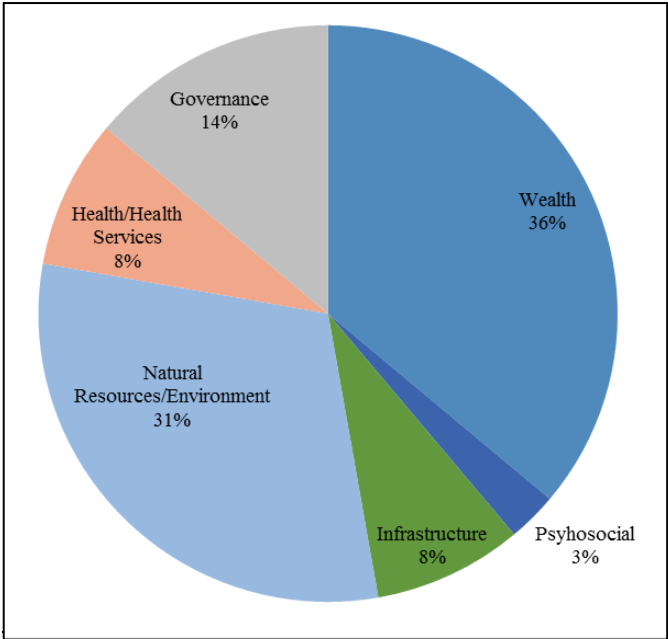
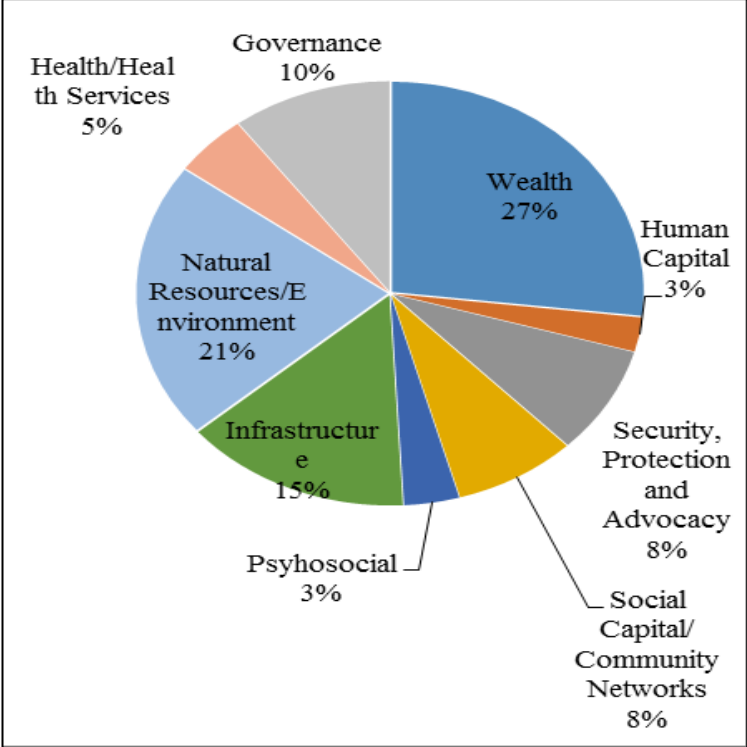


Figure 14 shows that key development agents prioritized *Wealth*, *Natural Resources/Environment* and *Infrastructure* as the most important dimensions for building resilience.

Figure 15. Frequency of occurrence of resilience dimensions mentioned by key development agents in Navrongo Municipality, Ghana (percent)



Across the three categories of respondents, the *Wealth* and *Natural Resources/Environment* dimensions were the two most highly rated in terms of their potential for achieving resilience. Note that the lack of wealth and natural resources have a common connection to economic vulnerability, and are thus perceived in the Navrongo site, where poverty rates are highest, as important resilience indicators.

