Doctoral (PhD) dissertation

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LUDOVIKA UNIVERSITY OF PUBLIC SERVICE
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~~Planning for climate change in 21st-century cities –~~ Institutionalised tools and techniques for effective urban climate governance in Ghana's Small and Medium-Sized Cities (SMCs)

Doctoral (PhD) dissertation

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DECLARATION

Hereby, I certify that my PhD thesis, ~~"Planning for Climate Change in 21st Century Cities:~~ Institutionalized Tools and Techniques for Effective Urban Climate Governance in Ghana's Small and Medium-Sized Cities (SMCs)," is solely my work. It contains no material that has been previously written or /and published by any other academic degree or diploma. Any previously published materials that have been used in this thesis are for bibliographical reference.

January 2025 Ama Kissiwah Boateng

ABSTRACT

This dissertation investigates the role of institutionalised tools and techniques for effective urban climate governance in Ghana's Small and Medium-Sized Cities (SMCs). As urban populations continue to increase, SMCs face heightened vulnerabilities to extreme weather events, flooding, and other climate-related challenges. Drawing on a comprehensive literature review and empirical research, this study examines how local governance structures and practices can be strengthened to promote resilience and sustainable urban development.

Through a case study research approach, including interviews and focus group discussions with key stakeholders across the New Juaben South Municipality, Wa Municipality, and Cape Coast Metropolis, the research identifies existing climate-related initiatives and the gaps within current institutional frameworks. The findings reveal that the need for local climate policies and action plans, coordination, and funding poses significant barriers to the effective implementation of national-level climate policies.

The dissertation contributes to understanding climate change adaptation in the context of SMCs by proposing a conceptual framework that highlights the importance of stakeholder engagement, integrated policy approaches, and the need for decentralised governance. Ultimately, this research underscores the critical need for institutional reform to facilitate proactive climate strategies, ensuring that SMCs in Ghana can better mitigate the impacts of climate change and promote sustainable urban futures.

ABSTRACT (HUNGARIAN)

A disszertáció a klímaváltozáshoz való adaptációs folyamatok intézményesülésének szerepét vizsgálja a ghanai kis és közepes méretű városok (SMC) példáján. A városi lakosság folyamatos növekedésével a kis- és középméretű városok kategóriájába taltozó települések kitettsége a környezeti veszélyeknek (extrém időjárási jelenségek, árvíz vagy más klimatikus kihívások) egyre nő. A szakirodalom átfogó elemzése és az elvégzett empirikus kutatás adatai segítségével a disszertáció azt vizsgálja, hogyan erősíthetők meg a helyi kormányzati szervezetek és gyakorlatok úgy, hogy erősödjék a városok ellenállóképessége és gyorsuljon a fenntartható fejlődésük.

Az esettanulmányi módszertannal, valamint lefolytatott interjúk és fókuszcsoport-beszélgetések útján az érintett három terület (New Juaben South Municipality, Wa Municipality, Cape Coast Metropolis) fő érintettjeinek bevonásával azonosíthatóvá lettek a már folyó klímaváltozással kapcsolatos kezdeményezések, valamint a jelenlegi intézményi rendszer hiányosságai. Az eredmények magyarázzák, miért szükséges a helyi klímaváltozási eljárásrendek, akciótervek, valamint a kapcsolódó koordináció és finanszírozás hiányosságainak pótlása ahhoz, hogy a nemzeti klímapolitika hatékonyan megvalósulhasson.

A disszertáció segíti a tárgyalt településtípusok kontextusában a klímaváltozáshoz kapcsolódó adaptációs folyamatok értelmezését, új konceptuális keretrendszert javasol alkalmazni azért, hogy a közreműködő érintettek szerepe, az integrált igazgatási megközelítések és a decentralizált irányítás igénye megfelelő hangsúllyal jelenhessenek meg. Végül, a kutatás eredményei nyilvánvalóvá teszik a proaktív klímastratégiák kivitelezéséhez elengedhetetlen intézményi reform szükségességét, amely biztosíthatná, hogy az ilyen ghanai települések sikeresebben enyhíthessék a klímaváltozás hatásait és építhessék fenntartható módon városuk jövőjét.

DEDICATION

I am profoundly thankful to my beloved parents, Kwasi Boateng (deceased) and Florence Denkyira. Your unwavering support and the invaluable lessons you imparted throughout my life have been the anchor of my journey.

To my adorable nephews and nieces (Shayn, Myles, Joseline, Lois, and Zoe) – thank you for bringing joy into my life. Your innocent antics and boundless energy provided much-needed relief during stressful times.

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ABBREVIATIONS

Abbreviation	Meaning
AC	Adaptation Communications
ACAP	Accra Climate Action Plan
AMA	Accra Metropolitan Assembly
BTR	Biennial Transparency Report
BURs	Biennial Update Reports
CIKOD	Center for Indigenous Knowledge and Organizational Development
DACF	District Assembly Common Funds
EPA	Environmental Protection Agency
DACF	District Assembly Common Funds
FGDs	Focus Group Discussions
FOAT	Fundamental Organization Assessment Tool
GCF	Green Climate Fund
GEF	Global Environmental Facility
GHGs	Green House Gases
GoG	Government of Ghana
GMet	Ghana Meteorological Agency
GSGDA	Ghana's Shared Growth Development Agenda
ICLEI	International Council for Local Environmental Initiatives
IPCC	Intergovernmental Panel on Climate Change
LGS	Local Government Service
MESTI	Ministry of Environment Science Technology and Innovation
MLGRD	Ministry of Local Government and Rural Development
MDA	Ministry Departments and Agencies
MMDA	Metropolitan, Municipal and District Assembly
MoE	Ministry of Energy

MoFEP	Ministry of Finance and Economic Planning
MTDPs	Medium-Term Development Plans
NADMO	National Disaster Management Organization
NAPs	National Adaptation Plannings
NC	National Communications
NCCC	National Climate Change Committee
NCCAS	National Climate Change Adaptation Strategy
NCCP	National Climate Change Policy
NDCs	Nationally Determined Contributions
NDPC	National Development Planning Commission
SDGs	Sustainable Development Goals
SMCs	Small and Medium-Sized Cities
SSA	Sub-Saharan Africa
UNFCCC	United Nations Framework Convention on Climate Change
FOAT	Fundamental Organization Assessment Tool
GMet	Ghana Meteorological Agency
CBOs	Community-based Organization
RCPU	Regional Co-ordinating Planning Committee
DPCU	Development Planning Co-ordinating Unit
NCCPF	National Climate Change Policy Framework
RCC	Regional Co-ordinating Council
NADMO	National Disaster Management Organization
LUPSA	Land Use and Spatial Planning Authority
CSR	Corporate Social Responsibility
GYCC	Ghana Youth Climate Coalition
MTCO2e	Metric Tons of Carbon Dioxide Equivalent
SYND	Strategic Youth Network for Development
GAYO	Green Africa Youth Organization

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1. INTRODUCTION

1.1. RATIONALE

Climate change impacts are projected to be severe and devastating, posing a significant risk to urban populations worldwide. The Intergovernmental Panel on Climate Change (IPCC) emphasised these critical consequences in its Sixth Assessment Report (AR6), outlining the diverse array of impacts that climate change will have on cities and their inhabitants (IPCC, 2022). Rising urban populations will increasingly face the threat of extreme weather events, such as hurricanes, floods, and heatwaves, alongside the imminent threats of sea-level rise and other climate-related disasters (Dodman et al., 2022; IPCC, 2022). These challenges necessitate urgent and comprehensive responses, particularly within densely populated urban areas.

Cities, while significant contributors to greenhouse gas emissions, also represent vital hubs for innovative climate solutions (Bulkeley, 2010; Bulkeley & Betsill, 2013; Revi et al., 2014; Kern, 2019; Salvado & Sancho, 2021). Their unique capacity for fostering collaboration among various stakeholders—including government entities, private sector actors, and civil society—enables them to explore and implement sustainable practices in areas such as land use planning, waste management, community engagement, disaster preparedness, and environmental stewardship (Fuhr et al., 2018; Santos et al., 2021).

Recent international frameworks, including the Paris Agreement[1], have recognised the essential role of urban areas and sub-national governments in climate action. These frameworks emphasised collaborative efforts required to mitigate climate change and facilitate sustainable development, as highlighted by the 2030 Agenda for Sustainable Development and the New

[1] UNFCCC (2015) Adoption of the Paris Agreement. United Nations Climate Change Secretariat (UNFCCC), Bonn, Germany. Available at http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf.

Urban Agenda. They also underscored the urgency for urban areas to lead initiatives that not only address climate risks but also promote social equity and economic resilience.[2]

Moreover, the recent IPCC special report on cities has identified urban areas as critical systems that require unprecedented transformation to secure a just, low-carbon, and climate-resilient future. The report calls for innovative governance structures that can adapt to the rapid changes brought on by climate impacts, thereby facilitating a more integrated approach to urban climate governance.[3]

These acknowledgements have precipitated significant progress in global climate actions and have fueled an increase in the literature surrounding urban climate governance (Castán & Westman, 2020, p.2). Notable advancements have primarily been observed in developed nations, especially through European case studies (Reckien et al., 2015; 2018; Olazabal et al., 2018) and in North America (Hughes, 2017; Guyadeen et al., 2019). Much of the existing research has focused on evaluating the content, quality, and scope of local adaptation plans in these regions. For instance, Reckien et al. (2013) found that among 200 European cities assessed, 35% lacked formal mitigation plans, while an overwhelming 72% had no adaptation plans in place.

In contrast, there exists a significant research gap regarding case studies from developing countries (Filho et al., 2019). Despite the disproportionate impacts of climate change on urban populations in these regions, effective climate action often remains abstract and poorly defined (Filho, 2019, p.1177). This gap is particularly pronounced in numerous African cities, where

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[2] United Nations. (2016). *The New Urban Agenda: Key Commitments - United Nations Sustainable Development*. United Nations Sustainable Development. Available at https://www.un.org/sustainabledevelopment/blog/2016/10/newurbanagenda/

[3] IPCC (2018). Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments — IPCC. Ipcc.ch; IPCC. Available at https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/

much research has concentrated on supranational and national levels, leaving subnational climate change governance largely unexamined (Boateng, 2023).

Furthermore, a growing body of literature reveals an additional gap in studies focusing on small and medium-sized cities (SMCs) in developed and developing contexts (Hoppe et al., 2016; Häußler & Haupt, 2021). Research indicates that cities with population under 500,000 are more vulnerable to climate impacts, experiencing greater risks due to limited resources and capacities (Birkmann et al., 2016; Fila et al., 2023). This reality is especially severe in numerous Asian and African cities, where a significant fraction of the world's urban population resides.

Recent studies have also delved into the barriers faced by urban climate governance, particularly those encountered by smaller cities (Burch, 2010; Measham et al., 2011; Hoppe, 2016; Fila et al., 2023). For instance, living in Koforidua, a rapidly urbanising city in Ghana's Eastern Region, I have encountered many developmental challenges, such as flooding and other environmental concerns exacerbated by climate change.

To effectively address these barriers, Dovers and Hezri (2010) argued for a paradigm shift, advocating for the practical mechanisms that drive institutional change. Similarly, Anguelovski and Carmin (2011) posited that climate governance structures comprising rules, norms, and practices are often developed and maintained through informal processes. Recent scholarships have also emphasised the need to move beyond traditional regulatory frameworks and local climate policies to acknowledge the significance of informal governance characteristics, which frequently go unexamined (Bisaro et al., 2018; Olazabal et al., 2022).

While regulatory frameworks may apply to many cities in developed nations, Leck and Roberts (2015) highlighted that the nuanced, "invisible" aspects of city climate change governance are particularly salient in developing countries. Their emphasis on "shadow systems" points to the coexistence and complementary roles of formal and informal governance structures—not as replacements, but as interconnected entities that can together foster effective climate governance (p. 65). Research supports the notion that traditional governance models can be enhanced by integrating experimental and collaborative approaches, leveraging these shadow

systems and other elements of institutional planning (Romero-Lankao, 2012; Aylett, 2013; Patterson & Huitema, 2019).

Despite the increasing recognition of informal governance systems in developing countries, there remains a significant gap in empirical studies documenting their efficacy and impact. As highlighted by Mubaya and Mafongoya (2019), a robust body of research is essential to understand the dynamics and mechanisms at play in these contexts.

To this end, the notion of institutionalised tools and mechanisms is central to this research. These tools can be framed as systematic actions undertaken by local governments to integrate climate governance into their urban management practices, extending beyond policy formulation. Existing research has largely neglected how municipalities in developing countries can proactively adapt to climate challenges through the institutionalization process.

Despite the challenges local administrations face concerning urban climate change governance, there are opportunities to institutionalise existing tools and techniques that can reinforce climate adaptation efforts. This dissertation provides a detailed exploration of selected SMCs in Ghana, highlighting the tools and techniques that have been successfully integrated to address the climate crisis, thus offering a model for other urban areas facing similar challenges.

This study hypothesises that effective adaptation to the implications of climate change requires local governments to integrate and institutionalise informal practices that communities already engage in. These informal practices, often rooted in local knowledge and culture, can complement formal top-down policy tools, leading to a more holistic approach to climate governance.

1.2. CONTEXT

1.2.1. THE GROWING NEED FOR URBAN CLIMATE GOVERNANCE IN THE AFRICAN CONTEXT

As climate risks intensify across Africa, the continent faces significant challenges related to environmental sustainability and urban resilience. Research indicates that the frequency and magnitude of climate-related disasters are on the rise, influenced by a variety of factors that heighten vulnerability in urban areas (Asibey & Cobbinah, 2022; Asibey et al., 2023). Key contributors to this increased risk include the dynamics of spatial and land-use planning, demographic shifts, the widespread prevalence of informal settlements, and the rapid pace of urbanisation (Adenle, 2017; Abass et al., 2022). Projections show that Africa's urban population is expected to experience substantial growth by 2050, creating a pressing need for effective governance strategies to mitigate the impact of climate change (UN-Habitat, 2020).

Despite the critical intersection of rapid urban development and extreme weather events, there is a significant gap in research concerning climate change governance within urban settings across Africa (Lwasa et al., 2018; Filho et al., 2019; Pasquini, 2020; Alem et al., 2022). The capacity of cities to formulate and implement robust climate change policies is heavily reliant on the frameworks and support provided by national-level policies (Baynham & Stevens, 2014; Poku et al., 2018; Cobbinah, 2019; Boateng, 2023; Asibey et al., 2024).

Governance structures in many African cities often operate under centralised systems, which can lead to overlapping responsibilities and a lack of accountability in addressing climate challenges. This issue is particularly pronounced in Ghana, where weak decentralisation hampers local municipalities' abilities to tackle climate change effectively (Adu-Boateng, 2015; Musah-Surugu et al., 2019; Cobbinah et al., 2019; Asibey et al., 2023). The centralised nature of governance complicates the implementation of tailored strategies that can address local vulnerabilities and needs.

Considering these circumstances, the study underscores the urgent need to enhance urban climate governance in Africa, with a specific emphasis on Ghana. It highlights the necessity

for new empirical data that can inform governance mechanisms and enable cities to respond to climate risks more effectively. This focus on empirical research is essential for developing innovative governance frameworks that empower local authorities and communities to play a proactive role in climate adaptation and resilience planning. Thus, a concerted effort towards improving urban climate governance is crucial for safeguarding African cities and their populations against the escalating threats posed by climate change.

1.2.2. SMCs are a Neglected Category

The growth of urban areas is increasingly prominent in small and medium-sized cities (SMCs), yet larger metropolitan regions such as Paris, New York, Stockholm, and Rotterdam are often acknowledged as leaders in climate action and sustainability discourse (Fila et al., 2023; Fünfgeld et al., 2023). These major cities have garnered substantial attention in academic literature, with numerous studies documenting their extensive climate mitigation and adaptation efforts. For instance, Grafakos et al. (2019) specifically highlighted the proactive engagement of nine major cities in climate initiatives, illuminating how their strategies are not only comprehensive but are also designed to synergistically interweave mitigation and adaptation measures. This integrated approach seeks to achieve optimal co-benefits across various sectors, including public health, infrastructure, and ecological conservation.

However, the overemphasis on these select urban centres has created a skewed knowledge base surrounding climate action, showcasing an "over-representation of a select few large and highly engaged cities in the Global North" (van der Heijden et al., 2019, p.11). This results in a narrative that primarily observes success stories and innovative solutions, often sidelining the experiences of smaller cities or those that face unique challenges. Noteworthy progress has certainly been made in several significant African cities like Cape Town, Durban, Mombasa, and Accra, which have undertaken various initiatives to bolster their resilience against climate impacts (Kithiia & Dowling, 2010; Aylett, 2013; Frick-Trzebitzky, 2017). Yet, the broader context remains that SMCs—despite facing some of the most urgent vulnerabilities linked to climate change are frequently overlooked in both research and policy discussions.

The challenges confronting SMCs are compounded by their rapid urban growth, which often leads to increased exposure to environmental hazards, socio-economic disparities, and infrastructural weaknesses. Research indicates that the vulnerabilities encountered by these cities are escalating, signalling a critical need for enhanced climate resilience strategies (Dodman et al., 2017; Boehnke et al., 2019; Paterson et al., 2017). Ignoring the unique circumstances of SMCs not only undermines their resilience efforts but also perpetuates a cycle of neglect that limits their ability to adapt to changing environmental conditions.

The lack of attention directed towards SMCs has broader implications as it hinders their capability to adapt effectively and limits their access to crucial transnational knowledge networks and capacity-building resources typically facilitated by national governments (Hoppe et al., 2016). This marginalisation prevents SMCs from learning from global best practices, leveraging shared experiences, and effectively mobilising resources to combat climate challenges.

Given this context, there is an urgent need to shift the research focus towards these smaller urban areas. By examining the socio-environmental challenges they face, the study can identify pathways for SMCs to strengthen their resilience and reclaim their role as critical players in the climate adaptation dialogue. This includes exploring innovative governance structures, community engagement models, and localised strategies that respond to the specific needs and capacities of SMCs. Highlighting their stories and providing platforms for knowledge sharing can potentially position SMCs as new frontiers for climate resilience, showcasing their unique contributions to sustainable urban development.

In summary, the oversight of SMCs in climate resilience discussions represents a significant gap in understanding urban responses to climate change. Addressing these shortcomings is not only vital for the cities themselves but is also essential for achieving broader global climate goals. The future of urban resilience must encompass all types of cities, ensuring that SMCs are equipped and empowered to face the critical challenges of our time.

1.2.3. INSTITUTIONALISING URBAN CLIMATE GOVERNANCE

Institutions, both formal and informal, serve as the backbone for governance structures, providing the necessary framework for policy development and implementation. Several scholarly works support the notion that there is a profound need to focus on how institutions can facilitate sustainable urban governance. For instance, Anguelovski and Carmin (2011) and Bridges (2016) argued that without robust institutional frameworks, efforts to combat urban climate challenges can flounder, leading to ineffective governance and unsustainable practices.

In addition to structured governmental bodies, Leck and Roberts (2015) highlighted the increasing importance of shadow systems and informal networks. These informal networks often emerge organically within communities and play a critical role in knowledge and information exchange, which is essential for the introduction of innovative ideas that might not be recognized or supported through formal channels. For example, informal networks can help disseminate information about best practices in sustainability or climate adaptation efforts among local stakeholders, thereby enhancing the overall capacity for effective governance.

Patterson et al. (2019) delved deeper into the dynamics between formal and informal institutions specifically within urban water governance. By proposing a heuristic framework, they illustrate the interconnectedness of these different types of institutions, stressing that effective urban water management relies not only on formal policies and regulations but also on the informal practices and relationships that exist within communities. This perspective draws attention to the complementary roles that these institutions play and encourages a holistic understanding of governance structures in urban settings.

The complexities associated with informality in urban climate change governance cannot be understated. While informal networks can be invaluable, they also present challenges, such as varying levels of legitimacy and recognition. As a response, Patterson and Huitema (2019) argued for a re-evaluation of traditional governance methods, advocating for collaborative efforts that incorporate shadow systems alongside official institutional frameworks. By fostering an integrative approach to climate action that includes both formal and informal

paradigms, local jurisdictions can enhance their responsiveness and adaptability to climate challenges.

Bridges (2016) further articulated that institutions are crucial for structuring the administrative and managerial functions of urban governments. When institutions function optimally, they can accelerate the achievement of sustainability goals and facilitate the execution of relevant projects. This necessitates a thorough examination of institutional capacities within the context of local-level climate action. As highlighted by Mubaya and Mafongoya (2017), the effectiveness of adaptation efforts is predominantly influenced by the characteristics of both formal and informal institutions. Understanding this interplay is essential for developing strategies that leverage the strengths of each type of institution.

Meanwhile, the existing literature indicates significant gaps in understanding the nuanced roles that both formal and informal institutions play within urban climate change governance. This research seeks to address these gaps by investigating the structural and functional attributes of various institutions and their combined impact on local climate action initiatives. By doing so, it provides insights that can guide policymakers and practitioners in enhancing the effectiveness of governance strategies in the face of pressing urban climate challenges.

1.2.4. RESEARCH QUESTIONS AND HYPOTHESES

The primary focus of this dissertation is to explore the tools and techniques that have been institutionalised by small and medium-sized cities (SMCs) to address the climate crisis. This approach advocates for enhancing their adaptive capacity to cope with the multifaceted impacts of climate change, moving beyond the traditional top-down policy frameworks that have often proven inadequate in addressing the unique challenges faced by these urban areas.