Figure 16. Resilience Framework for food insecurity and climate change in Navrongo Municipality, Ghana

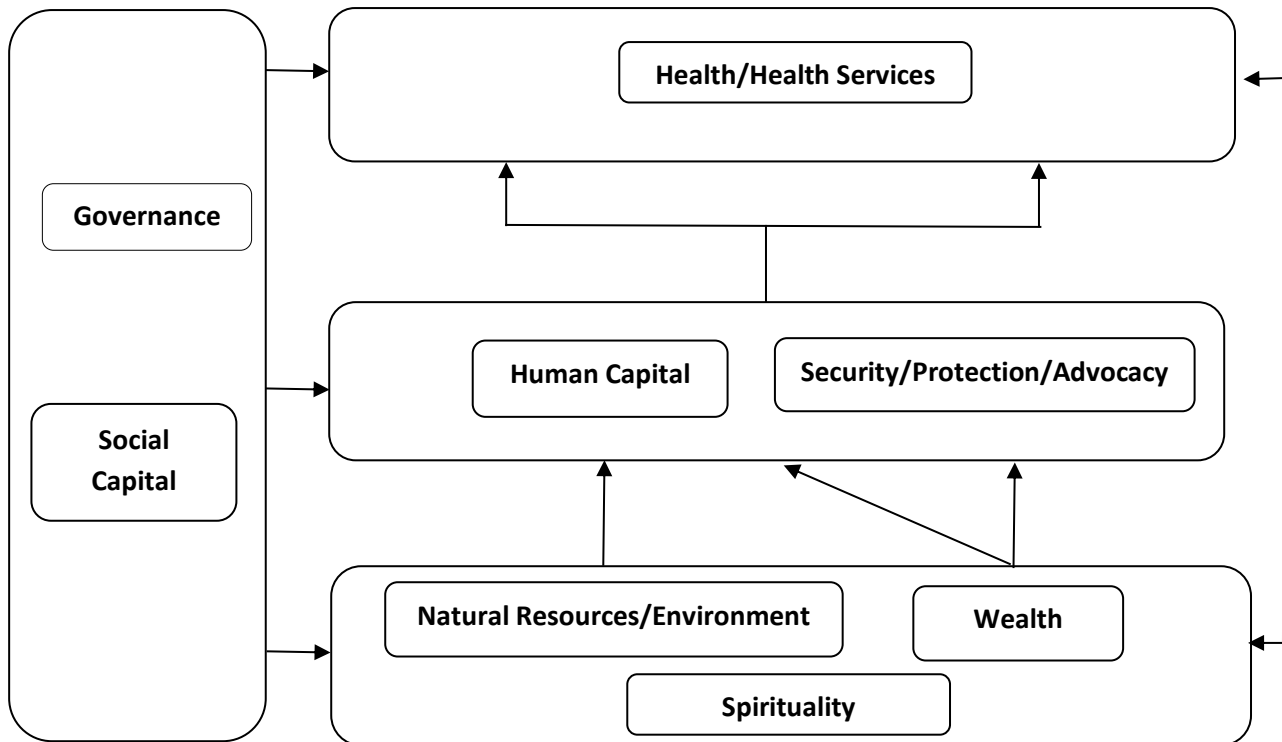


Figure 16 is the resilience framework for food insecurity and climate change developed on the basis of the community consultations in Navrongo. Overall, *Spirituality* is a driver of vulnerability in Navrongo Municipality. Participants in the qualitative study felt that people had lost touch with their ancestors and could no longer summon them in times of need, and that this disconnect left them vulnerable to climate variability because there were no ancestors to protect them from negative weather events. Out of need for land and resources, groves that were once left to be used as spaces of worship and refuge for spiritual beings have been felled and cleared. Respondents cited this as an example of a breakdown of spirituality and a sign of community vulnerability. Without a spiritual foundation, people could no longer manage their natural resources or create wealth.

The framework also indicates that poverty is endemic because of limited natural resources and lack of wealth. As a result of pervasive poverty, people are unable to build houses that are strong enough to withstand rainstorms. The immediate effect of vulnerability in the dimensions of *Wealth* and *Natural Resources/Environment* is the inability to build capital. Children do not have access to formal education because their parents cannot afford to pay school fees. People feel insecure because young people no longer fear the gods and engage in stealing and other vices.

Infrastructure, *Human Capital* and *Security/Protection/Advocacy* serve as the immediate causes of problems in the dimensions of *Health/Health Services* and *Psychosocial Wellbeing*. Poor housing makes people vulnerable to natural disasters, which can affect their

health.

CHAPTER SEVEN: INNOVATION ENTRY POINTS

The context-specific resilience frameworks helped identify entry point dimensions for interventions that would have a positive effect on overall resilience of communities affected by climate change, rapid urbanization, and food insecurity in the three metropolitan areas of Ghana.

7.1. Tamale Municipality

Human Capital is a major driver of the vulnerability of the people of the metropolis. Educational outcomes are particularly low in the area. The Northern Region as a whole should put a premium on education—all forms of it: functional literacy and formal and informal education. Effective, innovative strategies such as School for Life and the Class Zone online learning initiative can speed up the provision of functional literacy for young people to improve their employable skills and motivate them to integrate into the formal education system.