Through a comprehensive qualitative research methodology, this study seeks to explore the diverse strategies employed by SMCs in Ghana as they strive to implement effective urban climate governance initiatives at the local level. Ghana, like many developing nations, deals with governance and socio-economic challenges that complicate its response to the climate crisis (Musah-Surugu et al., 2019; 2021). Despite over thirty years of climate change

governance at the national level, there remains a lack of robust adaptation efforts at the local administration level (Boateng, 2022; 2023). This gap raises questions about how cities can integrate climate resilience into their governance frameworks.

While several studies have scrutinized the factors influencing the capability of Ghana's local governments to scale up urban climate initiatives, this research extends the existing literature by proposing these four hypotheses.

Hypothesis One: It is widely observed that climate change policy instruments in developing countries, including Ghana, tend to be heavily focused at the national level. This tendency is primarily shaped by the intricate dynamics of national-local government relations, where the priorities and needs of local governments and communities are often incorporated under broader national agendas. This centralisation of policy efforts can lead to a disconnect between the strategies developed at the national level and the actual requirements on the ground, undermining local engagement and effectiveness in addressing climate change.

Hypothesis Two: The second hypothesis posits that the relationship between national and local governments is likely to cause conflicts during the implementation of climate actions at the local level. Such conflicts can surface as discrepancies between national policies often standardized across regions and the unique realities faced by local communities. As a result, the misalignment of policies may lead to ineffective or poorly executed climate actions, generating frustration among local stakeholders who feel that their voices and circumstances are not adequately represented or addressed.

Hypothesis Three: The third hypothesis suggests that small and medium-sized cities will experience substantial barriers due to a lack of resources at the local government level. These barriers may encompass a variety of challenges, including financial constraints that limit the ability of local governments to fund climate initiatives, limited technical capacity to develop and implement effective strategies, and restricted access to relevant climate data that would inform decision-making processes. Additionally, there may be a deficiency in engaging with

crucial stakeholders, further compounding the difficulties in mobilizing collective action for climate adaptation and mitigation.

Hypothesis Four: Lastly, the fourth hypothesis posits that informal institutional mechanisms will play a more significant role in facilitating climate actions in developing countries compared to formal mechanisms seen in developed nations. This includes local agreements, community-based initiatives, and traditional governance practices that are often more flexible and context-specific than rigid formal institutions. This suggests that grassroots approaches, which leverage the social capital and unique local knowledge inherent in communities, can offer vital pathways for enhancing resilience and adaptive capacity in urban settings. By recognising and integrating these informal practices, there is potential for more effective and sustainable climate actions that resonate with the lived experiences of those most affected by climate change.

By exploring these hypotheses, the research aims not only to contribute to the academic discourse surrounding climate governance in urban contexts but also to provide actionable insights that can inform policy discussions and implementation strategies for enhancing resilience in Ghana's small and medium-sized cities.

To investigate the assumptions surrounding climate governance in Ghana comprehensively, the research is structured around three pivotal questions that aim to illustrate the multifaceted dynamics of climate policy and implementation:

1) How is climate change addressed across various levels of government in Ghana?

This question seeks to understand the distribution of responsibilities regarding climate change initiatives among the different tiers of government in Ghana ranging from the national level down to regional and local authorities. The objective is to explore how power and resources are shared among these entities. By examining the interactions between national strategies and local implementation, the research intends to uncover any gaps or overlaps in governance that may hinder effective climate action. This involves assessing the role of governmental institutions, the coordination mechanisms in place, and the communication flow between

different levels of administration. Additionally, this inquiry will consider how the political landscape influences climate governance and determine the extent to which local communities are engaged in the policymaking process.

2) What specific roles do small and medium-sized cities (SMCs) play in the context of climate policy implementation, and what barriers do they encounter in this process?

This inquiry focuses on the unique contributions of small and medium-sized cities within Ghana's climate governance framework. It seeks to identify the specific functions these cities perform in implementing national climate policies, such as innovative practices, community engagement, and localised initiatives. The research aims to provide a nuanced understanding of how SMCs can serve as critical agents of change in the climate governance landscape, potentially leading to more tailored and effective responses to climate challenges. Furthermore, the study will investigate the operational challenges that SMCs face, including limited financial resources, lack of technical expertise, inadequate infrastructure, and difficulties in accessing information. By analysing these barriers, the research will highlight the impediments to effective climate action at the local level and explore potential pathways to overcome them.

3) What are the prevalent institutionalised tools and practices and how can they improve climate adaptation strategies in Ghana’s SMCs?

This question seeks to identify and characterise formal and informal practices within small and medium-sized cities that contribute to climate adaptation efforts. These practices may include community-led initiatives, traditional environmental stewardship, and grassroots organising that are often overlooked in formal governance frameworks. The research will aim to document these informal systems and evaluate their effectiveness in enhancing resilience to climate impacts. By uncovering these practices, the study will shed light on the existing frameworks that have been institutionalised to facilitate local-level climate governance. It will also explore how these informal mechanisms can be integrated into formal policymaking processes to enrich climate adaptation strategies. Ultimately, this inquiry aspires to contribute to a more inclusive approach to climate resilience, recognizing the value of local knowledge and practices in addressing complex environmental challenges.

1.2.5. DISSERTATION OUTLINE

The dissertation is organised into seven chapters, as illustrated in Figure 1. Chapter One introduces the study's overarching rationale and sets the context for its significance. It outlines the research hypotheses and questions that guide the inquiry. Following this introductory framework, it presents a detailed dissertation outline and a glossary of terminologies essential for understanding the concepts discussed throughout the study.

Chapter Two delves into a comprehensive review of the interplay between climate change and urban environments across various contexts. The primary objective is to enrich the understanding of urban climate governance, exploring how this critical topic has been discussed in existing literature. Additionally, this chapter engages with ongoing debates regarding the role of institutions in urban climate governance. It synthesises the tools available for climate action at both local and regional levels.

Chapter Three outlines the research methodologies employed for empirical analysis. It thoroughly explains the research design, the criteria for selecting case study areas, and detailed descriptions of data collection tools and analysis methods. The empirical investigation focuses on three diverse case study regions within Ghana, each representing unique ecological zones and geographical characteristics: Koforidua, a rapidly urbanising city nestled in the landlocked Eastern region; Wa, located in the Savanna region; and Cape Coast, a coastal city in the Central region, home to approximately 189,925 residents. This chapter also addresses essential ethical considerations that guided the research process.

Chapter Four approaches the first research question through an extensive documentary review. This examination identifies and examines relevant policies and strategic plans, providing insights into Ghana’s multifaceted approach to tackling climate change across various governmental levels. The analysis highlights the evolution of climate change governance over the decades, evaluating how these policies address climate challenges and their consequential impacts on sub-national governments.

Chapter Five addresses the second and third research questions by conducting semi-structured interviews and focus group discussions with key stakeholders from the three study areas. The researcher aimed to collect specific qualitative data from these stakeholders while ensuring varied representation from influential heads of organisations within the designated study areas.

The interview questions were crafted to capture a range of perspectives on local climate action efforts, encompassing fundamental inquiries such as: 1) Who are the main actors driving climate change initiatives, and what resources do they possess? 2) What climate risks do these stakeholders face, and how aware are they of the climate-related challenges? 3) What bottom-up initiatives have been implemented, and what barriers do they face?

The third and final research question is through Focus Group Discussions (FGDs), which serve to verify and elaborate on the conceptual framework proposed in Chapter Two. The final inquiry focuses on the potential for synergy between formal and informal governance systems, advocating for a more inclusive approach to climate adaptation that harnesses the strengths of both paradigms.

Chapter Six delves into the research findings, providing a comprehensive analysis that not only presents the data but also rigorously verifies the hypotheses formulated at the outset of the study.

Chapter Seven concludes the dissertation by summarising and presenting the critical insights from the study. It also offers actionable recommendations for future climate governance and initiatives.

Figure 1

Dissertation outline

(Source: Author)

1.2.6. KEY TERMS

In this context, the terms "city," "urban area," and "municipality" are utilised interchangeably to denote local political and administrative entities responsible for governing and managing the functions of a specific geographical area.

Furthermore, for this study, "small and medium-sized cities" are characterised as urban centres with fewer than 500,000 inhabitants. It is important to note that the definition of these city categories may differ based on the specific contexts of each country.

Additionally, the phrases "local government," "city government," and "municipal government" are also used interchangeably throughout this work, referring specifically to the sub-national authorities that operate below the regional and national governance levels.

The concept of "stakeholders" is broad, encompassing a diverse range of actors—both state and non-state. This includes national and local governments, ministries, civil society

organisations (CSOs), non-governmental organisations (NGOs), private sector entities, and academic institutions.

When discussing “urban climate governance” and “urban climate action,” these terms can be used interchangeably to cover all varieties of climate-related initiatives. This includes efforts centred around mitigation, adaptation, or an integrated approach that combines both.

Mitigation focuses on strategies to reduce greenhouse gas (GHG) emissions or enhance GHG sinks. In contrast, adaptation focuses on modifying human systems to effectively respond to and manage climate change's actual or anticipated impacts.

The concept of “institutionalisation” is crucial in this research. It refers to embedding climate responses or actions within formal governance frameworks and informal everyday practices. This includes integrating policies and strategies into routine urban planning processes to ensure climate considerations are fundamental to city management.

1.2.7. SUMMARY

The introductory chapter of this dissertation presented the groundwork for the research. It discussed the motivations and rationale and outlined the specific problem the study seeks to address. Considering the growing interest in responses to climate change, there remains a significant gap in studies that focus specifically on urban settings and limited actions in medium-sized cities. Thus, the primary objective of this research is to explore the distinctive challenges these cities face in addressing climate change and scrutinise various institutionalisation strategies.

Focusing on small and medium-sized cities, this study aims to enrich the conversation surrounding urban climate governance, highlighting the unique challenges and opportunities these urban centres encounter. The chapter concluded with a structured dissertation outline and included a glossary of key terms essential for understanding the concepts and discussions explored throughout the research.

2. LITERATURE REVIEW

2.1. CHAPTER OVERVIEW

This chapter provides an in-depth literature review focused on the intricate and multifaceted aspects of urban climate governance, with a particular emphasis on the distinctive challenges that small and medium-sized cities encounter in their efforts to combat climate change.

In Section 2.2, the chapter delves into the diverse and extensive impacts of climate change on urban settings. It examines how small and medium-sized cities are disproportionately affected by rising temperatures, which can exacerbate heat waves, leading to public health crises and increased energy demand. The section further explores the consequences of extreme weather events, including flooding and storms, that challenge existing infrastructure and disaster preparedness.

Additionally, the review highlights the shifts in ecological conditions that threaten urban biodiversity, alter water availability, and disrupt local ecosystems, ultimately affecting the quality of life for residents. The section underscores the need for tailored strategies that address these specific challenges faced by smaller urban centres, which often have fewer resources compared to larger cities.

Section 2.3 provides a comprehensive analysis of the mechanisms and frameworks governing urban climate responses. It details how cities devise their resource allocation and strategic planning to address climate-related challenges. This discussion includes an overview of governance models—such as multi-level governance, network governance, and participatory approaches—that are essential for facilitating collaborative efforts among various stakeholders. The section also examines the role of local government, community organizations, and businesses in forming coalitions that aim to implement climate initiatives. Through concrete case studies, the narrative illustrates successful governance practices that highlight innovation, accountability, and adaptive capacity in responding to climate change.

Following the exploration of governance mechanisms, Section 2.4 identifies the numerous barriers that impede the implementation of effective climate solutions in urban settings. The section highlights financial constraints, such as limited budgets and access to funding sources, which can significantly hinder cities' ability to initiate and sustain climate projects. It also addresses the lack of political will, often rooted in competing interests and short-term decision-making priorities. Furthermore, insufficient public engagement is identified as a critical barrier; the section discusses how the disengagement of citizens can lead to a lack of support for climate initiatives and initiatives that might otherwise foster greater community resilience.

In Section 2.6, the narrative shifts to a systematic review that emphasises the vital role of institutionalisation in bolstering urban climate governance. This section delves into how formalised processes and organisational structures can create pathways for more effective climate action. By establishing clear roles and responsibilities, cities can enhance accountability and ensure that climate considerations are integrated into broader urban planning and policy-making frameworks. The analysis includes examples of configurations that have successfully institutionalised climate action, showcasing how they promote long-term sustainability and resilience.

Throughout the chapter, the overarching aim is to deepen the understanding of academic discourse centered on urban approaches to climate change. To that end, the chapter concludes by presenting a conceptual framework that guides this research. This framework identifies three interrelated elements—governance structures, stakeholder engagement, and resource mobilisation—that interact dynamically within the context of urban climate governance. This foundational guide serves as an essential tool for unpacking the complexities and dependencies inherent within urban climate action, providing a basis for future research and practical applications in the field.

By synthesising knowledge from various sources, this chapter aims to contribute meaningfully to the ongoing dialogue surrounding urban responses to climate change, with the hope of fostering innovative solutions that address the specific needs of small and medium-sized cities.

2.2. CLIMATE CHANGE IN URBAN ENVIRONMENTS

Urban areas are at the forefront of climate change impacts, facing unique challenges due to their high population density, diverse economies, and complex infrastructure. The United Nations Human Settlements Programme (UN-Habitat, 2020) highlights an alarming trend. By 2050, over 60% of the global populace will reside in urban environments. This rapid urbanisation is particularly pronounced in Africa, where it is projected that more than half of the continent's population will live in cities by 2030 (Lwasa, 2014).

The surge in urban populations presents challenges for climate governance. Housing, infrastructure, and services demand increases as populations increase, often leading to haphazard urban development. This unprecedented growth heightens vulnerabilities, leaving urban dwellers increasingly exposed to climate risks (Filho et al., 2019). In locations like Accra (Ghana), Muoroto (Kenya), Harare (Zimbabwe), and Abuja (Nigeria), informal settlements often find themselves in climatically precarious zones, primarily because this is the only land accessible to low-income residents (Finn & Cobbinah, 2023, p. 3).

The challenges of climate change disproportionately impact the most vulnerable parts of societies (Lwasa et al., 2018; Abunyewah et al., 2018). Research by Adams et al. (2023) indicated that residents of informal settlements are among the most affected by climate change in developing nations. Their precarious situations arise from tenure insecurity, dilapidated housing conditions, overcrowding, entrenched poverty, and the unsuitable locations of their dwellings in high-risk areas.

Major African cities, such as Lagos, Accra, Nairobi, Cape Town, Freetown, and Kampala, witness numerous informal settlements that are primarily constructed in low-lying regions, making them particularly vulnerable to climate change impacts, especially flooding (Finn & Cobbinah, 2023).

This situation disproportionately affects the most vulnerable populations (Lwasa et al., 2018; Abunyewah et al., 2018). Adams et al. (2023) have suggested that residents of informal settlements are some of the most vulnerable to climate change in developing countries partly due to their tenure security status, poor housing conditions, overcrowding, poverty, and poor location of dwellings in vulnerable spaces. In major cities across Africa, including Lagos, Accra, Nairobi, Cape Town, Freetown, and Kampala, these informal settlements are built in low-lying areas that are especially susceptible to the impacts of climate change, especially flooding (Finn & Cobbinah, 2023).

Coastal cities, constituting only about 2% of the Earth's land area, face increased flood risks compounded by projected sea-level rise (Garschagen & Romero-Lankao, 2015; Rosenzweig et al., 2018; Al-Sayed & Alanizi, 2023). For instance, Lagos is forecasted to evolve into one of the world's largest low-lying cities by the century's end due to the implications of rising sea levels (UNDP Climate Promise, n.d.; Adelekan et al., 2015).

Research has found the “top 20” cities most vulnerable to coastal flooding, evaluating them across low, middle, and high-income nations, with a significant emphasis on cities in Asian delta regions (Revi et al., 2014, p. 555). These vulnerable low-lying urban areas are anticipated to face increased coastal erosion and flooding as a direct consequence of rising seas.

This sets the stage for considerable challenges for coastal cities in developing countries and Small Island Developing States (SIDS) (Betzold, 2015; Kelman, 2015). The precarious characteristics of coastal settlements and river floodplains become apparent during extreme weather events and persistent rainfall, highlighting their susceptibility to climate change (Huang-Lachmann & Lovet, 2016).

In addition to the challenges of high population densities, an increasing demand for resources like water and energy resources is further exacerbated by climate change (Adenle, 2017; Al-Sayed & Alanizi, 2023). It is estimated that urban populations account for nearly three-quarters of the world's energy consumption, putting immense strain on both environmental and economic systems worldwide.

These challenges are particularly pronounced in smaller urban areas, where a lack of financial and technical resources hampers effective responses to the exigencies imposed by climate change. Climate change risks human health and well-being by triggering rises in extreme weather and climate-related events (e.g., droughts, heatwaves, floods) and air pollution. Urban populations of low and average-income nations are most susceptible because of their significant exposure to changing weather conditions and air pollutants and their limited ability to control and adjust to these risks (IPCC, 2014).

The risks of climate change extend deeply into public health, threatening human well-being. Urban populations, particularly in low- and middle-income countries, become vulnerable through intensified extreme weather events and climate-related challenges, such as droughts, heatwaves, floods, and increasing air pollution. Research conducted in the Limpopo Province of South Africa indicates a decline in the subsistence economy, a lack of water, exposure to dust and wind and health risks associated with climate change (Tirivangasi et al., 2022).

Previous explorations of climate change's impact on food security have primarily concentrated on traditional agricultural systems, paying insufficient attention to the complex dynamics of value chains, landscapes, and urban farming systems (Nelson, 2014). Urban environments exert considerable pressure on food systems due to their potential to influence food production and livelihoods. This complicates ensuring consistent access to sustainable food for rapidly growing populations (Hall, 2017). Multiple indicators reflect both micro and macro-level impacts of climate change on food affordability, with various climate scenarios predicting a significant increase in food prices (Nelson, 2014).

Climate change may have repercussions for food access in Africa, given a shift in the continent's livelihoods landscape. Most African populations are vulnerable to the consequences of climate change due to high poverty levels, reliance on rain-fed agriculture, lack of access to technology, and enhanced cultural practices (Tirivangasi, 2018).

2.3. URBAN CLIMATE GOVERNANCE

The capacity of urban governments to respond to climate change varies widely within and between low- and high-income cities, creating a profile of different needs and opportunities on a city-by-city basis. With increasing research in the last three decades, this section focuses on urban climate governance in other contexts (see, e.g., Bulkeley & Kern, 2006; Bulkeley, 2010; Broto & Bulkeley, 2013; Boyd & Juhola, 2015; Reckien et al., 2018; van der Heijden, 2019; Olazabal, 2022; Fila et al., 2023). However, questions still need to be answered regarding which cities actively engage in robust urban climate governance.

2.3.1. DEVELOPED VS DEVELOPING COUNTRIES

The degree of climate action exhibits considerable variability between developed and developing nations. Prior research, particularly within the European context, has sought to understand multilevel governance dynamics concerning climate policy implementation (Kern et al., 2019). Several studies have delved into aspects, such as the anchorage of local climate policies in major Dutch cities (den Exter et al., 2015) and the assessment of local climate policies and adaptation strategies across various European municipalities.

A comprehensive meta-analysis of urban adaptation efforts in Hungarian cities has been undertaken by Buzasi (2023). Pietrapertosa et al. (2023) analysed the status of urban climate change adaptation efforts in Mediterranean Europe and found that 30 % of cities and 67 % of regions in Mediterranean Europe have adaptation plans.

Researchers such as Reckien et al. (2018) have highlighted that several factors — including city size, prevailing national legislation, and active engagement in international networks— play pivotal roles in shaping local climate policies. Their findings indicate that a substantial proportion, approximately 80%, of cities with populations exceeding 500,000 have developed comprehensive and stand-alone plans dedicated to both mitigation and adaptation strategies.

In terms of the factors influencing the existence of local climate action plans, Reckien et al. (2015) found that city population is one of the drivers toward the development of mitigation and adaptation plans and reported that for every 10,000 inhabitants, the likelihood of a city having an adaptation plan rises by a percentage. Also, Araos et al. (2016), analysing 401 local governments in urban areas and tracking climate change adaptation policies, found that extensive adaptors (cities with more than 17 adaptation initiatives) are mainly large cities in high-income countries.

Similar results are also presented by Heidrich et al. (2016), who investigated the trade-offs between urban climate change mitigation and adaptation policies and found a positive relationship between the existence of a national climate adaptation mandate for cities and the local climate adaptation policy.

Further exploration by Liu and Lo (2021) emphasises the influential role of the European Union in urban climate governance. They note that the EU often operates independently of national governments, thereby facilitating more direct climate action at the municipal level. The emergence of transnational municipal networks, such as the Global Covenant of Mayors, C40 Cities Climate Leadership Group, and ICLEI, exemplifies innovative governance approaches. These networks provide crucial resources, encompassing information exchange, capacity building, and financial support, thereby empowering cities to implement effective climate governance strategies (Liu & Lo, 2021, p.83).

In addition to these networks, studies have analysed the emergence and functions of transnational city networks within a multilevel governance framework. Information sharing and norm-setting have been identified as particularly significant in these networks, predominantly observed in the developed world (Hickmann, 2016; Eisenack & Roggero, 2022). A recent study investigating 13 climate mitigation transnational city networks by Bansard et al. (2017) underscores the dominance of North American and European cities within these networks, alongside a notable underrepresentation of cities from developing countries.

Noteworthy evaluations have also taken place in North America, focusing on the strengths and weaknesses of local climate plans. For instance, research conducted in Canada assessed various climate plans (Guyadeen et al., 2019) and explored how city networks contribute to multilevel climate governance (Gordon, 2016; Scanu & Cloutier, 2016). In the United States, Fu and Li (2022) evaluated 50 local climate plans, revealing that standalone climate change adaptation plans are more effective in navigating uncertainty and adopting a systems-thinking approach than plans that integrate mitigation and adaptation strategies (p.6).

A study in Southeast Queensland, Australia, by Baker et al. (2012) examined seven local climate adaptation plans using a quantitative, multi-criteria analysis framework. The findings implied a strong recognition of climate impacts; however, the evaluated local adaptation plans could have suggested effectiveness in prompting tangible local government actions to address climate change effectively.

Despite the increasing volume of literature surrounding urban climate governance, instances of empirical studies conducted in developing countries still need to be explored. A few notable studies have scrutinised cities within developing nations, focusing on vertical and horizontal integration of climate actions amidst the multi-level climate governance landscape. These studies have investigated four of the world's largest emerging economies with significant greenhouse gas (GHG) emissions: São Paulo and Rio de Janeiro in Brazil, Rajkot, New Delhi, and Bengaluru in India, Jakarta, Balikpapan, and Bogor in Indonesia, and Johannesburg, Cape Town, and Durban in South Africa (Stehle et al., 2022, p.11).

A recent case study conducted in China by Liu and Lo (2021) revealed a diversification of actors involved in urban climate governance, which has been propelled by new governance mechanisms that promote the active engagement of an expansive array of state and non-state participants within climate initiatives.

According to Filho et al. (2019, p. 1177), existing research on developing countries predominantly centres on the national governance level. A significant portion of empirical findings has been concentrated in African cities, focusing on how centralised government

systems in least-developed African countries influence the urban governance of climate change adaptation in cities such as those in Egypt. Earlier investigations, such as the study conducted by Juhola et al. (2012), aimed to quantify adaptive capacity across Nordic countries, positing that the determinants of adaptive capacity are primarily situated at the national governance level.

2.3.2. LARGE CITIES VS SMCS

Legislative frameworks often necessitate setting concrete targets for greenhouse gas (GHG) emission reductions (Salvia et al., 2021), explaining the fundamental roles of national legislation and municipal size in shaping local climate governance. The research conducted by Bedsworth and Hanak (2013) employs empirical data drawn from two distinct surveys of city and county government administrators, aiming to clarify the adoption of holistic policy instruments such as emission inventories and climate action plans across various sectors, including energy, water management, land use, and transportation.

Their findings highlight that the effectiveness of climate action in cities often hinges on numerous contextual factors, notably the active engagement of municipalities in climate action networks, primarily constituted of larger urban centres in the United States (Allred et al., 2022). These networks play a pivotal role in bolstering the capacity of local governments to pursue meaningful climate change initiatives.

Additional studies focusing solely on large urban areas reveal a noteworthy trend: many cities have established adaptation plans. For instance, Olazabal and Ruiz De Gopegui (2021) document that among the 136 largest port cities worldwide, 59 possess an adaptation strategy. Similarly, Fiack et al. (2021) report that 45 of the 100 largest cities in the U.S. have implemented climate adaptation strategies. Reckien et al. (2018) conducted an expansive analysis, cataloguing local climate plans (both mitigation and adaptation-focused) in 885 European cities, underscoring the significance of such initiatives in urban resilience frameworks.

As urban areas continue to grow and expand, they become increasingly susceptible to the unpredictable nature of climate variability and the rising frequency of extreme weather events. These challenges pose significant risks not only to infrastructure but also to the health, safety, and well-being of urban populations.

Over the last three decades, extensive research and analyses have been conducted, primarily focusing on climate adaptation policies and plans (CAPs) in well-established, larger developed cities. This body of work seeks to understand how cities are preparing for the impacts of climate change, and it emphasizes the necessity for effective strategies to reduce vulnerability and enhance resilience.

For instance, Salvia et al. (2021) conducted a comprehensive analysis of 885 cities across the European Union (EU) that have implemented some form of climate adaptation policy. Their study highlights a diverse range of approaches and strategies, reflecting the unique challenges and priorities of different urban environments. By examining these CAPs, the authors identified best practices and common barriers to effective implementation, which can inform future policies and initiatives.

Similarly, Reckien et al. (2018) analyzed climate adaptation efforts in 200 cities across 11 EU member states. Their findings emphasized the importance of local governance and community engagement in developing and executing adaptation strategies. The research underscored that cities with robust stakeholder involvement tended to have more effective and sustainable adaptation plans in place, contributing to long-term resilience against climate impacts.

Furthermore, Otto et al. (2021) examined the climate change mitigation plans of the 103 largest cities in Germany. Their research indicated a growing acknowledgment among urban decision-makers of the need for comprehensive strategies that not only address mitigation of greenhouse gas emissions but also integrate resilience measures to prepare for climate-related risks. This dual approach is essential in ensuring that cities are not only reducing their carbon footprints but are also equipped to handle the immediate effects of climate variability.

Together, these studies contribute to a clearer understanding of how urban areas can strategically navigate the complexities of climate change. They emphasize the need for well-rounded policies that encompass both adaptation and mitigation, ensuring that cities are not only prepared for future environmental challenges but are also leading the way in sustainability and resilience planning. The lessons learned from these analyses can serve as a valuable framework for cities worldwide as they work to confront the realities of a rapidly changing climate.

In contrast, research concentrated on urban centres in Africa has often focused on high-profile cities such as Durban (Roberts, 2008b), Mombasa (Kithiia & Dowling, 2010), and Cape Town (Simon et al., 2021). While there is recognition of the efforts in these prominent cities, it is crucial also to emphasise the relevance and potential of smaller and medium-sized towns (SMCs) in global climate action (Van Der Vegt et al., 2016; Dodman et al., 2017; Häußler & Haupt, 2021).

In multiple instances, transformative local environmental initiatives can be attributed to the actions of environmental champions in positions of political influence, who drive normative changes and catalyse action (Pasquini et al., 2015). The presence of a local leader is therefore identified as a critical factor in fostering the necessary changes in policy and practice to address climate challenges (Fuhr et al., 2018). For example, in Durban, local leaders have actively cultivated their expertise in climate change, leveraging this knowledge to steer the Municipal Climate Protection Programme and empower other stakeholders (Roberts & O'Donoghue, 2013).

Conversely, small and medium-sized cities, which house a significant portion of the world's vulnerable urban populations, have not received proportional research and policy focus compared to larger metropolitan and megacities (Wisner et al., 2015; Fila et al., 2023). Homsy (2018) articulates that these municipalities are seldom regarded as pioneers in climate governance. The findings from Salvia et al. (2021), which surveyed 327 core cities in Europe, reveal a discrepancy in ambition levels, indicating that merely 7.1% of cities with populations between 50,000 and 100,000 have set carbon neutrality targets, in contrast to a more robust

32% average across all municipalities. This disparity underscores the established networks and collaborative efforts in larger municipalities, often absent in their smaller counterparts (Hoppe et al., 2019; Boansi & Cobbinah, 2018; Häußler & Haupt, 2021).

Bausch and Koziol's (2020) investigation in Bavaria further illustrate this trend, showing that smaller municipalities (those with populations under 2,000) tend to address adaptation primarily through their elected councils. In contrast, cities with populations ranging from 10,000 to 20,000 often engage their municipal administrative bodies and civil society organisations in formulating adaptation strategies, showcasing a more holistic approach to governance.

While demographic trends indicate the potential for SMCs to contribute substantially to GHG emission reductions, existing literature highlights that these cities face specific challenges, including limited financial resources and reduced institutional capacities compared to larger municipalities (Fila et al., 2023; Fünfgeld et al., 2023). Research reveals that the challenges SMCs face stem from inadequate data, diminished political clout, and constraints in personnel and infrastructural resources (Birkmann et al., 2016).

Addressing the disproportionate vulnerabilities of smaller cities necessitates strategies aimed at bolstering local organisational capabilities, institutional frameworks, and the implementation of physical infrastructure improvements, such as enhanced local governance practices and resilient engineering solutions (Birkmann et al., 2014). This understanding of SMC challenges may clarify the inconsistencies between empirical research, which frequently reports a lack of engagement from private sector actors, and case studies documenting notable private sector participation in climate action initiatives (Klein et al., 2018, p. 134).

Despite demographic trends indicating substantial potential for small and medium-sized cities to contribute effectively to GHG emission reductions, existing literature highlights specific challenges these municipalities encounter, particularly concerning their limited financial resources and constrained institutional capacities. This disparity underlines an urgent need for enhanced policy frameworks and targeted interventions that empower smaller cities to

participate actively in effective climate governance, thus enabling them to play a significant role in global climate mitigation efforts.

2.4. CHALLENGES OR BARRIERS

Urban climate governance faces many challenges that can significantly hinder effective climate action and adaptation efforts in cities worldwide. The following detailed points highlight vital areas of literature addressing these challenges. A considerable body of literature highlights the complexities inherent in multi-level governance systems within urban settings. These systems often need more clarity and cohesive power structures that complicate effective planning and decision-making. Musah-Surugu et al. (2019) and Adu-Boateng (2019) illustrate that while local governments are positioned to access critical local knowledge, they frequently find their efficacy curtailed by centralised governance frameworks.

Such top-down regulations diminish local autonomy and hamper tailored climate action initiatives. For instance, Davies et al. (2020) emphasise that the national government in Namibia typically implements climate adaptation processes through a central approach that overlooks local perspectives. Moreover, Boateng (2022) argues that rapidly urbanising cities need help to localise national climate policies effectively. This challenge is rooted in their inability to participate constructively in climate decision-making processes, leading to misaligned strategies that fail to address the unique vulnerabilities of local communities.

Access to sufficient climate finance is crucial for the success and sustainability of urban climate initiatives. Existing research confirms that city governments, particularly in developing countries, grapple with significant hurdles in mobilising and accessing adequate funding for mitigation and adaptation efforts (Boateng, 2023). These governments' dependency on external funding sources is prevalent, severely limiting their financial autonomy and capacity to implement self-sufficient adaptation measures. Consequently, this reliance on external financing creates a precarious situation where local governments may need help to respond adequately to emerging climate challenges, leaving them vulnerable to fluctuating economic conditions and donor priorities.

The technical capacity of municipal governments is critical for effective adaptation planning, yet many still need to improve in this area. Fila et al. (2023) provide a systematic review indicating that smaller municipalities, often called small and medium-sized cities (SMCs), experience delays in adaptation progress due to their limited workforce and specialised departments. The research indicates that smaller SMCs are often tasked with a broader range of responsibilities without the dedicated resources needed to focus on climate adaptation specifically. For example, a survey conducted in Bavaria revealed that municipalities with fewer than 20,000 inhabitants tended to engage in climate adaptation discussions predominantly within elected councils, contrasting with larger municipalities that developed comprehensive strategies in collaboration with civil society organisations (Bausch & Koziol, 2020, as cited in Fila et al., 2023).

The capacity and robustness of institutional structures are pivotal in shaping urban climate governance. Francesch-Huidobro (2012) investigates the implications of insufficient institutional frameworks, demonstrating how they can obstruct the development and execution of comprehensive climate strategies. SMCs often need a holistic approach to addressing climate change, contributing to their inefficacy in implementing adaptive measures.

An extensive lack of awareness regarding climate risks, coupled with ineffective governance structures, significantly undermines the implementation of climate-related projects. Studies on sub-Saharan African cities (Adenle, 2017) highlight the critical need for improved infrastructure and knowledge regarding climate change in urban settings, where local governments often lack the necessary tools to identify, design, and execute practical projects.

Research by Simon (2010) and Kithiia (2011) underscores the extreme vulnerability of poor urban populations in fast-growing cities, revealing high levels of exposure to climate impacts. The absence of proactive engagement from local governments in recognising and addressing these threats exacerbates the challenges faced by these communities.

More than effective involvement of local communities in climate adaptation planning is needed. Case studies, such as those conducted by Mubaya and Mafongoya (2017) illustrate that

local governments may only engage citizens and community members during the implementation stage of climate adaptation measures, sidelining them in earlier phases of planning and decision-making. This limited engagement can hinder incorporating vital local knowledge crucial for understanding localised climate impacts and tailoring appropriate adaptation strategies. The literature stresses the importance of inclusivity in the adaptation process, as local stakeholders possess significant hands-on knowledge that can enhance the effectiveness of climate initiatives (p.102)

To address these interconnected challenges, urban areas must strengthen institutional frameworks, enhance awareness and education about climate issues, improve financial mechanisms for funding climate initiatives, and foster community engagement in the planning processes. The literature underscores that with concerted efforts to overcome these obstacles, cities will continue to work hard to implement effective urban climate governance and adapt to the realities of climate change.

2.5. INSTITUTIONALISING URBAN CLIMATE GOVERNANCE (1990 – 2020)

2.5.1. SYSTEMATIC REVIEW

Research has consistently demonstrated the significant role of systematic reviews in the health sciences, underpinned by their ability to provide transparent and objective evaluations of existing data, thus facilitating the synthesis of results and the identification of knowledge gaps. In contrast, applying systematic reviews in climate change research still needs to be improved (Klopfer et al., 2021), which raises critical questions about methodologies used in this increasingly important field.

Notably, scholars like Berrang-Ford et al. utilised systematic reviews in both 2011 and 2014 to deepen the understanding and characterisation of adaptation actions specific to climate change. Their research focused on the diversity of adaptation strategies and contributed valuable guidelines for conducting systematic reviews within this context, setting a precedent for future research. Similarly, Biesbroek et al. (2013) adopted a systematic approach to propose

conceptual frameworks and theoretical models governing barriers to adaptation, shedding light on the multifaceted challenges stakeholders face in effectively responding to climate-related issues.

In an additional layer of analysis, Saheli et al. (2019) focused their research on determining and categorising climate change adaptation indicators. These indicators are essential components of comprehensive risk management strategies, as they help policymakers and practitioners gauge the effectiveness of various adaptation efforts and inform decision-making processes.

Recent findings by Nalau and Verrall (2021) have further enriched the field by providing a comprehensive multi-dimensional review of climate change adaptation science. Their research highlights the evolution of adaptation science over time, revealing that while priority research topics and themes have shifted in response to emerging challenges and societal needs, certain core concepts such as vulnerability, resilience, and adaptive capacityhave maintained a steady presence in the discourse.

This current research aims to add to the existing body of knowledge by employing a systematic review to synthesise evidence of effective climate governance and the strategies being implemented by cities worldwide. The methodology used in this study allows for a detailed analysis of diverse urban responses to climate risks and highlights best practices and lessons learned from various global contexts.

Theoretically, this review builds on a substantial three-decade history of scholarship that has traced the emergence of new urban actors, spaces, and political dynamics considering the pressing realities of climate change. It draws connections between local governance, community engagement, and larger-scale climate initiatives to provide a comprehensive understanding of how cities can navigate the complexities of climate adaptation and resilience-building. Overall, this study aims to contribute meaningful insights to the ongoing discourse in climate governance and adaptation research, emphasising the critical role of systematic reviews in advancing knowledge in this field of study.

2.5.2. PUBLICATION TRENDS

The distribution of the included literature across the years reveals an interesting pattern, as illustrated in Figure 2. The first article, published in 2007, used the city of Berlin as a case study to advocate for innovative policy approaches and institutional changes that align with the growth of energy networks and address local and regional sustainability needs (Monstadt, 2007). In Germany, municipalities have financial support from higher government tiers to develop energy and climate mitigation plans (e.g., Germany).

In 2008, the second article shifted focus to adaptation, framing it as a challenge for local administrations rather than national ones. By 2010, Fünfgeld reviewed four critical institutional challenges related to climate risks in urban contexts. This was followed by an expansion of study dimensions in 2011 and beyond. Notably, the review by Anguelovski and Carmin (2011) examined the dual aspects of innovation and institutionalisation in urban climate governance. They noted that while mitigation planning is more established than adaptation, cities from the global North and South are experimenting with new institutional arrangements and policies as they advance their climate agendas.

From 2011 onward, there was a noticeable increase in published articles, with the highest recorded in 2013 and 2015. This surge in urban adaptation studies coincided with a growing interest in the role of sub-national actors in climate action. A closer examination of the methods employed reveals a predominant use of qualitative approaches, especially expert interviews, focus groups, and participant observation. While most studies relied on single or multiple case studies to capture participants' perspectives on how climate change adaptation is institutionalised, a clear gap remains in the literature regarding quantitative methods. Some studies did, however, successfully integrate both qualitative and quantitative approaches.

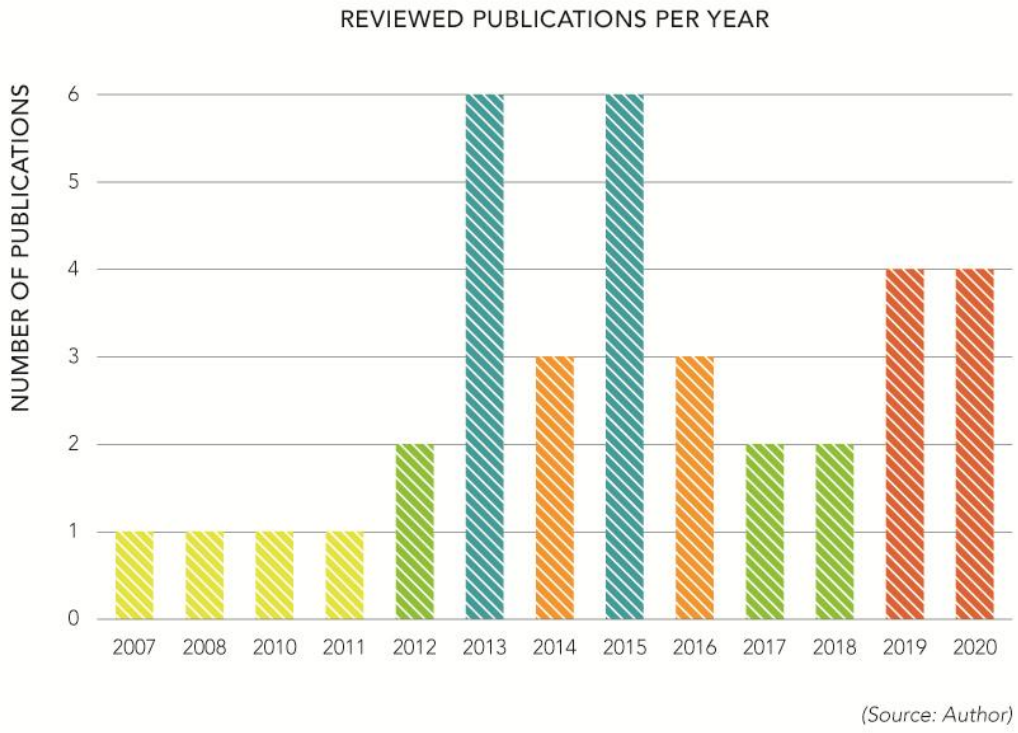
The upward trend observed post-2015 suggests an increasing acknowledgement of the importance of urban climate governance, particularly following the Paris Agreement. For instance, Pasquini and Shearing (2014) illustrated how a municipality in South Africa made significant strides in institutionalising environmental concerns through adaptive planning.

Further, several articles explored the motivating factors behind selecting institutional arrangements for climate change mitigation and adaptation.

Aylett (2015) found that governance structures significantly influence the choice of policy tools for urban climate action. Bettini et al. (2015) indicated that enhanced institutional capacities necessitated a transition in urban water management. The Paris Agreement 2015 marked a significant milestone emphasising the crucial role of cities and sub-national actors in robust climate action (Lesnikowski et al., 2017).

Figure 2

Publications per year



(Source: Author)

2.5.3. SEARCH STRATEGIES

The present review aims to establish a broad understanding of the conceptual frameworks applied to assess the institutionalisation of climate governance in cities and urban areas. The search protocol was determined to be part of the planning stage, and this section outlines the fundamental steps needed to conduct the review.

Therefore, the first step of the process was to select the appropriate database for the literature search. For the selection phase, three databases (Web of Science, ScienceDirect, and Scopus) were considered suitable, but the Web of Science was the most appropriate for this study. The selection was because it provides a broader range of peer-reviewed literature than Google Scholar. However, unlike Scopus, Web of Science extensively covers urban literature across various disciplines. Additionally, it provides a broad range of peer-reviewed social science-related literature, increasing the likelihood of identifying a more significant number of relevant articles for this review. (Buzási & Csizovszky, 2023).

The search was conducted using the advanced database search tool, to which two separate search strings were applied to find the most relevant articles for this review. After several tests, the search strings were defined so that the results would include the highest number of articles that could potentially help achieve the review's objective. However, considering this study's objective, the search strings' scope was limited to finding publications that specifically address the institutions and urban climate governance. This ensured that a review of only the literature around this concept was conducted and avoided the need for interpretation.

2.5.4. INCLUSION AND EXCLUSION CRITERIA

In the next step, the exact search criteria were designed. The category filter ensured a broad but topic-related scope of the academic literature, which enabled the search by title and topic (title, keywords, and abstract). The initial search was conducted in September 2020, with January and February 2021 updates. The search strings were revised several times before reaching the final parameters. The first search string contained the terms “climate”, “cities”,

and “urban areas” institutions. The final search strings were *“urban* OR city OR cities OR municipal*) AND clim* AND governance AND institution*”.*

The scope and timeframe were defined according to the purpose of this study, with the main field of interest being the institutionalisation of urban climate governance. The scope was limited to academic publications, considering that they have already undergone a rigorous peer review process that indicates a suitable quality for this paper. The search was limited to the timeframe of 1990 to 2020. Since the critical milestone for urban climate governance research was in the early 2000s, it was necessary to choose 1990 as a starting point for the search to gauge understanding of the upward trend.