A Deliberative Polling® event planned for the metropolis based on the outcome of this qualitative study will enable a random sample of residents to discuss and prioritize a number of policy and programmatic options. These options include but are not limited to waste management, backyard vegetable farms and poultry raising, cultivation of local crops, environmentally friendly toilet facilities, composting for farming, prohibiting the use of untreated waste water for vegetable farming and rainwater harvesting systems for homes and academic institutions.

As the area is grappling with increased human activity and inadequate waste management, the way forward for addressing these challenges is finding integrated solutions. A Waste-to-Energy System can empower communities to engage in a variety of livelihood activities to make more money. This could significantly improve nutritional status, especially of children and pregnant or lactating women. People would also be able to pay for better education for their wards or get them employable skills to compete in the marketplace.

Wastewater management, including water reuse and rainwater harvesting, is a critical intervention. Expanding rainwater-harvesting technologies for homes and institutions has been tried in other areas and proved successful. This costs about GHS 12,000 (approximately US\$ 3,500).

Expanding the use of environmentally friendly toilets (which cost about GHS 2,000, or US\$ 500) for homes and biogas systems (which cost about GHS35,000 or US\$ 10,000) for institutions can generate compost for school farms and backyard vegetable farms. Encouraging backyard vegetable gardening and poultry raising could maximize the use of available land in urban areas.

Other promising interventions to strengthen resilience to rapid urbanization in Tamale Municipality are listed below.

- Water-efficient irrigation facilities such as drip irrigation, which, though expensive, is known for its efficient use of water
- Putting local resources such as rice husks, millet straw and shea butter slurry, are described as “waste,” to good use
- Making credit available and encouraging communities to develop village savings and loans schemes that draw on the contributions of individual members
- Introducing and strictly enforcing legislation to prohibit littering and the use of non-biodegradable packaging materials
- Promoting cultivation of local crops and consumption of local foods that have more nutritious value than those that currently crowd the dinner table—rice, maize and wheat.

The Tamale metropolis is in a particularly good position to debate these policy options and find practical solutions that local and central government are most likely to be interested in.

7.2. Ashaiman Municipality

One intervention in the *Wealth* dimension that emerged in this study is providing the community with credit to enhance and expand trade, as the majority is engaged in petty trading. Traders are unable to provide collateral required to access loans from financial institutions. Innovative mechanisms such as trust, self-motivation and peer influence could be used as collateral for borrowing.

A grants program that offers seed capital for innovators would overcome this challenge by making money available for promising business ventures. The government’s Youth Enterprise Support (YES) program provides enterprising young men and women of 35 years and below support to develop and implement innovative ideas. This support must be used sparingly because of the potential for jealousy in highly heterogeneous communities with limited social ties and solidarity.

In the *Natural Resources/Environment* dimension, recognizing waste as a resource is another example of a promising innovation in Ashaiman. There is a need to develop innovations along the entire value chain of waste. Waste-to-energy options can improve the community lighting situation, which will go a long way to improve security and allow traders to go about their businesses, make more money to improve their nutrition and pay for better education for their children to give them employable skills, completing a virtuous cycle of empowerment.

In the *Natural Resources/Environment* dimension, another intervention is setting up systems for wastewater management and reuse and rainwater harvesting facilities for all homes. The failed household toilet program supported by district assemblies needs to be carefully

evaluated and reintroduced because it holds promise for managing solid and liquid household waste and reducing the incidence of diseases.

In the dimension of *Governance*, weak governance systems indicate a need to pilot limited legislation such as prohibiting the use of non-biodegradable packaging materials in the cities before nationwide application.

The stock of *Social Capital* can be mobilized to improve the security situation in communities, especially when governance systems break down and local security arrangements compromise rather than improve the situation.

In the *Infrastructure* dimension, the Municipal Assembly is building low-cost housing and relocating some of the residents who live in unsafe areas. Improved housing technologies should be adopted to speed up the provision of decent but affordable housing.

An intervention in the *Human Capital* dimension would be to introduce skills-based training for youth such as vocational and technical training for those who have the aptitude to learn a skill but are unable to continue their education beyond the basic level. This would equip youth with skills for living. It was established in this study that unemployment has a major negative effect on all dimensions.