Following the search string, the first search in the database gave 860 articles, which were exported into an Excel sheet and later uploaded to a reference manager to screen titles and abstracts (Refer to Appendix 1 for a list of the supplementary material). The first screening was applied to these articles by reviewing the title and abstract and excluding the ones that did not meet the selection criteria or did not fit the purpose of this review. This process led to the selection of 230 articles eligible for the next round of review, while 530 were not considered for this study.

After reviewing the titles and abstracts, 177 articles were excluded, while 54 were deemed suitable for full-text review. Having a high rate of exclusion of publications is considered standard in systematic reviews that apply practical and quality screens, and it helps the review become efficient and accurate by focusing mainly on the articles of relevance. In this case, the main reasons for exclusion were that the articles were broad and needed to focus on the topic.

Next, the 54 full-text articles were analysed according to the inclusion criteria, leading to 36 articles being selected for the systematic review (see Appendix 1 for supplementary data). The reasons for excluding the 18 articles were: 1) the article did not directly focus on institutions and urban climate governance; 2) the publication did not focus on cities and urban areas; and 3) the body of the article needed to be in English.

2.5.5. DISTRIBUTION OF ARTICLES BY GEOGRAPHICAL REGIONS

Figure 3 illustrates the distribution of studies by geographical region, revealing that Europe led with ten articles. Following Europe, the Latin American region contributed six articles, while five focused on two or more regions. Australia and Asia each recorded four articles, and Africa featured three. Additionally, four articles did not concentrate on any specific region.

Europe's representation, comprising 28% of the case studies, demonstrates a disproportionate distribution of articles. However, this does not imply a lack of climate action or limited regional research focus. Indeed, it may reflect the realities faced by vulnerable societies located in coastal and river floodplains, particularly those economies heavily reliant on climate-sensitive resources.

Over half the global population resides in coastal areas, and 75% of major cities are along coastlines. For example, the IPCC (2015) projects that Europe will face increased storm frequency and rising sea levels, leading to heightened risks of tidal and storm floods and more significant coastal erosion.

Moreover, since the Paris Agreement in 2015, some European countries, including Sweden, France, and the UK, have passed legislation to reach climate neutrality by 2050 or earlier (Salvia et al., 2021). Their study found that 90% of cities striving for carbon neutrality are members of a climate network.

With a 17% representation, the Latin American region demonstrates a significant concentration of case studies in larger cities compared to their smaller and medium-sized counterparts. Notable examples include Mexico City (Hughes & Romero-Lankao, 2014; Romero-Lankao et al., 2013), Santiago (Patterson & Huitema, 2019a; Vicuña et al., 2020), and Melbourne (Ferguson et al., 2013).

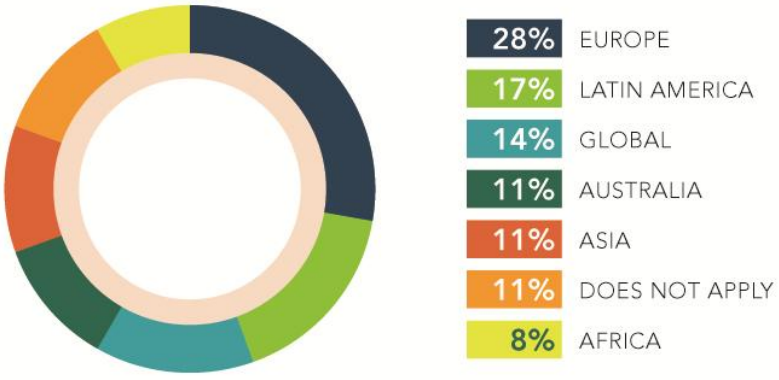
Previous studies underscore the crucial role of city governments in driving climate action; however, the literature also reflects local climate initiatives involving diverse actors, indicating that local governments are seldom the sole leaders in these efforts. Also, 14% are those that

focus on two or more regions. With several case studies focusing on urban water management and multi-sectoral aspects, previous studies by Bridges (2016) recognise the growing nature of urban water management in developed and developing countries. The number of studies on adaptation appears to be coastal primary cities dealing with climate variability. Hence, scholars argue that resilience and adaptation planning provide a more flexible, robust, and integrated approach to coping. This shows regions that experience severe risk from floods and water-related issues (see., Santiago in Chile, Perth in Australia, Semarang in Indonesia, and Accra in Ghana, amongst others).

Both urban water management and resilience studies represent 11% of the articles from Australia, focusing on resilience and disaster risk management in Asian cities (Govindarajulu, 2020; Lassa, 2019). Lastly, 8% of the articles originate from larger African cities, predominantly addressing urban water management. It appears that the number of studies on adaptation primarily centres on coastal cities facing climate variability. Scholars argue that resilience and adaptation planning offers a more flexible, robust, and integrated approach to addressing these challenges. This is particularly relevant for regions experiencing severe risks from flooding and water-related issues, such as Santiago in Chile, Perth in Australia, Semarang in Indonesia, and Accra in Ghana, among others.

Figure 3

Distribution of articles by geographical region



(Source: Author)

2.5.6. DEFINITIONS AND THEORETICAL PERSPECTIVES OF INSTITUTIONS

Institutions represent the frameworks within which social interactions occur, shaping behaviours, norms, and collective decision-making processes. Scholars have long debated the definitions and roles of institutions across various academic disciplines, including political science, economics, sociology, and environmental studies. Institutions can be understood as the rules that structure social life and the organisations that enforce these rules. These entities are critical in facilitating cooperation and mitigating conflict, serving as the foundation of governance systems worldwide.

North (1996) defines institutions as the "rules of the game" in a society that influence how individuals interact. This definition highlights the dual nature of institutions as both constraints and enablers. Ostrom (2010) expands on this by framing institutions as organisations formulated by these constraints, rules, and interaction patterns. According to her Institutional Analysis and Development (IAD) framework, institutions also serve as tools for addressing societal challenges by enabling collective action and governance.

Young et al. (2008, as cited in Patterson & Huitema, 2019) further emphasise the importance of understanding institutions within the context of governance systems, exploring how they interact with belief systems, norms, culture, and community. This interaction navigates formal and informal institutions, which differ fundamentally in their characteristics and implementations.

2.5.6.1. Formal vs. Informal Institutions

Formal Institutions include codified rules, laws, regulations, and official norms societies establish. They create a foundation for predictable interactions and establish clear expectations for individual behaviour. Examples include constitutions, statutes, and regulatory frameworks. In contrast, informal institutions encompass unwritten social norms, customs, and traditions upheld by community values and practices outside formal mechanisms. Examples include

societal customs, professional practices, and unwritten rules governing behaviour in specific social contexts (Paavola, 2007).

The interplay between formal and informal institutions is crucial for understanding governance. Informal norms often influence compliance with formal regulations and shape societal responses to governance challenges, particularly in environmental management and climate change adaptation (Yeboah-Assiamah, 2019).

2.5.6.2. Role of Institutions in Environmental Governance

As climate change's impacts gain prominence, institutions' governance roles become increasingly vital. Institutions facilitate decision-making processes related to environmental issues by shaping municipalities' social practices and enabling effective responses to climate challenges (Wejs, 2014). Central to this transformation is the institutionalisation of new environmental norms and practices, which can manifest through new job descriptions, policies, and operational routines that prioritise sustainability (Patterson et al., 2019).

Recent studies highlight how institutions serve as structural mechanisms and platforms for innovation and adaptation. For instance, Patterson and Huitema (2019) argue that understanding the heuristic nature of institutions can open new pathways for analysing governance frameworks that may initially appear constraining. Their research underscores the importance of both formal and informal institutions in fostering resilience and adaptability within communities facing climate-related crises.

The categorisation of institutions into formal and informal types has significant implications for developing adaptation strategies in responding to environmental change. Research by Patterson (2019) and Olazabal & Castán Broto (2022) emphasises how informal institutions—such as community norms, beliefs, and networks—can support adaptive governance approaches. Informal institutions often complement formal structures by providing the social capital needed to implement change effectively. They influence societal decision-making processes and can enhance collective action, facilitating communities' more robust adaptive capacity (Jones et al., 2010, as cited in Mubaya & Mafongoya, 2019).

Understanding governance that transcends conventional definitions of formal institutions is essential for addressing contemporary governance challenges. Rosenau (2000) defines governance as the pathways and mechanisms to coordinate diverse state and non-state actions. This broader perspective recognises the complexity of governance in practice, where various actors operate across formal and informal domains to achieve collective goals.

Dichotomies that strictly differentiate between formal and informal governance mechanisms can be more complex. A nuanced approach considers the interplay between these mechanisms and how they coalesce to shape the governance landscape. This understanding is particularly relevant in environmental governance, where adaptive strategies are often needed in response to the fluid dynamics of climate change.

Formal and informal institutions form the bedrock of social interaction and collective action. Their roles are particularly salient in environmental governance, guiding decision-making processes and shaping norms, behaviours, and social practices. As adaptation to climate change becomes increasingly urgent, understanding and strengthening institutions—through formal rules and informal practiceswill be critical in fostering resilient and sustainable communities. The ongoing research highlights the need for interdisciplinary perspectives in institutions, recognising that effective governance requires an integrative approach encompassing all dimensions of human interaction and environmental stewardship.

2.5.7. TOWARDS A NEW FRAMING OF INSTITUTIONAL CONCEPTS

The term "institutions" has emerged as a fundamental concept across a multitude of research disciplines, including sociology, political science, and environmental studies. However, this widespread adoption has led to significant ambiguity and a lack of a unified definition. To navigate this complexity effectively, a systematic review has highlighted three interrelated elements and practices that are essential for understanding the functioning of institutions: policy tools, organizational capacity, and stakeholder collaboration.

To further explain the relationships among these elements, insights from the heuristic framework developed by Patterson and Huitema (2019) have been incorporated. Their

framework underscored that institutional innovation can be understood at three distinct yet interrelated levels. Firstly, there are invisible changes in institutional arrangements which may include shifts in how institutions perceive their role or function without apparent external alterations. Secondly, modifications in underlying rules-in-use pertain to the informal guidelines and practices that govern behaviors and decision-making within institutions. Lastly, these innovations must be contextualized within a broader framework of governance dilemmas, which may involve conflicts of interest, competing priorities, or systemic barriers that challenge effective climate governance.

In the specific context of urban climate governance, the idea of institutionalising responses to climate change is crucial. This process involves embedding climate-related actions into both formal and informal governance structures, ensuring that policies reflect and address climate challenges. It incorporates a variety of approaches, from the development of comprehensive climate action plans to the integration of climate criteria into urban planning routines. This nuanced understanding emphasizes the interdependence of the three elements previously identified policy tools, organizational capacity, and stakeholder collaboration—illustrating how they collectively contribute to the effectiveness of governance strategies aimed at mitigating climate change and enhancing urban resilience.

A deeper exploration of these elements reveals their distinctive characteristics and how they interact with one another. Policy tools encompass the mechanisms through which governance is enacted, including regulations, incentives, and informational strategies. On the other hand, organizational capacity refers to the resources and competencies available within institutions, such as human capital, financial resources, and infrastructural support that enable effective governance and implementation of policies. Lastly, stakeholder collaboration emphasizes the importance of involving diverse actors ranging from government entities to community organizations in the decision-making process to ensure that responses to climate change are holistic and reflective of multiple perspectives.

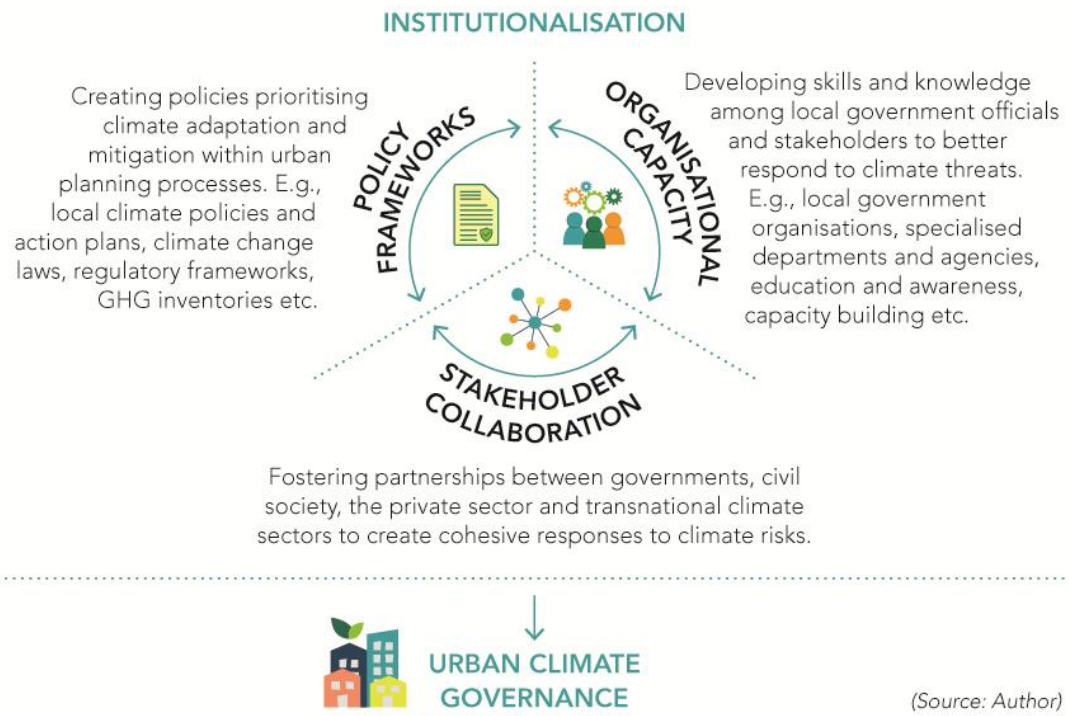
This novel conceptualisation of institutionalisation provides a valuable framework for further analysis within the context of urban adaptation. Chapter Five of this dissertation applies the

framework to the empirical case studies in Ghana, exploring the complexities of how these elements interact and how they influence climate change governance within small and medium-sized cities (SMCs).

The subsequent sub-sections will investigate how different geographical regions adapt the institutionalisation framework to meet their specific climate challenges, showcasing various tools and mechanisms instrumental in institutionalising effective climate action. Through this detailed exploration, the research aims to contribute to a deeper understanding of the role of institutions in advancing climate resilience across diverse urban landscapes.

Figure 4

Conceptual Framework



2.5.7.1. Policy Frameworks

Research enriched by case studies, expert assessments, and the lived experiences of various cities engaged in climate change mitigation and adaptation highlights the critical need for local governments to formalise and institutionalise these initiatives. Such formalisation is not merely bureaucratic; it serves as a basis for effective implementation, bolstering the legitimacy of local climate efforts and enhancing interdepartmental coordination and support across various sectors. This need is underscored in the foundational work of Anguelovski and Carmin (2011), who stress that institutional frameworks significantly shape the outcomes of climate policies.

Developing a local climate-change policy is a complex, data-intensive process that requires cities to adopt innovative methods for utilising, generating, and synthesising scientific information. This complexity arises from the uncertainties and novelty of current and future

climate projections. A pivotal example of this is Debra (2008), which analysed the institutionalisation of climate change within the administration of Durban, South Africa. These reports underscored the necessity of broad engagement with existing climate science to understand potential risks and their implications for the city and its local communities.

Fünfgeld (2010) expands this discourse by calling for developing comprehensive manuals, toolkits, and educational materials that would serve as essential resources for local governments. These tools are supplementary and vital for integrating climate change considerations into urban planning and decision-making processes. As cities deal with the array of climate action strategies— from local adaptation plans to legislative measures and supportive programs, these educational resources help sharpen the focus and scope of their efforts, guiding them towards effective climate action.

In examining the institutional arrangements that impact climate action execution across Europe, Monstadt (2007) makes a compelling case for innovative policy methodologies and necessary institutional reforms. Such reforms aim to align the development of energy networks not just with environmental goals but also with broader local and regional sustainability objectives. A prime example can be found in Berlin, where there is a growing emphasis on integrating energy and climate policies across multiple sectors. Despite the Energy Task Force in the Environmental Department being legally responsible for energy planning, resources for sustainable energy management often remain disjointed across several departments, including economic, financial, housing, and research policies (p. 339). The fragmentation of these resources can hinder efficient climate action and calls for a systemic overhaul that synthesises efforts across departments.

Further studies into local climate change policies assert that initiating climate planning must begin with a thorough situation analysis to identify prevailing trends and challenges. This essential process involves accumulating local-level Greenhouse Gas (GHG) emission profiles from various sectors alongside scientific assessments of future emission projections (Anguelovski & Carmin, 2011; Marsden & Groer, 2016). A pertinent example is seen in Hong Kong, where authorities have recently established a baseline emissions inventory and defined

their GHG emissions targets. Nevertheless, a comprehensive climate strategy remains in development (Francesch-Huidobro, 2012, p. 803).

Insights from Danish cities illustrate how municipalities can adapt to climate risks through defined climate goals. Three specific municipalities employed an experimental approach of consensus-building and stakeholder negotiation to address disagreements over climate goals and collaboratively determine standardised means of achieving them (Wejs, 2015). This adaptive approach mirrors ongoing efforts in various locales to refine scenario planning processes, ensuring they can anticipate future conditions and accommodate surprises. Such initiatives prioritise developing contextualised evidence bases and mechanisms that foster knowledge sharing while generating local demonstrations to build practical experience (Ferguson, 2013).

Another crucial aspect of effectively addressing climate change is developing robust monitoring guidelines and systems for tracking progress. Research conducted in Würzburg, Germany, and Mwanza, Tanzania, reveals that the framework established by Göpfert et al. (2019) lays the groundwork for crafting context-specific guidelines tailored to the needs of national and local decision-makers and officials. Mainstreaming climate actions into existing plans, such as sectoral development plans, is essential to ensure proper implementation and accountability.

Shifting the focus to the transport sector, Marsden and Groer (2016) extensively analysed strategic objectives, operational policy tools, and initial progress toward carbon emissions reduction in seven cities across the UK and Germany, each characterised by distinct institutional frameworks. Their findings reveal significant disparities. For instance, UK cities like Leeds, Manchester, Edinburgh, and Glasgow benefit from well-defined national carbon targets and strong intergovernmental relationships. Conversely, German cities such as Frankfurt, Stuttgart, and Munich operate within more cohesive local transport systems bolstered by robust local and regional governmental structures. Worth noting is that all cities studied have implemented comprehensive city-wide carbon management programs (Marsden

& Groer, 2016, p.171), showcasing a concerted effort to integrate climate action into urban governance.

Delhi and Mexico City emerge as exemplary urban areas that have proactively crafted climate change plans. Mexico City stands out with its rich history of prioritising climate change as a central policy issue (Patterson, 2019). The Mexico City Climate Action Plan is a monumental document detailing 44 distinct action items—26 dedicated to mitigation and 22 aimed at adaptation—all striving towards the audacious goal of reducing carbon dioxide emissions by a staggering 7 million tonnes.

The formulation of regional adaptation strategies signifies a growing recognition of the necessity for coordinated action across larger geographic scales, reflecting an understanding of the interconnected nature of urban environments within specific regions. The development of the PARMS plan exemplifies how crucial scientific knowledge and expertise can guide practical climate actions. Engaging experts from diverse countries has enriched the strategy with multiple perspectives, experiences, and valuable scientific insights (Romero-Lankao et al., 2013).

In alignment with these insights, Aylett (2015) argues that it is essential to coordinate policies and actions across various sectors within and outside established urban systems to meet the cross-system challenges posed by climate change. For instance, in Cape Town, the city climate action plan has proven effective in increasing stakeholder awareness and fostering proactive preparations for the anticipated impacts of climate change (Taylor, 2016). The intersection of policy coordination, stakeholder engagement, and scientific input emerges as a holistic approach to tackling the complexities of climate change. This approach will be crucial for urban areas striving for resilience in an uncertain future.

Wei (2020), drawing on institutional theory, conducted a comprehensive evaluation of progress in low-carbon urban initiatives across China. His research hinged on the willingness and capacity of urban stakeholders to pursue more ambitious reforms. Through a methodical combination of semi-structured interviews and a thorough documentary analysis, the study

revealed that a significant factor driving these discussions was recognising the intrinsic value of carbon reduction. Moreover, it highlighted how national commitments frequently intertwine with local economic development initiatives. While governmental bodies intend to enhance these efforts, the research indicates that several challenges must be addressed before achieving substantial advancements.

Literature indicates delta cities—the urban areas at the land and water meeting point—are increasingly vulnerable to climate risks, particularly flooding. This vulnerability has led to efforts to institutionalise climate change considerations across relevant sectors, including water management, climate resilience, and disaster preparedness. Highly exposed delta cities like Hong Kong, Guangzhou, and Rotterdam have taken proactive steps by developing comprehensive climate change policies, plans, strategies, and programs aimed at mitigating these risks and addressing associated vulnerabilities (Duijn & van Buuren, 2017; Francesch-Huidobro, 2012).

Building urban resilience is paramount in cities like Guangzhou and Hong Kong, which have experienced severe flooding. Govindarajulu (2020) advocates for making such resilience efforts more structured by developing disaster management plans that duly consider the unique vulnerabilities of cities, including establishing early warning systems and emergency preparedness protocols for flood management. Similarly, Lassa (2019) sheds light on establishing the Asian Cities Climate Change Resilience Network (ACCCRN), which aims to facilitate the creation of a City Resilience Strategy. This framework is vital for addressing climate change's current and future impacts, particularly regarding urban water management.

This multifaceted approach to policymaking and implementation encompasses training programs, knowledge exchange among stakeholders, and awareness-raising campaigns. These initiatives are vital in empowering stakeholders and the broader public to engage in climate action actively. Alongside setting goals and defining visions, many cities now focus on developing concrete climate action plans to structure their adaptation and mitigation initiatives. A comprehensive review by Reckien et al. (2018) of 885 urban areas within the EU-28 identified three primary types of climate mitigation plans: those produced autonomously, plans

created to comply with national regulations, and plans developed within international climate networks. The study found that approximately 66% of EU cities have formulated climate mitigation plans influenced by city size, national legislation, and participation in international networks (Reckien et al., 2018).

2.5.7.2. Organisational Capacity

Organisational capacity is a critical pillar in successfully implementing local climate policies. This concept revolves around the ability of local governments and institutions to facilitate seamless coordination across various departments. Even in the presence of robust climate action plans, the actual efficacy of these plans hinges on the motivation, skills, and capabilities of the personnel involved in their execution. According to the United Nations Development Programme (UNDP, 2009, p.11), capacity encompasses an organisation's internal structure, policies, and procedures, collectively determining its effectiveness in delivering targeted outcomes.

Integrating specialized administrative jurisdictions into climate policy has shown remarkable effectiveness, as demonstrated by a German case study by Monstadt. This research highlighted how these jurisdictions have successfully initiated regional climate programs to enhance energy efficiency and promote adopting renewable energy sources. For instance, establishing targeted programs in Germany reflects a strategic commitment to addressing climate change locally, paving the way for more sustainable practices (Bulkeley & Kern, 2004, as cited in Monstadt, 2007). Furthermore, forming an Energy Task Force within Berlin’s environmental department is a testament to the city's proactive approach to championing sustainable energy practices.

The evolving challenges posed by climate change necessitate that policy designs address immediate environmental concerns and account for interlinkages across different sectors. Aylett (2015) argues that to navigate the complexities of climate impacts, policies must coordinate activities that span multiple areas, such as urban planning, health, and economic development, ensuring a holistic approach to climate governance.

In a pivotal study conducted by Roggero in 2015, an institutional economics perspective was employed to investigate climate adaptation at the municipal level. This research focused specifically on bureaucratic organisations, focusing on 14 climate-sensitive municipalities in North Rhine-Westphalia, Germany. The findings suggest that integrative institutions—those that foster collaboration and coordination—are essential for enabling adaptive responses to climate change. While such integration is beneficial, the study also notes that it is not an absolute prerequisite for effective adaptation, indicating the complexities involved in local climate governance (Roggero, 2015).

Further examination of institutional structures reveals an increasing allocation of dedicated staff members to tackle climate initiatives. Anguelovski and Carmin (2012) highlight that the engagement of dedicated personnel is vital for successfully implementing local climate policies and programs. A global survey by Aylett (2015a) found that approximately 40% of cities maintain small teams of 1 to 5 employees dedicated solely to climate planning efforts. Alarmingly, around 23% of municipalities have only one individual responsible, often a sustainability coordinator entrusted with this crucial task. Moreover, about 15% of cities have yet to establish any responsibility for climate planning, which could significantly hinder long-term progress.

Illustrating this point, Wamsler and Lawson (2012) provide a compelling narrative of how El Salvador witnessed a marked improvement in integrating urban planning, disaster management, and climate adaptation strategies following the devastating impacts of Hurricane Mitch in 1998 and the earthquakes in 2001. This progress was largely attributed to enhanced inter-institutional cooperation and an emphasis on building internal capacities.

Leadership dynamics also play a pivotal role in fostering resilience against climate challenges. In a case study of Semarang City, Lassa (2019) pointed out how effective leadership from the city's executive secretary facilitated the formation of a City Team composed of representatives from various stakeholders, including municipal government, local universities, and NGOs. The presence of a dedicated climate coordinator was emphasised as critical, as this individual

served as a linchpin to connect diverse policy areas and drive the overarching goals of climate strategies forward.

The literature often highlights numerous barriers in Africa that impede effective climate action implementation. For instance, research conducted by Measham et al. (2011) and Baker et al. (2012) underline systemic issues within many cities. A study by Pasquini and Shearing (2014) focused on a smaller South African municipality and illuminated key factors that bolster the growth of environmental agendas within local governments. Their findings revealed that political champions and robust networks between municipalities and external organisations are paramount for institutionalising climate agendas. This is crucial for ensuring sustainability and continuity of ecological initiatives despite changes in leadership and external partnerships—thereby lessening the risk of regression in climate action efforts.

In a contrasting study of eight Danish municipalities (Wejs, n.d.), the creation of dedicated project management units for climate planning projects illustrated the effectiveness of the strategic organisation. Six of these municipalities assigned these responsibilities to their technical environmental departments, underscoring a trend towards systematic and coordinated climate action. One example is Paris, which exemplifies the advantages of establishing dedicated divisions for climate action. This strategic move highlights local governments' essential role in climate governance, as they possess the jurisdictional and administrative authority needed to enact policies and initiatives that directly shape urban environments and community well-being.

The city of Venice presents yet another interesting case. Munaretto et al. (2012) recounted that a local technical committee was established in 1973, comprising technical experts tasked with providing binding advice to project developers and approving authorities regarding building works and territorial transformations within the Venice lagoon. Initially intended to dissolve after safeguarding measures are implemented, this committee remains active today, reflecting the ongoing need for expert oversight in managing environmental challenges.

Integrating specialised administrative jurisdictions into climate policy has shown remarkable effectiveness, as demonstrated by a German case study by Monstadt. This research highlighted how these jurisdictions have successfully initiated regional climate programs to enhance energy efficiency and promote the adoption of renewable energy sources. For instance, establishing targeted programs in Germany reflects a strategic commitment to addressing climate change locally, paving the way for more sustainable practices (Bulkeley & Kern, 2004, as cited in Monstadt, 2007). Forming an Energy Task Force within Berlin's environmental department was a testament to the city's proactive approach to championing sustainable energy practices.

Similarly, case studies conducted in Mexico City have underscored the invaluable contributions of specialised departments in climate policy. These departments are equipped with essential technical expertise, robust research capabilities, and insightful policy knowledge critical for crafting comprehensive strategies for climate adaptation and mitigation (Romero-Lankao et al., 2013). By leveraging this specialised knowledge, these entities can catalyse the development of focused climate programs, effectively addressing local environments' unique challenges and opportunities.

Researchers Anguelovski and Carmin (2011) and Wretling and Balfors (2021) further corroborate this by emphasising that institutionalising climate change involves creating new positions, defining new job roles, and integrating innovative practices into the core routines of organisations. This approach not only enhances the capacity of local governments to respond to climate challenges but also embeds climate considerations into the very fabric of governmental operations.

Applying the Adaptigation Institutionalization Framework, researchers Göpfert et al. (2019) shed light on the growing influence of municipal advisory committees in shaping decision-making processes related to climate challenges. Their study identified two types of climate-related advisory committees in 107 cities: the Climate Specific Committees (CSC) and the Climate Integrative Committees (CIC). While CSCs primarily focus on addressing climate-specific issues, CICs can address a broader range of mitigative and adaptive strategies, facilitating mainstreaming climate considerations across various governance sectors.

Furthermore, establishing an internal steering committee at the management level can significantly enhance the division of tasks related to climate strategies. Such committees are pivotal in anchoring climate initiatives within the administrative framework, bolstering internal support and improving coordination among the various sectors involved in climate policy and action. This comprehensive approach fosters collaboration and ensures a unified direction in tackling the pressing challenges of climate change.

2.5.7.3. Stakeholder Engagement

The literature on climate action increasingly highlights the importance of collaboration and networks among various stakeholders. The literature shows a diverse engagement landscape; in certain regions, local government plays a pivotal role, particularly in cities across Europe, North America, and, to some extent, in Oceania. Conversely, local governmental presence is markedly less prominent in African and South American urban areas. Anguelovski and Carmin (2011) provide compelling empirical case studies illustrating the participation of stakeholders in major urban centres like Paris, London, and Toronto. Notably, London's climate change adaptation strategy exemplifies a model of inclusivity, integrating insights from the broader public through consultations encompassing formal agencies, such as public administrations, and informal entities like individual households and grassroots social networks.

As articulated by Wamsler and Lawson (2012), the structured involvement of private-sector entities, NGOs, and community organisations is pivotal in fostering cooperation between government and society. The operational frameworks of the analysed NGOs often centre around community-based initiatives, such as actively engaging in cleaning sewage systems, while also establishing hierarchical structures for coordinated action, including the formation of emergency response committees and institutionally based early-warning systems.

Furthermore, highlighting the significant role of NGOs, Romero-Lankao et al. (2013) examine Mexico City as a vanguard in climate action. Their study illustrates how the city has developed and implemented a local climate strategy by engaging the Ministry of Environment and leveraging the Internet to facilitate the exchange of information among various agencies and the public. Moreover, research by Hughes and Romero-Lankao (2014) unveils a deliberate

effort by the city to foster formal relationships with scientific communities, culminating in the establishment of the Mexico City Virtual Center for Climate Change (MCVCCC). This organisation serves as a crucial portal through which science and policy collaborators aim to transform current knowledge surrounding climate change to enhance the living conditions of the citizens of Mexico.

The literature consistently points to transnational and inter-municipal networks' essential role in climate action. Shearing's (2014) analysis emphasises the significance of networks such as ICLEI and the South African Local Government Association, showcasing how they act as information-sharing channels and foster successful climate action initiatives within local governments. These networks facilitate learning among diverse stakeholder groups and provide financial resources necessary for building adaptive capacities. For instance, participation in international climate networks such as ICLEI (Local Governments for Sustainability) or the Covenant of Mayors offers cities valuable opportunities to exchange best practices and innovative solutions in addressing climate challenges. A pertinent example is Delhi's partnership with ICLEI to establish its greenhouse gas emissions baseline in alignment with established international emissions inventory protocols.

Particularly noteworthy is the emphasis on actors beyond local and national governments, as highlighted by Hoppe et al. (2011). Their research reveals that local authorities and private sector partnerships can significantly enhance climate ambitions. However, they caution that such high aspirations might also lead to a focus on easily attainable objectives that may not adequately address more complex environmental challenges. In the context of Chicago, Cousins (2017) outlines the intricate interplay among various stakeholders, including engineers, policymakers, non-governmental organisations (NGOs), and urban planners. Together, they strive to devise innovative institutional frameworks and technical solutions to tackle the pressing issues arising from stormwater management and the overarching impacts of climate change. This collaborative effort is critical in crafting comprehensive responses to environmental threats.

This cooperative approach is particularly evident in urban adaptations within the water sector. For instance, in the insightful study of Patterson et al. (2019), the authors illuminate the vital participation of governmental and non-governmental organisations. Their findings underline how these entities formulate and implement climate strategies that effectively address local environmental challenges. Patterson and Huitema (2019) argue that involving a broad spectrum of stakeholders is becoming normative in adaptation decision-making. This inclusive approach led to establishing a local NGO called Adapt-Chile, which fosters adaptation planning while serving as a platform for coordinating local priorities and needs.

In a detailed report by Lassa (2019), the city of Semarang is showcased as a success story in building resilience against climate impacts. The study highlighted the critical role played by local champions dedicated to driving climate initiatives and engaging with the community to promote sustainable practices, showcasing the profound impact of localised efforts in the broader context of climate action. This collaboration facilitated the transfer of technical knowledge, resources, and financial opportunities, laying a foundation for enduring progress in climate resilience. Central to these efforts is the Asian Cities Climate Change Resilience Network (ACCCRN), which functions as a dynamic network to promote knowledge exchange among various Asian cities.

Through this network, urban centres can share valuable experiences, best practices, and critical lessons learned that enhance their overall resilience to climate change challenges. The ACCCRN acts as a pivotal platform for fostering the exchange of innovative methodologies and practical strategies, enabling cities to learn from one another in their quest for sustainability and resilience (Lassa, 2019)

In South Africa, Pasquini and Shearing (2015) provided insight into the critical role of networks in institutionalising environmental governance and climate change initiatives within municipalities. They found that the weak external relationships formed between municipalities and other organisations and strong internal bonds among municipal actors were vital for advancing the green agenda in their study. A key takeaway from their research is the significant impact of relationships formed by the Deputy Mayor with external organisations. These

connections provided a valuable influx of ideas, knowledge, support, and opportunities, instrumental in igniting the municipality's environmental innovation process. The strong ties created within the organisation also facilitated the flow of comprehensive, nuanced, and often redundant information and knowledge resources among individuals and groups, thereby enhancing decision-making and innovation.

In Australia, Bettini et al. (2015) addressed a critical academic gap by developing an analytical framework that examines the institutional context surrounding necessary transitions in environmental management. Their findings reveal significant differences in governance frameworks between Perth and Adelaide. In Perth, a prescriptive governance environment led to a horizontal segregation of water management responsibilities. Here, regulation emerged as the primary mechanism for performance management, resulting in distinct management and service objectives. Conversely, Adelaide faced challenges that included disjointed public discourse, conflicting water governance debates, and varying levels of professional capacity among stakeholders.

Perth's urban water sector is characterized by a high degree of corporatization and an extensive regulatory framework, which provide robust, maintaining influences while discouraging innovation. Consolidating resources and asset ownership within a single utility restricts opportunities for innovative practices by other entities in the sector. However, Perth has also established a Department of Water, which is crucial in delivering strategic support, creating governance structures, and facilitating collaboration among stakeholders in the water management landscape (Bettini et al., 2013).

Research examining municipal responses to environmental disaster risk management (EDRM) reveals additional complexities. Valdivieso et al. (2013) observed that municipalities engage and coordinate efforts with external actors regarding programs, plans, actions, transferred resources, and investments. While some municipalities actively invest in EDRM, others merely adhere to traditional operational routines. Existing literature suggests that the availability of financial and human resources is critical to influencing these decisions (e.g., Carmin et al., 2012). Moreover, social participation is identified as a driving force for municipal action (e.g.,

Adger, 2003). However, the Chilean experience underscores a caveat; despite high expectations surrounding the effects of social participation—such as legal reforms, participatory democracy, and community-based disaster reduction plans—the quality of this participation is not guaranteed. Moreover, social participation does not automatically yield improved outcomes in environmental disaster risk management efforts.

Well-established institutions are pivotal in successfully harnessing sustainability for socio-economic development and environmental governance. They clarify the institutional framework's role in enabling local adaptation by identifying effective strategies, areas requiring improvement, and enhancement methods. Carlos (2020) employed mixed research methodologies to collect, document, and analyse data on institution's and organisations' strengths, weaknesses, opportunities, and threats. This analysis emphasised challenges associated with local-level policy implementation, scrutinising the effectiveness of Disaster Risk Management (DRM) and applying adaptation policies among sub-national governments in Brazil's Semi-Arid Lands (SALs).

The quest for sustainable urban development amid the pressing challenges posed by climate change has prompted extensive research into the role of stakeholders in climate action. In a significant contribution to this discourse, Wei (2020) delved into the dynamics of low-carbon cities in China, employing insights derived from institutional theory to assess the efficacy of urban actors' engagement in driving radical changes for carbon reduction. This perspective suggests a limited recognition among stakeholders of the broader benefits of sustainability, framing the discourse primarily as a pragmatic response to governmental directives. Notably, the Chinese government has pledged to enhance the utilisation of clean fuels within public works and activities, signifying a critical commitment to advancing carbon reduction policies (p.803).

Expanding on the challenges of implementing climate action, the literature highlights numerous barriers encountered, particularly in African cities. Scholars such as Measham et al. (2011) and Baker et al. (2012) identify issues like inadequate funding, lack of technical expertise, and institutional inertia as significant hindrances. Within this context, Pasquini and

Shearing (2014) present a case study from a smaller municipality in South Africa, illuminating the factors crucial for fostering an enduring environmental agenda at the local government level. They emphasise the importance of political champions, key individuals who advocate for and drive environmental initiatives—and the establishment of robust networks between local municipalities and external organisations.

Such networks facilitate the dissemination of knowledge and resources and build coalitions that are essential for sustaining environmental efforts. Furthermore, Pasquini and Shearing (2014) argue that institutionalising these efforts is vital to ensure that environmental agendas remain resilient despite leadership changes and network fluctuations.

In summary, the successful engagement of stakeholders in climate action hinges on recognising the multifaceted nature of climate governance. By understanding the various dynamics at play—ranging from the significance of institutionalisation to the role of local champions—cities can more effectively navigate the complex landscape of climate action, fostering resilient urban environments capable of withstanding current and future climatic challenges.

2.6. SUMMARY

The literature review underscored an urgent requirement for effective urban climate governance, particularly in small and medium-sized cities, which often face unique challenges compared to larger metropolitan areas. Various scholars have explored climate change actions across Europe and North America, illustrating a diverse landscape of research and practices.

In Europe, studies by Reckien et al. (2015, 2018) and Heidrich et al. (2013) delve into the implementation of climate change initiatives, assessing both their effectiveness and the varying approaches taken by different municipalities. The contributions from these works highlight the importance of establishing robust frameworks that can facilitate urban resilience and adaptability in the face of climate change. On the other hand, Guyadeen (2019) offers insights into North America, discussing the regional disparities in climate action initiatives and the varying levels of commitment and resources allocated to address these pressing concerns.

Another focal point of the review is the examination of adaptation plans as analyzed by Baker et al. (2012), Araos et al. (2016), and Aguiar et al. (2018). These scholars explore the different strategies employed by cities to prepare for and respond to climate-related disruptions. The narratives indicate that effective adaptation often hinges on the integration of scientific knowledge, community engagement, and the alignment of local policies with broader climate goals.

Additionally, the review incorporates mitigation strategies, particularly the research conducted by Heemann and Grafakos (2018), which discusses various methods cities can employ to reduce greenhouse gas emissions. These strategies, while critical, are not without their challenges, as evidenced by the barriers to effective implementation of local climate policies identified by Fila et al. (2023). This work underscores the complexity of executing climate policies on the ground, revealing issues such as lack of funding, insufficient data, and the need for cross-sector collaboration.

Through this systematic review, the discourse on climate action and resilience in urban environments is enriched by examining the specific challenges encountered by small and medium-sized cities. A key takeaway is the essential role of institutionalisation in driving climate governance, which requires not only political will but also technical expertise and community involvement.

The evidence gathered illustrates that cities from diverse geographical backgrounds employ a range of tools and mechanisms to tackle climate challenges. Europe stands out with the most comprehensive research coverage, highlighting a preference for formalised tools over informal processes. This preference underscores the significance of structure and governance in facilitating effective climate adaptation.

As a part of the systematic review, a conceptual framework emerged that outlines the interconnectedness of policy tools, organisational capacity, and collaborative efforts. This framework serves as a guide, showcasing how these elements work in harmony to enable urban

adaptation, with a particular emphasis on the water sector, which is often highly vulnerable to climate impacts.

This systematic review will serve as the foundation for the dissertation's conceptual framework, which will be further tailored and tested within the case study locations selected for this research. The following chapters of the dissertation will build upon these insights to propose focused and actionable strategies aimed at enhancing climate governance in these critical locales, thereby contributing to a more sustainable urban future.

3. EMPIRICAL RESEARCH METHODS

3.1. CHAPTER OVERVIEW

This dissertation utilises a qualitative research approach to investigate the current landscape and potential roles of small and medium-sized cities (SMCs) in the context of urban climate change governance in Ghana.

Section 3.2 outlines the research methodology, providing a foundational overview before delving into the specific case study locations in subsequent sections. Section 3.4 details the threefold method that underpins this research. This methodology begins with desk research to compile a comprehensive inventory of climate policy documents.

This analysis focuses on collecting data and enhancing the understanding of how Ghana's climate change policies have evolved over different governmental levels over the past few decades. The examination extends to an in-depth analysis of available policies and strategic plans and their implications for subnational governments. Such thorough groundwork is crucial for selecting relevant case study locations for more focused exploration.

Before initiating fieldwork, ethical clearance and approvals were obtained from the Ludovika University of Public Service in Budapest, emphasising the importance of ethical research practices. The fieldwork spanned from May 2021 to December 2022 and unfolded in phases.

The initial phase centred around conducting key informant interviews with diverse participants, including local, district, and regional government officials and representatives from non-governmental organisations. This engagement investigated the framework for integrating climate change considerations into urban governance, uncovering the various bottom-up initiatives instituted and identifying the challenges encountered.

Following these interviews, the preliminary findings from the research were subjected to validation through stakeholder workshops. During these workshops, Focus Group Discussions (FGDs) were conducted to evaluate and confirm the conceptual framework initially proposed in Chapter 2 of this dissertation. The chapter concludes by addressing ethical considerations

and limitations related to the study, underscoring the commitment to integrity in research and transparency about the challenges encountered.

3.2. CASE STUDY RESEARCH APPROACH

The research question concerning the effects of institutionalisation on small and medium-sized cities and municipalities required a case study approach.[4] This approach was appropriate since it investigated a contemporary phenomenon in depth and within a real-world context. The aim was not to prepare a comparative study of the three locations but to offer a detailed insight into the various factors that appear in the three locations.