7.3. Navrongo Municipality

People live off land that was once very fertile and is currently depleted and difficult to farm. There is a need for improved farming practices using appropriate technology that is environmentally friendly to improve soil and farming lands. Since the area has one short rainy season and a long dry season, it cannot adequately support rain-fed agriculture. Irrigation farming would be a good adaptive strategy, but because it is capital intensive, other methods of irrigation are needed besides relying on water from dams. As the area is vulnerable to floods, there is a need for dams and dugouts to collect floodwaters for farming during the long dry season. Containing floodwaters would be a potential strategy to save lives, provide farming resources and perhaps mitigate the impacts of dry season drought. This would significantly improve the resilience of communities. Because the majority of the farmers are engaged in rain-fed agriculture, the erratic rainfall pattern has to be factored into the design of the intervention.

Communities should be educated on the proper use of agro chemicals to improve farm yields without harming the soil. Inappropriate use jeopardizes livelihoods in the long term. It is also important to counter the community perception that agro chemicals deplete soil fertility. They are meant to improve the soil when used correctly.

Financial support for rearing animals emerged as a livelihood activity for community members. The vegetation in the area is conducive to animal rearing and financial and technical support for this activity could alleviate household poverty.

Planting trees is another entry point. Respondents were able to draw the link between felling of tree and the frequent drought and erratic rainfall. Tree planting has the added effect of offering protection against rainstorms that may rip materials off buildings. However, these trees may be cut down for firewood and charcoal for household use and for sale to others. Therefore, in addition to planting trees, alternative sources of livelihood are needed for people who depend on trees.

Environmental education is needed because some community members tend to perceive rainstorms as the result of blockages in the pathways of the gods.

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APPENDIX 1. WEST AFRICA RILAB COMMUNITY CONSULTATION RESEARCH TEAM

The Multi-disciplinary Research Team included the following faculty members of the University for Development Studies in Tamale, Ghana:

- Dr. Sam Bugre, Tamale, Public Health Team Member
- Dr. Jasper Ayelazuno, Nyankwala, Political Economy Team Member
- Mr. Dennis Chirawurah, Tamale Community Development RILab Director
- Dr. Joseph Amikuzuno, Nyankpala, Food Security, Head of Department Climate Change and Food Security
- Dr. Thomas Azongo, Medical Anthropology Team Leader
- Dr. Stephen Apanga, Tamale, Public Health Team Member
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District-Based Postgraduate Student Field Teams

No.	Name	Field of study	Responsibility
Navrongo-based team			
	Dr. Stephen Apanga		Supervisor, data quality assurance
1.	Mr. Gregory Adebah	MSc Community Health and Development	FGDs/KIIs
2.	Ms. Logubayom A. Ida	MSc Statistics	FGDs/KIIs
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Tamale-based team			
	Dr. Joseph Amikuzuno		Supervisor, data quality control
1.	Shamsudeen, Bilal Taimako	MSc. Community Health and Development	FGDs/KIIs
2.	Djabaku Kamal-Deen	MSc Community Health and Development	FGDs/KIIs
3.	Rosaline Alhassan	MSc Natural Resources	FGDs/KIIs
Ashaiman-based team			
	Dr. Thomas Azongo		Supervisor, data quality assurance
1.	Kofi Appiah	MA Population Studies	FGDs/KIIs
2.	Justice Abuchow	MPhil Rural Development	FGDs/KIIs
3.	Aaron Addah	MSc Community Development	FGDs/KIIs

Translators/Transcribers

#	Name	Site	Language	Specialization
1	Mr. Pwawuvi John Paul	Navrongo	Kasem/Nankam	Linguistic Expert
2	Ms. Rose Achana	Navrongo	Kasem/Nankam	Linguistic Expert
3	Karimu Mohammed	Tamale	Dagbani	Linguistic Expert
4	Issah Haruna	Tamale	Dagbani	Linguistic Expert
5	Stephen Ntsua	Ashaiman	Ewe	Researcher
6	Kofi Appiah	Ashaiman	Twi	Researcher

Timeline for Qualitative Study

A change in the institutional leadership of the West Africa RILab affected the timeframe for the conduct of the community consultations. The final schedule for the consultations is shown below.

Activity	Timeline
Adapt the draft rapid assessment protocol to the West Africa situation.	February 19, 2014
Submit protocol to NHRC IRB and seek expedited review.	May 7, 2014
Train in qualitative data collection and analysis.	May 21–22, 2014
Organize field logistics and collect data.	May 2014
Supervise data collection.	May 26–June 10, 2014
Process and analyze data.	June 10–July 31, 2014
Write report.	August 1–30, 2014
Submit report.	August 31, 2014