Using the city as the central unit of analysis ensured close collaboration with the participants, allowing them to share their views and insights. This enabled the execution of an in-depth study and maximised the information gathered (Baxter & Jack, 2008). The insights derived from the perspective of those working in climate governance also aligned with the research objectives. Moreover, the practical aspects of the appropriateness of a case study are based on the duration of the PhD program, making it impossible to examine all cities and local authorities.

Since the research is purely qualitative, purposefully selecting three cases provided sufficient information for scientific analysis (Creswell, 2011). The study employed a comprehensive approach to data collection using three distinct qualitative methods. Specifically, the documentary review employed a meticulous and rigorous approach, including a narrative analysis of interview transcripts and a thorough review of relevant policy documents. This approach, particularly in the context of climate change, allowed the researcher to delve into

[4] Case study research refers to an in-depth examination of a specific phenomenon within a real-world context, often using multiple data collection methods like interviews, observations, and document analysis to gain a detailed understanding of a particular issue. It is commonly used in social sciences, business, and medicine to explore complex situations and generate rich qualitative data (Creswell, 2014).

The semi-structured interviews and focus group discussions solicited information from experts and senior-level officials, ensuring a well-rounded and thorough understanding of the topic. Direct involvement with policymakers, decision-making, and contact with the study subjects (Bracken, 2007) ensured the validity and reliability of the findings.

3.2.1. SELECTION OF STUDY AREAS

The selection of three study areas contributed to a rich understanding of how climate change impacts city governments in small and medium-sized cities. Further description of each case study shows how these locations vary in population sizes, which presents an intriguing case for researching smaller cities.

Summarised in Table 1, the justification for selecting Koforidua, Wa and Cape Coast are: 1) they represent different ecological zones; 2) they have different climate conditions with varied impacts; 3) they should have similar local government structure and institutional frameworks, including formal and informal arrangements; 4) should have some examples of climate change adaptation and mitigation strategies at the local level.

An assessment of climate change vulnerability across the country shows increasing vulnerability as one moves from the coast (Tropical et al. zones) into the transition zone (Semi-deciduous et al. zones) and the northern savanna zones (Guinea Savannah and the Sudan Savannah). Figure 5 shows a map of the study areas.

Table 1

Characteristics of study areas

Element	Wa	Koforidua	Cape Coast
Population size	200,672	232,776	189,125
Region	Upper West	Eastern	Central
Local government structure	Municipality	Municipality	Metropolitan
Ecological zones/climate classification	Guinea savanna	Forest Savanna transition	Coastal savanna
Exposure to climate risks	Periods of drought, heat waves and floods	Increase in rainfall patterns, flooding and damage to the built environment.	Increase in storm surges, changes, coastal erosion and sea level rise

(Source: Author)

3.2.1.1. Koforidua

Koforidua, a landlocked city in the Eastern region of Ghana, has been one of the fastest-growing cities with unique challenges related to urbanisation. It doubles as the administrative capital of the Eastern Region of Ghana and the New Juaben South Municipality. The Municipality shares familiar boundaries with the following Assemblies: north with the New Juaben North Municipal Assembly, southeast with Akwapim North Municipal, and east with the Krobo Municipal Assembly.

Koforidua covers a land area of 43 square kilometres, representing approximately 0.6% of the total surface area of the Eastern Region. According to the 2021 Population and Housing Census, the Municipality's population is 232,776. It lies within the semi-deciduous Forest Zone, with a bimodal rainy season of between 1200mm and 1700mm, reaching its maximum during the peak periods of May-June and September-October.

In terms of climate, the dry season is relatively short and occurs between November and February. Humidity and temperature are generally high, ranging between 20°C and 32°C. The dry season is relatively short and occurs between November and February. Humidity and temperatures are usually high, ranging between 20°C and 32°C. The land is gently undulating, with heights ranging between 152 meters and 198 meters above mean sea level. The highest area is the mountain belt along the eastern boundary, which is drained mainly by the Densu and its tributaries.

Considering the vegetation, the city falls within one of the country's three agroclimatic zones, the semi-deciduous rain forest. The flora and fauna are diverse and have different spears of economic and ornamental tree species with varying heights. The key sectors of the economy are the service sector, industrial manufacturing, processing agriculture, and other socio-economic activities. While most industrial establishments are found in the central business area of the municipality, agricultural production is carried out in the small settlements and the peri-urban localities.

3.2.1.2. Wa

Wa doubles as the regional capital of the Upper West Region. The region's land area is about 234.74 square kilometres, accounting for around 6.4% of the total area. The Municipal Assembly is empowered as the highest political and administrative body charged with facilitating the implementation of national policies. According to Ghana’s Population and Housing Census (2021), the Municipality has a population of about 200,672.

Regarding the physical features, Wa lies in the Savannah high plains, which, generally, is gently undulating with an average height between 160m and 300m above sea level. The low-lying areas have further given rise to two central drainage systems, the Sing-Bakpong and its tributaries to the South and Billi and its tributaries to the North. The streams are seasonal and dry up during the long dry season, reducing water availability for agriculture, domestic, industrial, and construction uses. The vegetation is one of the Guinea Savannah grassland types, made up of short trees with little or no canopy and shrubs of varying heights and luxuriance, with grass ground cover in the wet season. The common trees include shea,

dawadawa, kapok, and baobab. Cashews and mango are exotic species that are growing well in the area.

An assessment of climate vulnerability shows that the Upper West region of the Guinea Savannah zone is the most vulnerable agroecological zone (Adaptation Communication, p. 18)**.** The Southwestern Monsoon winds from the Atlantic Ocean bring rains between April and October, while the northeastern trade winds from the Sahara Desert bring the long dry season between November and March.

The mean annual rainfall varies between 840mm and 1400mm. Most of the rainfall occurs between June and September, and it is not unusual to have very high rainfall figures concentrated on a few rainy days. While the natural environment consists of existing farmlands, flora, fauna, and grazing land, the built environment comprises towns and villages with residential, educational, and other socio-economic facilities.

3.2.1.3. Cape Coast

Cape Coast has been at the forefront of climate impacts such as floods and rising sea levels. With its administrative capital as Cape Coast, the Cape Coast Metropolitan Area is one of the oldest in Ghana. According to Ghana's Population and Housing Census (2021), the Metropolis has a population of about 189,925. The landscape of the Cape Coast Metropolis is generally undulating. Many minor streams end up in wetlands, with the largest draining into the Fosu Lagoon at Bakaano. The landscape in the Metropolis's northern parts is generally low-lying and is suitable for crop cultivation.

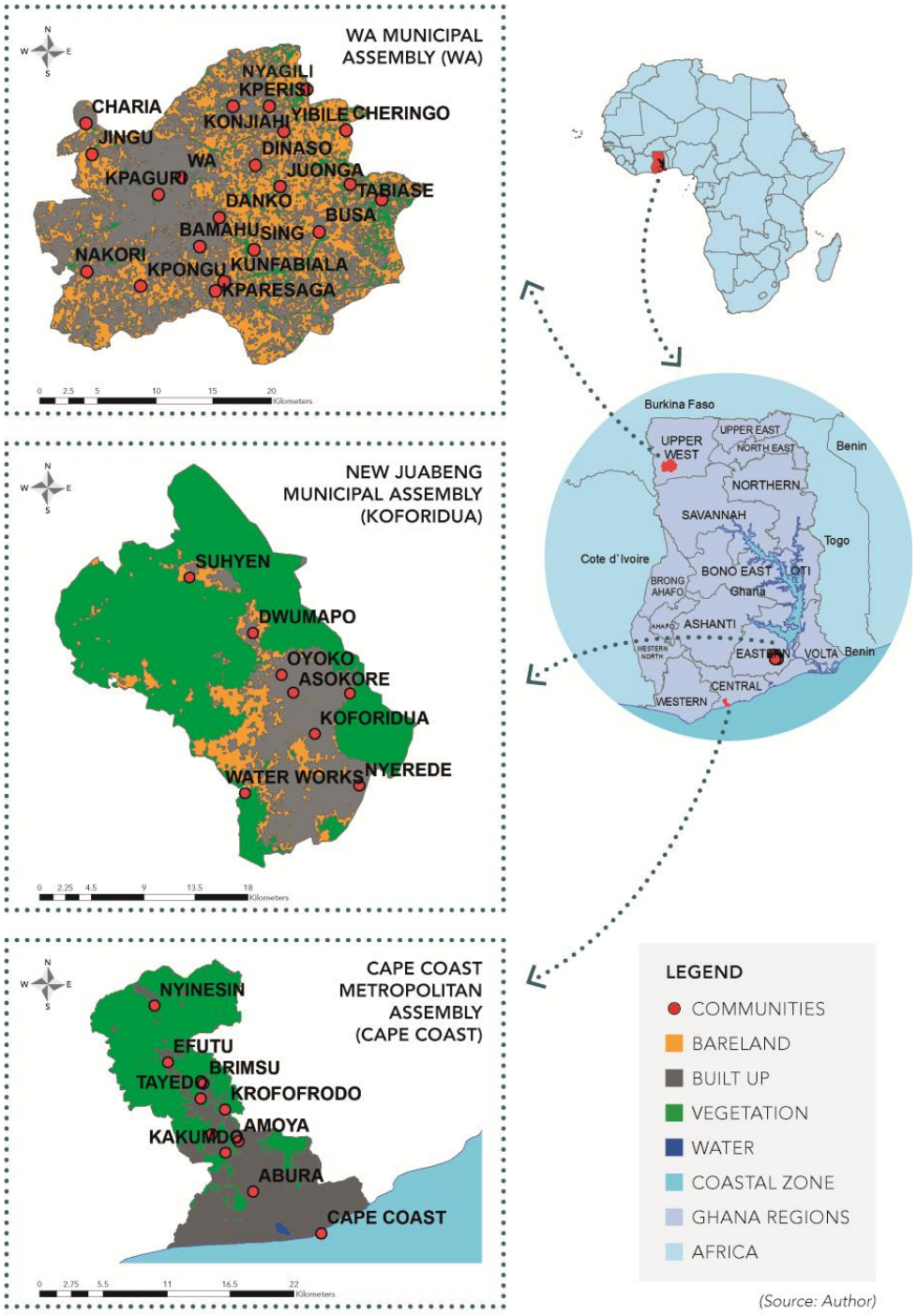
Cape Coast experiences high temperatures throughout the year. The hottest months are February and March, just before the primary rainy season, while the most incredible months are June, July, and August. The variability in climate in the Metropolis is influenced more by rainfall than temperature. The Metropolis has double-maximal rainfall, with annual rainfall between 750 and 1,000mm. The present vegetation of the Metropolis consists of shrubs about 1.5 meters high, grasses, and a few scattered trees.

The original dense scrub vegetation, which the rainfall supported, has been replaced by secondary vegetation because of clearing for farming, charcoal burning, bushfires, and other human activities. Presently, trees are less dense in the area compared with the interior forest areas. The northern parts of the Metropolis are an exception to what has been described above.

Secondary forests can be found in these areas, and they have survived mainly due to lower population densities and relatively slight ecosystem disturbance. Combined with the challenges of natural disasters, vulnerability to coastal erosion, and similar challenges, the Cape Coast Metropolis initiated a sea defence wall project.

Figure 5

Location map of study areas



(Source: Author)

3.3. DATA COLLECTION AND ANALYSIS

The findings of this research are significant for advancing urban climate governance in Ghana's sub-national administrations. This is because the documentary review comprehensively understood Ghana's broader context of climate change governance. It unearthed the evolution of Ghana's governance structures for climate change over the last few decades, focusing on national-level climate action developments and their implications for sub-national administrations.

The second phase, semi-structured interviews, analysed the potential constraints in urban climate governance in SMCs or intermediate cities. The final phase, focus group discussions, identified the tools and actions for advancing the institutionalisation of urban climate governance in Ghana's SMCs.

3.3.1. DOCUMENTARY REVIEW

A documentary review was conducted to understand Ghana's approach to climate change at various government levels. It provides context for the semi-structured interviews and focus group discussions. The review analyses how climate change governance has evolved over the last decades, what policies and plans address climate change, and their implications for subnational governments.

3.3.1.1. Objective and Sources of Data

The primary aim of the documentary review is to systematically compile and critically analyse existing climate policy documents and strategic frameworks that pertain to climate change governance in Ghana. This analysis is pivotal for understanding the developmental trajectory of climate governance across different governmental strata and its consequential implications for subnational entities.

These documents were collected from the official websites of the various organisations. For each identified policy, a database was created to reflect information on the policy's name, date,

implementing agency, how it addresses climate change, and its implications for subnational governments. The relevant documents identified and reviewed are presented in Appendix 2.

The documentary review constitutes a fundamental aspect of the qualitative research methodology employed in this dissertation. It contextualises the evolving landscape of urban climate governance within Ghana's small and medium-sized cities (SMCs). The following outlines the structured approach taken in conducting this review.

A diverse array of documentary sources was utilised, including 1) Documents associated with international climate change agreements; 2) National climate change policies and strategic frameworks outlining the government's comprehensive approach to climate adaptation and mitigation; 3) Local governmental action plans explicitly addressing climate change, which provide insights into localised governance responses; 4) Reports and position papers from non-governmental organisations (NGOs) that operate within the climate governance arena, offering additional perspectives on urban climate initiatives and challenges and 5) Academic literature encompassing peer-reviewed articles and empirical studies that contribute to understanding urban climate governance frameworks in Ghana and similar contexts.

The documents were selected using rigorous criteria emphasising relevance, authenticity, and scholarly credibility. Emphasis was placed on documents that specifically articulated the roles and responsibilities of SMCs in climate action or enunciated adaptation strategies relevant to urban contexts.

3.3.1.2. Analysis

The documentary review employed a thematic analysis approach, which involved: 1) Identifying dominant themes and patterns within the collected documents, including conceptualising climate governance and describing actors' roles; 2) Evaluating the extent of climate integration within urban governance frameworks, alongside assessing the policy instruments utilised to facilitate local climate responses and 3) Analysing the institutional architecture governing climate policies at various levels and its influence on local governance practices.

The insights from the documentary review were instrumental in informing the selection of pertinent case study locations for subsequent fieldwork. This ensured a purposeful alignment between the documentary findings and the empirical investigation, allowing for a comprehensive exploration of specific urban contexts reflective of broader national trends.

The review provided a contextual backdrop for the subsequent phases of field research. It contributed to developing a conceptual framework elucidating the interplay between policy instruments, governance capacity, and effective climate action. This framework is critical for grounding the analysis and interpretation of data from interviews and focus group discussions on the selected case studies.

By rigorously analysing existing literature and policy documents, the documentary review enhances the overall academic rigour of the dissertation, reinforcing the theoretical underpinnings and empirical inquiries that guide the research agenda on urban climate governance in Ghana.

3.3.2. SEMI-STRUCTURED INTERVIEWS

The primary objective of the semi-structured interviews was to collect detailed qualitative data regarding the lived experiences, perceptions, and adaptive strategies of Koforidua, Wa, and Cape Coast residents about the specific climate risks and urbanisation challenges they face.

By exploring these themes, the interviews aimed to uncover nuanced understandings of how climate change impacts daily life, economic activities, and community structures within these regions, thus informing broader discussions on community resilience and adaptation strategies.

3.3.2.1. Interview Design

A semi-structured interview format was selected due to its inherent flexibility. This format allows researchers to pose open-ended questions while enabling participants to express their thoughts freely. This approach fosters a conversational atmosphere, encouraging respondents to elaborate on their experiences and insights (ref).

A comprehensive question guide was developed, focusing on pivotal thematic areas, which included: 1) Recognition of significant climate risks experienced in the communities (e.g., flooding, drought, coastal erosion). - Perceived changes in local environmental conditions over time, including shifts in weather patterns and their impacts on agriculture and livelihoods; 2) Discussion of community-specific adaptation strategies to cope with climate change (e.g., infrastructural changes, agricultural adjustments) and 3) Assessment of the effectiveness of local government policies and programs related to climate adaptation and disaster risk reduction.

Participant Selection or Sampling Method: A purposive sampling strategy was employed to ensure that the selected participants possessed relevant knowledge, experiences, or expertise on climate-related issues, thereby providing valuable insights into the research objectives. Participants comprised a diverse group from relevant governmental and non-governmental organisations.

The interviewed actors were divided into three categories. The first category consists of government ministries, departments and agencies. The second consisted of non-governmental and private-sector companies focusing on climate change and environmental services. The third consisted of academic and research institutions. After sampling the desired number of research participants, they were contacted by either e-mail or telephone and informed about the nature of the research, the other case studies involved, and why they were selected for participation. Strategies were implemented to follow up and establish contacts with research participants.

This diversity ensured a panoramic understanding of the community dynamics and perspectives on climate resilience. (The complete list of interviewees is presented in Appendix 3).

3.3.2.2. Data Collection Process

Each semi-structured interview was conducted in settings that were comfortable and familiar to the participants, such as their offices. This approach aimed to create an environment conducive to open dialogue and candid sharing of experiences.

Each interview lasted 30 to 60 minutes, allowing participants sufficient time to articulate their thoughts thoroughly while covering a range of inquiry topics. With the explicit consent of all participants, interviews were audio-recorded to capture the richness of participants' responses accurately. Recording ensured that no details were overlooked, and subsequent transcriptions were performed diligently to maintain fidelity to the spoken words.

A thematic analysis approach was employed to organise, analyse, and interpret the qualitative data systematically gathered. This process involved identifying recurring themes and patterns within the participants' responses, highlighting commonalities and divergences in their experiences and perspectives.

The semi-structured interviews yielded rich, qualitative insights into the climate vulnerabilities faced by the communities in Koforidua, Wa, and Cape Coast. The findings aim to inform local policymakers and stakeholders of the pressing need for context-specific interventions and strategies by capturing residents' personal narratives and adaptive strategies. Additionally, this research seeks to contribute to the broader body of knowledge on community resilience in the face of climate change, ultimately guiding future research initiatives and adaptation efforts.

3.3.3. STAKEHOLDER WORKSHOPS

Stakeholder workshops and focus group discussions were essential components of this research, which aimed to foster dialogue among various actors involved in urban climate governance in Ghana. These engagements served as crucial avenues for gathering qualitative data, enabling participants to share their experiences, insights, and innovative ideas regarding the pressing challenges and promising opportunities for advancing climate governance at the sub-national level.

Specifically, the workshops aimed to 1) identify the relevant stakeholders involved in urban climate governance and ensure a comprehensive representation of perspectives from various sectors; 2) solicit varied viewpoints on the current governance frameworks and policies addressing climate change, highlighting successes and areas needing improvement; 3) encourage an open dialogue about the obstacles hindering effective climate management in

small and medium-sized cities (SMCs), allowing for a collective exploration of these challenges and 4) collaboratively brainstorm actionable tools and strategies that could enhance the institutionalisation of urban climate governance, fostering resilience and adaptability in urban settings.

3.3.3.1. Objective and Participant Selection

Participant Selection: The stakeholder validation workshops in the three study areas in April and May 2022 reviewed the initial findings and the study's conceptual framework. A total of 70 stakeholders were drawn across different sectors, ministries, and organisations were present, including the Ministry of Agriculture, EPA, Department of Gender, Forestry Commission and a cross-section of NGOs and civil society actors (Wa = 21, Koforidua = 24, and Cape Coast = 25). The appendices and supplementary materials contain detailed information about participants and discussion points.

The selection of participants was crucial to the research's success. A diverse group intentionally chose representatives from local government authorities, non-governmental and community-based organisations (NGOs), academic institutions, and private sector stakeholders. This variety ensured that the discussions reflected various experiences and expertise, enriching the dialogue. After the mapping exercise, invitation letters were sent to the heads of the selected organisations to nominate at least two officers based on their positions and experiences relating to climate change issues and broader environmental management.

Once the organisation confirmed availability to participate in the workshop, the agenda and guiding questions were shared with nominated participants as the scheduled date and venue. Feedback from the focus group discussions during the stakeholder workshops helped to broaden the understanding of climate change at governance levels, challenges at the sub-national level and ways of institutionalising climate action.

3.3.3.2. Structure of the Workshop

The structured format and focus group discussions were designed to maximise engagement and constructive dialogue. The workshops commenced with introductions and a presentation

outlining the research's objectives and significance, setting the tone for collaborative engagement.

Breakout Sessions: Participants were divided into smaller, focused groups of 4, each tasked with discussing specific topics related to urban climate governance. This format allowed in-depth conversations on critical issues, such as identifying policy gaps and innovative community engagement strategies. Following the breakout sessions, each group reconvened to share their findings with the larger assembly, fostering a collective synthesis of insights and experiences. The sessions concluded with a comprehensive summary of the key points discussed, and participants were encouraged to articulate potential steps forward.

To ensure a robust data collection, the following techniques were employed:

Audio Recordings: Discussions were meticulously recorded, enabling researchers to capture the detailed contributions of each participant accurately.

Field Notes: Throughout the sessions, researchers took extensive notes, documenting key insights, participant interactions, and emerging themes to complement the recorded discussions

The stakeholder workshops and focus group discussions provided a platform for collaborative dialogue and revealed insights critical to advancing urban climate governance in Ghana. The feedback gathered will inform policy recommendations and develop a strategic framework to enhance climate resilience in SMCs.

3.3.4. ANALYSING THE DATA

Conducting a qualitative analysis of interviews and focus group discussions involved several steps to ensure accuracy and depth in understanding the data. Below is a detailed breakdown of the process undertaken.

The initial phase of the analysis involved deeply engaging with all relevant data sources, including notes, interview transcripts, and audio recordings. This was not a one-time review;

instead, it was a thorough and iterative process. Each piece of data was revisited multiple times to develop familiarity and gain insights into the underlying patterns and themes.

3.3.4.1. Familiarisation with data

During this familiarisation stage, several critical activities were undertaken, including careful listening to the audio recordings and reading the transcripts, which allowed for a nuanced understanding of the participants' perspectives. Potential gaps and inconsistencies became apparent as the data was explored, prompting further inquiry and clarification where needed. Through careful analysis, key issues and topics emerged, forming the foundation for subsequent coding efforts.

A pivotal aspect of this stage was the transcription of recorded interviews, which a dedicated research assistant meticulously handled. Their expertise ensured the transcripts were accurate and reflective of the spoken content, setting the stage for the coding process.

3.3.4.2. Coding and Thematic Analysis

The next step involved coding the data to extract relevant concepts and themes. This collaborative effort involved multiple researchers to bring diverse perspectives into the analysis. The coding process involved several key actions:

Identification of Codes: Relevant concepts were meticulously identified within the data. Each theme or concept was assigned a code, which acted as a label for categorising the information.

Grouping Codes into Themes: Once the individual codes were identified, they were examined to discern relationships and grouped into broader thematic sets. This was influenced by insights from the document review, interviews, and focus group discussions.

Iterative Comparison: Each new data item was continuously compared to existing codes and thematic sets, which helped refine the coding structure and maintain consistency across the analysis.

Contextualisation: Contextualising the findings was crucial for interpretation. Understanding the data's social, cultural, and situational contexts allowed for deeper insights into participant responses.

After contextualising the data, the essential findings were synthesised into a coherent narrative, directly addressing the research questions posed at the beginning of the project. This narrative was supported by examples drawn from participant quotes, enriching the narrative and ensuring convergence in findings.

3.3.4.3. Triangulation

Triangulation was employed to enhance the robustness of the findings by comparing data from various sources: documents, interviews, and focus group discussions. This multi-faceted approach served several important functions:

Ensuring convergence and validity: Triangulation aimed to highlight coherence across different data sources, thus strengthening the validity of the findings.

Cross-checking against official documents: Interview responses were validated against official documents from local organisations, which boosted the reliability of the data collected.

Informal validation with other organisations: Some participant reactions were also informally validated with external organisations, providing an additional layer of assurance regarding the accuracy of findings.

Understanding Contextual Meanings: While triangulation is sometimes critiqued for striving for objectivity, the goal of this analysis was to acknowledge that subjects create meanings from within their specific contexts. Recognising these contexts was pivotal for a well-rounded understanding.

3.3.4.4. Comparison and Reporting of Data

Next, the data was continuously compared to the existing ones to help refine results and ensure their consistency in the analysis. They also provided a better understanding of the context and a more accurate interpretation of the findings. Preliminary findings were verified with research participants when necessary to enhance credibility.

A coherent narrative synthesising the key findings was provided to answer the research questions. Direct quotes and examples from research participants supported these findings. Based on insights from stakeholders, the feedback obtained from the focus group discussions was used to refine the conceptual framework.

The final phase of the analysis involved synthesising and reporting the findings coherently. The approach taken included:

Developing a Coherent Narrative: The key findings were interconnected into a narrative that systematically addressed the original research questions. This narrative was structured to present a clear and logical flow of information.

Utilising Direct Quotes and Examples: Direct quotes and selected examples from research participants were incorporated to enhance the narrative and provide empirical grounding. This not only added authenticity to the findings but also helped validate the researchers' interpretations.

Incorporating Feedback from Stakeholders: Insights gathered from stakeholders during the research process were factored into the analysis. Feedback from the focus group discussions proved instrumental in refining the conceptual framework, ensuring that the final report resonated and aligned with participant experiences and viewpoints.

Overall, the rigorous analytical process anchored in familiarisation, coding, triangulation, comparison, and reporting ensured the qualitative analysis was thorough, credible, and contextually rich.

3.4. ETHICAL CONSIDERATIONS

3.4.1. INFORMED CONSENT

During the planning phase, the researcher decided on the research population, the sample size, and the methodology to be applied. Before the fieldwork, approval was sought from the University of Public Service in Budapest, Hungary.

Before the start of the fieldwork, letters were distributed to relevant stakeholders to inform them about the research and to confirm their participation. The letter reassured the respondents that the collected data would be kept confidential and that their anonymity was fully assured (Appendix 7).

Participants were informed about the study's objectives, significance, and methodologies. They were also made aware of their right to opt out at any moment, emphasising the voluntary nature of their involvement.

3.4.2. CONFIDENTIALITY

The researcher was concerned about the participants' privacy, so their data would not be used except at the interpretation stage. Moreover, the collected data were stored securely. Anonymity and confidentiality issues were crucial in dealing with the data, especially the questions aimed at getting a deep and clear idea of the subject.

For confidentiality reasons, the names and positions of research participants from the study areas were not provided in a way that would facilitate their identification.

3.4.3. VALIDITY AND RELIABILITY

Steps were taken to ensure the validity and reliability of the research. To ensure validity, a detailed description of the case studies was provided to enable another researcher to relate to the findings. In this case, the three (3) Ghanaian case study locations were purposively selected

to represent the average population size of a fast-urbanizing small and medium-sized city or municipality across the country.

Secondly, the interview guide was first validated by a few researchers and later updated. Twenty research participants were used for the semi-structured interviews, and seventy (70) participants were used for the focus group discussions. This number was considered sufficient to get valid and reliable results for this research, which enhanced the credibility and validity of the research process.

Member checking was executed to enhance the credibility of the findings. This involved inviting select participants to review preliminary findings to validate that their views had been accurately represented and interpreted, fostering trust and transparency in the research process.

3.4.4. LIMITATIONS

While the semi-structured format allows for depth and flexibility in responses, it may also lead to variability in the detail and richness of information provided by different participants based on their engagement levels and comfort with the subject matter.

Acknowledgement of potential researcher bias in data interpretation was paramount. This was addressed through reflexive practices, where researchers continually reflected on their positionality and assumptions and the influence these may have on data analysis. Additional limitations are as follows.

1) Empirical research was limited to developed countries. Since the research focused on SMCs in the developing country context, future studies should focus on different geographical regions for a comparative assessment
2) Data accessibility in several organisations was limited due to a lack of databases and software for storing data. Moreover, some officials whose opinions were crucial to this study were absent due to other meaningful engagements. Future studies should utilise probability sampling methods, which carefully select and give equal representation to different members of the studied population.

3) In 2020, the COVID-19 restrictions prevented travel to the case study locations early enough to start the fieldwork

3.5. SUMMARY

This research employed a comprehensive methodological framework structured across three principal phases, each contributing to a deeper understanding of urban climate governance in Small and Medium Cities (SMCs) in Ghana.

The initial phase focused on a thorough documentary review, which involved examining existing literature, policy documents, and previous studies related to urban climate governance. This phase aims to gather foundational information on the current state of SMCs, identify existing frameworks for climate governance, and understand the historical context that has shaped urban climate policies in these cities. By analyzing documents from government agencies, NGOs, and academic journals, the review helps pinpoint common themes, gaps, and challenges in addressing climate issues at the urban level. This foundational knowledge lays the groundwork for the subsequent phases of the research.

The second phase employed semi-structured interviews with key stakeholders in urban climate governance, including local government officials, urban planners, environmental activists, and community leaders. These interviews are designed to delve into the specific constraints faced by SMCs in implementing effective climate governance strategies. By employing a semi-structured approach, the research allows for an in-depth exploration of individual experiences and perspectives while also maintaining a framework that ensures consistency across interviews. The insights gained from this phase are critical for understanding the unique challenges, such as limited resources, lack of awareness, and institutional barriers that hinder urban climate governance in these cities.

The final phase consisted of focus group discussions that bring together a diverse group of stakeholders to brainstorm and identify effective tools and actions that can facilitate the institutionalization of urban climate governance in Ghana's SMCs. This participatory approach encourages collaborative dialogue and leverages the collective knowledge of participants to

develop practical recommendations. During these discussions, participants examine potential strategies for overcoming the identified constraints and propose innovative solutions tailored to the unique contexts of SMCs. The outcomes of these discussions not only highlight pertinent actions for implementation but also aim to foster a sense of ownership and commitment among stakeholders toward developing robust urban climate governance frameworks.

Through this structured methodological approach, the research aims to provide actionable insights and recommendations to enhance the capacity of Small and Medium Cities in Ghana to effectively manage and govern their responses to climate change. The insights gleaned from this study are expected to contribute to more resilient urban environments and facilitate sustainable development in the region.

4. THE GHANAIAN CONTEXT

4.1. CHAPTER OVERVIEW

This chapter provides an in-depth examination of Ghana's initiatives in response to the impacts of climate change, conducted through a comprehensive desk review that aims to address the first research question regarding the country's strategies and adaptations.

Section 4.2 delves into the critical sectors most susceptible to the consequences of climate change, including agriculture, water resources, health, and infrastructure. The implications for public health are also explored, focusing on the rising incidence of climate-related diseases, such as malaria and waterborne illnesses, particularly in vulnerable communities. This discussion extends to infrastructure challenges, where the strain on transportation, healthcare, and sanitation systems is examined, demonstrating the interconnectedness of these sectors and their collective vulnerability to climate impacts.

In Section 4.3, findings regarding the evolution of climate change governance in Ghana are presented. Here, the chapter outlines the country's commitment to international climate agreements, including its strategic alignment with frameworks such as the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement. The section provides a detailed analysis of the National Climate Change Policy, highlighting its objectives, principles, and how it has been tailored to address both global climate goals and local realities.

The governance structures at the national level are discussed, with an exploration of how various ministries and governmental bodies collaborate to implement climate strategies. Additionally, the role of subnational governments is examined, detailing how local authorities engage in climate governance and develop strategies that respond to the unique environmental and socio-economic challenges faced in their regions. This includes insights into community-based adaptation projects and partnerships with non-governmental organizations aimed at building local resilience.

The chapter concludes by summarising the climate finance landscape in Ghana and identifying the diverse stakeholders involved in climate change governance. This includes governmental bodies at national and local levels, non-governmental organizations, international development partners, and private sector entities. The critical relationship between these stakeholders is emphasized, underscoring the need for coherent strategies that effectively bridge the governance levels to ensure successful climate action and resource allocation.

Through this comprehensive analysis, the chapter seeks to provide a clearer understanding of Ghana's positioning in the global climate landscape. It illustrates how the country leverages both international commitments and innovative local initiatives to address pressing climate challenges, ultimately fostering resilience and promoting sustainable development for its population.

4.2. COUNTRY PROFILE AND CLIMATE IMPACTS

Ghana is a West African country with borders with Cote d'Ivoire to the west, Burkina Faso to the north, Togo to the east, and the Gulf of Guinea to the south. It has a total area of 238,535 square kilometres (km), 16 administrative regions, and 260 Metropolitan, Municipal, and District Assemblies (MMDAs). With a population of about 30 million, it is estimated that more than 50 % of residents live in urban areas.[5]

Like several other countries in West Africa, Ghana has a tropical climate with annual rainfall ranging from 1100 mm in the north to about 2100 mm in the southwest.[6] The country's northern region has one rainy season from May to September, whereas the south has two: the first from April to July and the second from September to November. The dry season (December to

[5] Ghana Population and Housing Census (2021)

[6] UNDP (2019). Climate Change Adaptation Profile – Ghana. Available at https://www.adaptation-undp.org/explore/western-africa/ghana

March) is characterised by low humidity, hot days, cool nights, and arid and dusty harmattan winds from the Sahara Desert.

The yearly temperature is approximately 26°C, with greater temperatures in the north, especially during the dry season. Historical data indicates a progressive increase in temperature and a drop in mean annual rainfall in all six of the nation's agroecological zones. Rising sea levels, droughts, high temperatures, and unpredictable rainfall are some ways that climate change is manifesting itself, and they have a detrimental effect on infrastructure, food security, hydropower generation, and the livelihoods of those living along the coast and in agriculture.[7]

4.2.1. AGRICULTURE AND FISHERIES

Ghana's agriculture and fisheries sectors play crucial roles in the country's economy, providing food, employment, and livelihood support. However, due to its dependence on rainfall, the industry is vulnerable to climate variabilities. Extreme weather events exacerbate food insecurity and affect the rural economy at different points along the value chain.[8] For instance, rising temperatures are projected to lower yields in major staple crops (cassava, yams, plantains, maise and rice). The area between the forest in the southwest and the savanna in the north is vital for domestic food production due to more reliable rains and an extended growing season.

Smallholder farmers dominate Ghana's agriculture and significantly reduce poverty (Darfour & Rosentrater, 2016; Bawa, 2019). However, the sector needs to improve regarding human resource and managerial skills, natural resource management issues, and food insecurity. The northern part of Ghana, where agriculture is the main activity, faces challenges in food security and poverty reduction (Bawa, 2019).

[7] Climate Risk Profile: Ghana (2021). The World Bank Group.

[8] USAID (2017) Climate Change Risk Profile – Ghana.

The livestock subsector contributes significantly to the agricultural GDP. It is a crucial asset for poor people, fulfilling multiple economic, social and climate change adaptation functions by providing alternative livelihood. For rural communities, losing livestock assets could trigger a collapse into chronic poverty and significantly impact livelihoods.

The direct effects are due primarily to increased temperatures, frequency and intensity of heat waves, and changing rainfall patterns, which could translate into the increased spread of existing vector-borne diseases and microparasites, accompanied by the emergence and circulation of new diseases.

In the fisheries sector, overfishing and population pressure have led to a decline in fish stocks (Nunoo et al., 2014; 2018). These climate effects on fish have social and economic effects on those whose livelihoods rely on fishing and aquaculture. This negative impact of climate change is responsible for the deterioration of the fishing sector, limiting the country's ability to meet domestic demand and threatening many Ghanaians' economic and food security.[9]

4.2.2. NATURAL RESOURCES

The natural resource sector is one of the critical drivers of the country’s economic growth. Meanwhile, the sector faces environmental degradation due to land degradation, air and water pollution, deforestation, and illegal mining activities. Studies have also shown that climate change is decreasing forest ecosystems' capability to provide essential services to communities, affecting agriculture, forest resources, and water resources (Boon, 2013). The continued degradation of forest reserves results in significant biodiversity loss, including the extinction of many species and the associated loss of ecosystem services provision.

At the same time, about 70% of the total land surface is now prone to soil erosion, and hard-pressed farmers are resorting to slash-and-burn practices that have converted more than 50% of the original forest to agricultural land (Amoah & Korle, 2020). Fish, timber, and non-timber forest product stocks have decreased. Ghana is losing its wildlife and biodiversity, with many

[9] IWMI (2012) The Water Resource Implications of Changing Climate in the Volta River Basin

species facing extinction. Mining operations have also contributed to the high rates of deforestation, land degradation and destruction of farmlands, inadequate availability of clean water, poor air quality and noise pollution.

4.2.3. WATER RESOURCES

Freshwater covers nearly 5% of Ghana's total land area, primarily through the Volta, Southwestern, and Coastal River systems (Agodzo et al., 2023). Climate change is projected to significantly impact Ghana's water availability and crop production, particularly in the Volta Basin and the southwestern and coastal basin systems (Sylla et al., 2018). The impacts of climate change on water resources in Ghana are complex and multifaceted.

Additionally, clean water and sanitation are a challenge for some Ghanaian communities, where they need access to clean water. Declining rainfall, increased drought and rising temperatures, and increased pressures from a growing population, urbanisation, and industrialisation will likely compound this issue further. Water's reduced quantity and quality will significantly challenge human consumption and use in the agriculture, industry and hydropower sectors.

Rising sea levels are already increasing salinisation in coastal water sources and wells. Moreover, during the last two decades, extreme rainfall events have become more common, and the country has been exposed to extreme hazards, with flooding ranked as the second-highest natural disaster in the country.[10] Also, poorer communities in the northern part disproportionally suffer from droughts, floods and soil erosion that are adversely affecting agricultural production; newer challenges in flood management due to urbanisation and these events have caused economic losses and displacement across the country.

[10] Government of Ghana. (2021). Ghana’s Adaptation Communication to the United Nations Framework Convention on Climate Change. Environmental Protection Agency, Accra, Ghana.

4.2.4. URBAN PLANNING

Climate change poses significant challenges to urban planning in Ghana, with studies highlighting the need for current planning approaches to address these impacts effectively. Research indicates that urban planning regimes in Ghana are less efficient, more reactionary, and unsustainable in building resilience and adaptive capacities to climate change impacts (Asibey et al., 2022). The situation is exacerbated by unclear policies and a need for more focus on climate change issues in urban planning (Cobbinah et al., 2019).

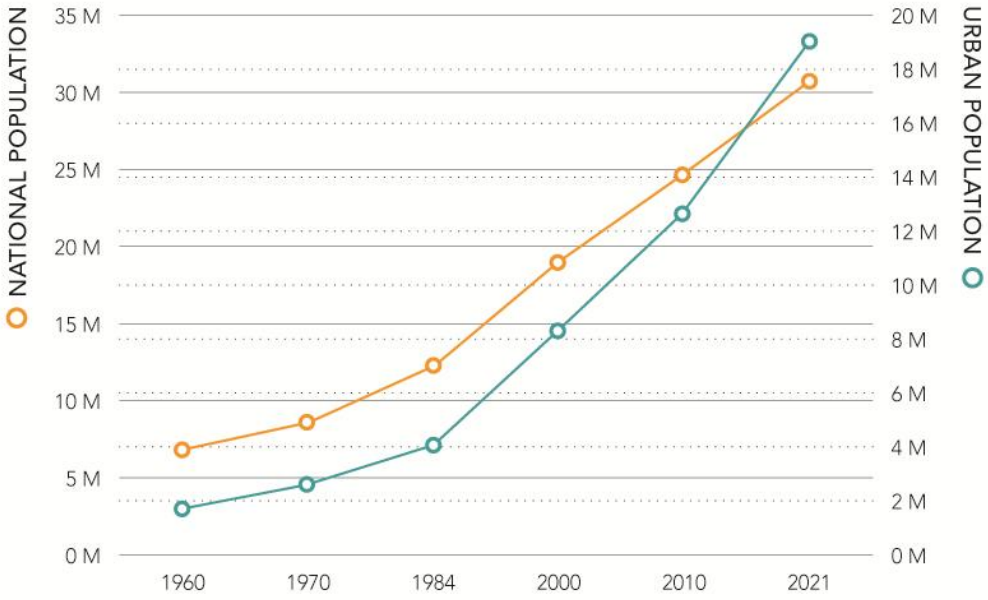
As shown in Figure 6, Ghana faces an expected rise in urban population. According to the 2021 Population and Housing Census, this is particularly true in densely populated urban areas where temporary settlements lack access to clean water and sanitation. Moreover, most of the population lives along the coast in rapidly expanding metropolitan areas and is especially vulnerable to flooding and waterborne disease.

Furthermore, migration and urban vulnerability constitute critical dimensions of climate change in Ghana. The increasing migration rate is attributable to climate change and socio-economic vulnerabilities. The northern regions and parts of the Volta region have substantial numbers of their population moving to the wetter south and urban areas.

Increasing weather extremes will exacerbate these movements, creating open spaces and concentrated populations, especially in urban areas where vulnerability to flooding, diseases, heat waves, and poor water supply is aided by poor urban planning and infrastructure provision. The primary characteristic of these groups that makes them prone to climate change impacts is their dependence on nature and their use of inadequate technology.

Figure 6

National vs urban population



(Source: Ghana's Population and Housing Census, 2021)

4.2.5. ENERGY

The energy landscape is a crucial aspect of economic development in Ghana, with hydropower dominating the sector (Agyekum 2020). A more significant proportion of total energy demand is from residential use, with a substantial portion of the population relying on biomass for cooking. This results in large-scale and widespread deforestation. For example, rural areas in Ghana primarily rely on fuel wood and charcoal, with limited access to modern energy forms.

The dependence on traditional biomass energy sources is affected by and contributes to climate change, as indicated by changes in rainfall, surface temperature, and evaporation patterns (Adom-Opare & Inkoom, 2017). Also, the increasing demand for fuel wood and charcoal and slow forest cover regeneration threaten energy access and exacerbate climate change in rural communities.

Interestingly, the power supply has been relatively unstable in recent years, and the country has experienced power outages due to either low dam water levels or equipment malfunctioning caused by high water levels (Tutu Benefoh & Kofi Ackom, 2016).

The country's energy mix is shifting from a hydro-dominant electricity generation to a hydro-solar-thermal mix, with crude-fired thermal plants accounting for about 65% of generation in 2020 (Amanfo, 2022). This transition, however, raises concerns about greenhouse gas emissions and climate change impacts.

4.2.6. CROSS-CUTTING SECTORS

Lastly, climate change impacts populations in many cross-cutting sectors, including public health and gender. For example, frequent extreme weather events are expected to increase the prevalence and geographic extent of vector and waterborne diseases already widespread in Ghana. Increased disease prevalence will be particularly significant in densely populated urban areas where temporary settlements lack access to clean water and sanitation. Flooding commonly leads to cholera outbreaks across the country.

Malaria remains a significant challenge and is likely to increase as temperatures rise and flooding becomes more common, particularly in coastal and urban zones (Walker 2019). This will be particularly true in densely populated urban areas where temporary settlements lack access to clean water and sanitation.

The severity of climate change impacts is felt mainly by poorer groups, who depend on natural resource-based activities and live in marginal environments. The socio-economic groups affected most by climate change include small-scale food crop farmers, women small-scale farmers, Livestock operators, fishermen and fishmongers, slum dwellers, and migrant farm workers. These groups are vulnerable mainly due to institutional bottlenecks, legal frameworks, poor capacities, and market imperfections.

These non-climate drivers of vulnerability define the access patterns of different people in different places to productive resources, which builds resilience and adaptive capacity. Poor

adaptive capacity results from poverty due to poor assets, institutions, markets, physical infrastructure, and eroding social support systems.

4.3. ADDRESSING CLIMATE CHANGE

Recognising the impacts of climate change, Ghana has taken various measures at different levels of government, with several commitments at the international level and climate change-related policies at the national and sub-national levels. Figure 6 shows the critical milestones of Ghana's efforts in addressing climate change at each government level.

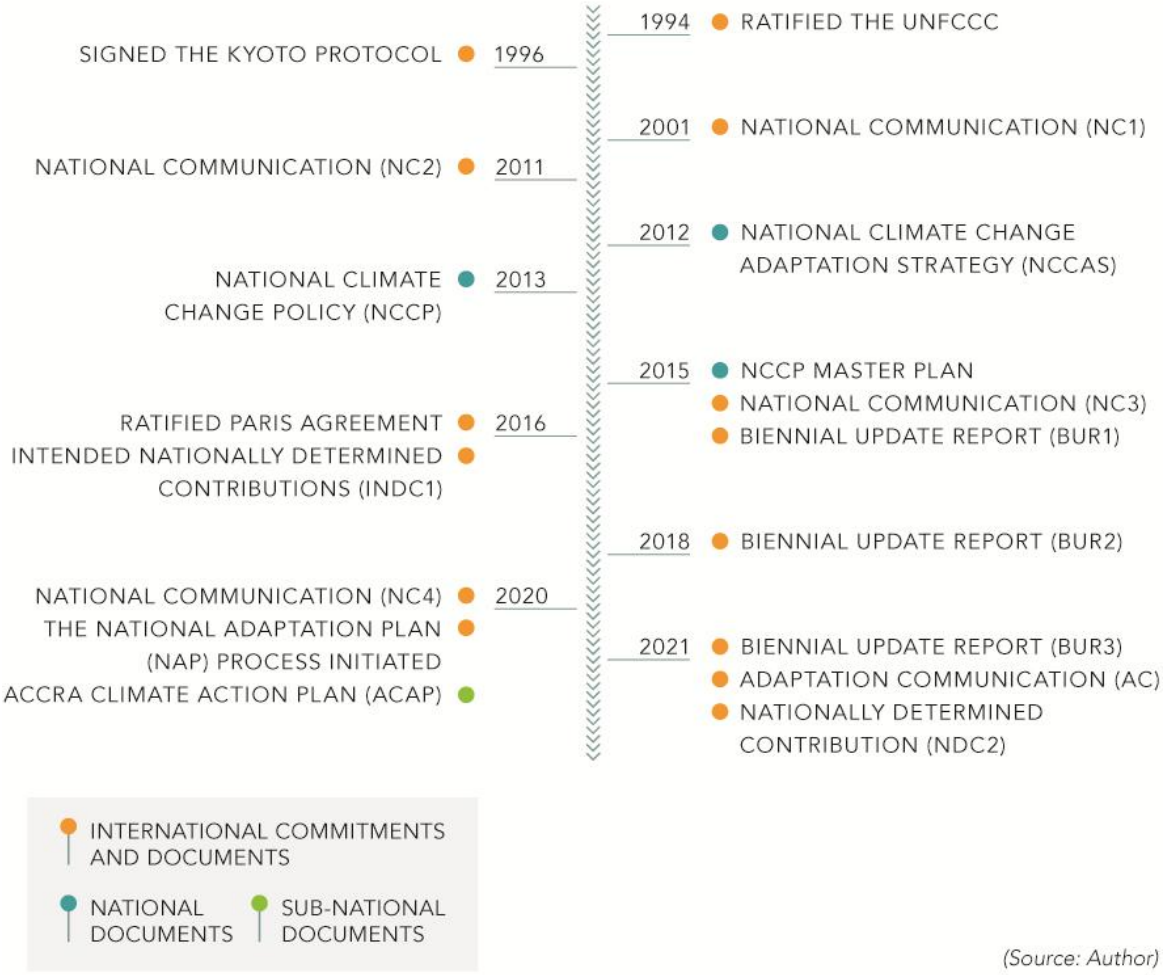
This Chapter identifies three levels of government: international, national, and subnational. These can be referred to in different ways (e.g., subnational can also be referred to as regional or local government in other contexts, and local governments are interchangeably used with the terms municipalities or municipal or city governments).

National and local governments are vital in sustaining coordinated climate action in urban areas. For example, Anguelovski et al. (2014, p.156) find that, for climate adaptation, "sustained political leadership from the top, departmental engagement and continued involvement from a variety of stakeholders are integral to effective decision-making and institutionalisation of programmes in the long run."

National governments are key actors in urban development because they set strategic priorities and policy guidance for urban climate governance. They can push local governments to act on specific policy areas (Fuhr et al., 2018).

Figure 7

Key milestones



(Source: Author)

4.3.1. INTERNATIONAL COMMITMENTS AND DOCUMENTS

Ghana has signed several climate-related multilateral agreements in the last three decades. These include the three Rio Conventions. The United Nations Framework Convention on Climate Change (UNFCCC), the United Nations Convention on Biological Diversity (UNCBD), and the United Nations Convention to Combat Desertification (UNCCD). The

UNFCCC was the first global treaty established in 1992 to support the international response to climate change.

As a parent treaty of the Kyoto Protocol and the Paris Agreement, it guides Parties with the common objective of keeping the global average temperature rise this century as close as possible to 1.5 degrees Celsius above pre-industrial levels.[11] Since becoming a party to the United Nations Framework Convention on Climate Change (UNFCCC), Ghana has completed several projects and policy documents to address climate change issues at different government levels.[12] She ratified the United Nations Framework Convention for Climate Change (UNFCCC) in 1995, its Kyoto Protocol in 2005 and the Paris Agreement in September 2016.

4.3.1.1. Mitigation

Despite its minimal contribution to global GHG emissions, Ghana has initiated various projects in line with international efforts to limit temperature to 1.5 °C above pre-industrial levels. Under the Paris Agreement, Parties must communicate and effectively implement ambitious Nationally Determined Contributions (NDCs) that broaden mitigation action and drive sustainable development.[13]

In this light, Ghana's Intended Nationally Determined Contributions (INDCs) were prepared and submitted to the UNFCCC in 2015 and the updated NDCs in 2021.[14] These documents

[11] UNFCCC Secretariat. Available at https://unfccc.int/about-us/about-the-secretariat

[12] Ghana is classified under the UNFCCC as a non-Annex 1 country, a group of developing country parties considered vulnerable to the adverse impacts of climate change.

[13] UNFCCC Paris Agreement, 2015: *Adoption of the Paris Agreement*. United Nations Climate Change Secretariat (UNFCCC), Bonn, Germany: http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf.

[14] MESTI. (2021). Ghana's Updated Nationally Determined Contribution under the Paris Agreement (2020 – 2030).

guide alignment with various national and sector policies, which are crucial in achieving the country's long-term national and sustainable development goals.

The first NDCs sought to reduce emissions by 15 to 45 per cent below the business-as-usual scenario by 2030 and strengthen climate resilience closely aligned with its development priorities. In all, 20 mitigation and 11 adaptation actions were outlined across seven priority economic sectors - energy, agriculture, industry, transport, waste, forestry and other land use. The 20 mitigation measures have strong development imperatives and aim to scale up renewable energy, promote clean cooking and lighting, double energy efficiency in households and industry, promote mass urban transportation, reduce emissions from deforestation and forest degradation (REDD+), and promote alternative solid waste management.

The 11 adaptation measures aim to build resilience in vulnerable agriculture landscapes, enhance value addition in using forest resources, promote resilient infrastructure, promote early warning and disaster prevention, manage climate-induced health risk, promote integrated waste management, and address gender considerations. The updated NDCs sought to generate absolute greenhouse gas (GHG) emission reductions of 64 MtCO2e. As part of the national strategy, Ghana has developed 19 policy actions in 10 priority areas to achieve nationally determined contribution goals in the next decade (MESTI, 2021, p. 8).

The 19 policy actions translate into 13 adaptation and 34 mitigation programmes of action. These policy actions have the potential to maximise the interactions between adaptation and economic diversification, resulting in mitigation co-benefits. In the long term, these will lead to the following outcomes: accelerate sustainable energy transition; build resilient economies and societies; enhance early warning and disaster risk management; enhance landscape restoration; ensure responsible production and consumption; foster social inclusion focusing on youth and women; and provide safe communities.

Ghana anticipates that the updated NDCs will be vital in achieving the country's long-term national development objectives and global sustainable development goals. That is why the document strongly aligns with the various national and sector policies and is backed by

concrete programmes that can be implemented by the Ministries Department and Agencies (MDA), Metropolitan, Municipal and District Assemblies (MMDAs), private sector, and civil society organisations.

4.3.1.2. Transparency

In the context of climate change, transparency refers to the reporting and review of relevant climate information and data. Transparency arrangements under the UNFCCC enable the availability of regular data on countries' GHG emissions, policies and measures, progress towards targets, climate change impacts and adaptation, levels of support and capacity-building needs. By providing clear and robust data and information on climate action, transparency also builds trust, credibility and accountability among all those involved.[15]

The government of Ghana has submitted three Biennial Update Reports (BUR) so far, in compliance with decisions at COP17.[16] These reports provided updates on the status of the GHG emissions, information on mitigation actions taken or envisaged to undertake and their effects, and support needed and received. In addition, three National Communications (NCs) have been submitted since 2001 in compliance with their obligations under Articles 4 and 12 of the UNFCCC. The overall objective of these documents was to update and communicate the latest information on Ghana's progress in addressing climate change through specific policies.[17]

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[15] BURs are reports to be submitted by non-Annex I Parties, containing updates of national Greenhouse Gas (GHG) inventories, including a national inventory report and information on mitigation actions, needs and support received. Available at https://unfccc.int/biennial-update-reports.

[16] BURs are reports to be submitted by non-Annex I Parties, containing updates of national Greenhouse Gas (GHG) inventories, including a national inventory report and information on mitigation actions, needs and support received. Available at https://unfccc.int/biennial-update-reports.

[17] Ghana's Fifth National Greenhouse Gas Inventory 2021 National Greenhouse Gas Emissions Report. (2022). https://unfccc.int/sites/default/files/resource/gh_nir5_15052022_final.pd

Consequently, the UNFCCC developed reporting guidelines for annual GHG inventories by Annex 1 party countries, including Ghana. Article 13 of the Paris Agreement provides the transparency framework for reporting the progress and achievement of the NDCs, the national greenhouse inventory and climate support. To this end, Ghana aims to publish its reports on the progress, achievements, and challenges of implementation regularly in the Biennial Transparency Report (BTR) consistent with the UNFCCC Decision 18/CMA.1 on Modalities, Procedures and Guidelines for the Transparency Framework.[18]

4.3.1.3. Adaptation

Recognising Ghana's vulnerability to climate change impacts necessitates adaptation planning for current and future risks. Adaptation planning is, therefore, happening at different levels and being led by various actors, including the national and subnational governments. The NAP process was initiated under the UNFCCC in 2010 to address medium- and long-term climate adaptation needs in developing countries. It is an iterative, country-owned planning process that allows countries to identify, address and review their evolving adaptation needs.[19]

Ghana's National Adaptation Planning (NAP) process is guided by a National Adaptation Plan Framework (NAP-F) developed and published in 2018. The NAP Framework outlines the country's vision for adaptation and establishes the implementation road map and stakeholder engagement architecture needed to achieve Ghana's planned adaptation goals.[20]

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[18] Transparency refers to Measurement, Reporting and Verification under the Convention and the Kyoto Protocol, and the Enhanced Transparency Framework (ETF) under the Paris Agreement, including technical assistance to developing country Parties and training experts engaged in the reporting, review and analysis processes. Available at https://unfccc.int/Transparency

[19] Least Developed Countries Expert Group (LEG) (2012). *National Adaptation Plans. Technical guidelines for the national adaptation plan process*. Bonn: UNFCCC secretariat. Retrieved from http://unfccc.int/NAP.
The NAP process is a "continuous, progressive and country-driven process that seeks to align national priorities and sustainable development objectives" (Least Developed Countries Expert Group [LEG], 2012).

[20] Ghana National Adaptation Framework (2018)

The process seeks to provide the enabling framework for the planning and implementation of adaptation actions as enshrined in the National Climate Change Policy (2013), the National Climate Change Adaptation Strategy (2012) and the Nationally Determined Contributions (NDCs) (2015), all done within the context of sustainable development. It proposes a more sectoral-based approach to climate change with priorities identified for critical sectors such as agriculture, forestry, water, energy, gender and health.

The first adaptation communication (ADCOM) was prepared in 2021, drawing on Ghana's national adaptation planning process. It aims to fully integrate adaptation into economic, environmental, and social decision-making.[21] The Government of Ghana has prepared this first adaptation communication (ADCOM) in line with Article 7, paragraphs 10 and 11 of the Paris Agreement and through robust engagement with stakeholders.

It also draws on the results of Ghana's National Adaptation Planning (NAP) process, which aims to integrate adaptation fully into economic, environmental and social decision-making. The first AdCom is submitted as a standalone document and as a response to the invitation to countries by paragraph 7 of decision 9/CMA.1 of the UNFCCC to submit appropriate information highlighting national overall efforts towards adaptation to climate change.

Evidence from Ghana's AdCom shows it is organised into seven interlinked parts, providing a coherent account of Ghana's climate adaptation state. Together, the different parts provide comprehensive and insightful narratives that project climate change adaptation efforts in Ghana and highlight the support needed to catalyse enhanced adaptation action in the country.

[21] Government of Ghana. (2021). Ghana's Adaptation Communication to the United Nations Framework Convention on Climate Change. Environmental Protection Agency, Accra, Ghana.

4.3.2. NATIONAL CLIMATE POLICY FRAMEWORKS

Before adopting climate change policies, Ghana's 1992 constitution sought to promote the well-being and safety of all individuals while preserving the environment for future generations and the well-being and safety. In this regard, the EPA Act was established in 1994 to regulate and prescribe environmental standards and guidelines.[22]

As part of its approach to implementing the 3 Rio Conventions and recognising the implications of climate change for its national development, Ghana has taken various actions, including developing climate change-related policy instruments. These efforts date back to 2012 and 2013, when the first National Climate Change Adaptation Strategy (NCCAS) and National Climate Change Policy (NCCP) were adopted, respectively.

These policies have been heavily influenced by the country's agriculture, water resources, and coastal areas, particularly vulnerable to these effects. Serving as a framework, they address the effects of climate change through various measures, such as mitigation, adaptation, and capacity building. These policies have been complementary and are all aimed at building adaptive capacity at multiple levels and using them as additional avenues to enhance Ghana's sustainable development efforts.

Prominent among Ghana's adaptation policy initiatives are the National Climate Change Adaptation Strategy (NCCAS, 2012), the National Climate Change Policy (NCCP, 2013), the Nationally Determined Contributions (NDC, 2015), and the National Climate Change Master Plan Action Programmes for Implementation (2015–2020). These different but interrelated policies have built on each other at different times and are currently being consolidated in Ghana's National Adaptation Planning (NAP) program, which provides the needed

[22] Retrieved from EPA Ghana. https://www.epa.gov.gh/epa/

implementation pathways at multiple and diverse sectors for proactive and effective medium to long-term adaptation planning in Ghana.

4.3.2.1. National Climate Change Adaptation Strategy (NCCAS)

Initiated in 2012, the NCCAS Recognises the increasing threats posed by climate variability, particularly to vulnerable communities and critical sectors, and aims to enhance the resilience of both human and ecological systems.[23]

The primary objective is to strengthen the resilience of communities, ecosystems, and the economy against the adverse effects of climate change. This involves proactive measures that prepare for and adapt to the anticipated changes in climate patterns. It also aims to mainstream climate adaptation into various national, regional, and local development plans and sectoral policies. It ensures a holistic approach to addressing climate risks by embedding climate considerations into planning processes. The strategy also emphasises the need for educational campaigns and community involvement in adaptation initiatives, fostering a culture of climate awareness among citizens. Critical Components of the NCCAS are:

Vulnerability assessment: The NCCAS is foundational to systematically evaluating the vulnerabilities faced by different sectors, including agriculture, water resources, health, and infrastructure. This assessment identifies specific areas of concern and informs targeted adaptation strategies.

Adaptation Actions: The NCCAS outlines actionable measures tailored to various sectors. For agriculture, this includes promoting climate-resilient crop varieties, implementing efficient irrigation practices, and enhancing agroforestry. The strategy highlights sustainable management practices in water resources that address shifts in rainfall patterns. For health, it

[23] Government of Ghana (GoG). (2012). National Climate Change Adaptation Strategy. Accra. Retrieved from http://www.adaptation-undp.org/sites/default/files/downloads/ghana_national_

prioritises the prevention of climate-related diseases and strengthening healthcare systems to manage health risks associated with climate change.

Stakeholder Engagement: Effective implementation of the NCCAS requires the active involvement of various stakeholders, including government agencies, local communities, civil society organisations, and the private sector.

Monitoring and Evaluation Framework: The NCCAS includes a robust monitoring and evaluation framework to gauge the effectiveness of the implemented adaptation measures. This framework allows for assessing progress, identifying challenges, and fine-tuning strategies to enhance their impact over time. In terms of focus areas of adaptation, these include;

Agriculture: Given that a significant portion of Ghana's population relies on agriculture, the NCCAS emphasises increasing farmers' resilience to extreme weather events such as droughts and floods. Measures include training in sustainable farming techniques, crop diversification, and access to climate information.

Water Resources: The NCCAS strongly underlines sustainable water management practices. These include constructing efficient irrigation systems, protecting watersheds, and promoting rainwater harvesting to ensure water availability, especially during dry spells.

Health: The strategy recognises the public health risks associated with climate change and focuses on strengthening disease surveillance systems, improving access to medical care in vulnerable areas, and conducting public health awareness campaigns about climate-related health issues.

Infrastructure Resilience: The NCCAS advocates for improved urban planning and infrastructure development to withstand climate impacts. This includes designing flood-resistant structures, enhancing drainage systems, and investing in green infrastructure to mitigate heat and flash floods in urban areas.

The NCCAS is designed to guide the actions of various tiers of government—national, regional, and local ensuring a coordinated, cross-sectoral response. It highlights the roles and responsibilities of different stakeholders, facilitating collaboration and resource sharing.

Adequate financial resources are required for the successful implementation of the NCCAS. The strategy encourages the mobilisation of funds from both domestic budgets and international funding sources, such as climate finance mechanisms, donor agencies, and public-private partnerships. It also promotes capacity-building initiatives to strengthen local project implementation and management institutions.

In summary, Ghana's National Climate Change Adaptation Strategy represents a proactive approach to managing the risks associated with climate change. By focusing on critical vulnerable sectors, fostering stakeholder engagement, and ensuring sustainable resource management, Ghana aims to safeguard the livelihoods of its citizens and promote long-term resilience in the face of climate challenges.

For planning and plan implementation, the District Assembly Environmental Committee will develop and implement the climate change adaptation strategy at the local level. Decentralised departments, Non-governmental Organisations, traditional authorities, and the private sector will also assist the district assemblies in preparing detailed action plans and implementing them.

4.3.2.2. National Climate Change Policy (NCCP)

Ghana's National Climate Change Policy (NCCP), adopted in 2013, serves as a basis for the country's strategic approach to mitigating the impacts of climate change and promoting sustainable development.[24] The policy framework is designed to facilitate a coherent response

[24] (MESTI). (2013). Ghana National Climate Change Policy. Accra. Retrieved from https://pef.org.gh/documents/climate-change/ national-climate-change-policy.pdf

to climate change, emphasising both adaptation and mitigation while considering the socio-economic context of Ghana.

The NCCP aims to create a climate-resilient economy while fostering sustainable development. Its vision aligns with national development goals, seeking to ensure the well-being of current and future generations. Strategic Objectives include: 1) Increase resilience to climate risks for vulnerable communities and sectors; 2) Promote sustainable management of natural resources; 3) Advocate for low-carbon economic growth and 4) Enhance capacity for disaster risk reduction and adaptation planning.

A critical aspect of the NCCP is integrating climate considerations into national, regional, and local development policies and plans. This approach ensures that all sectors—such as agriculture, health, water, energy, and infrastructure—consider the potential impacts of climate change in their planning processes.

The NCCP point out proactive adaptation measures that support vulnerable communities. This includes 1) Conducting vulnerability assessments to identify at-risk populations and ecosystems, 2) Implementing programs for sustainable agricultural practices and water management, and 3) Fostering community involvement and education to enhance awareness and engagement in climate adaptation efforts.

While adaptation is a significant focus, the NCCP also outlines strategies for reducing greenhouse gas emissions. Key initiatives include 1) Promoting renewable energy sources and energy efficiency, 2) Encouraging sustainable land-use practices to preserve carbon sinks, and 3) Supporting technological innovations that contribute to lower emissions across various sectors.

The policy outlines the need for a robust institutional framework to support its implementation. This includes coordination among government agencies, civil society, private sector involvement, and stakeholder engagement to promote collective climate-issue action. Recognising the financial challenges associated with climate action, the policy encourages the

exploration of diverse funding sources, including public-private partnerships, international grants, and climate financing mechanisms.

Overall, Ghana's National Climate Change Policy represents a significant commitment to addressing the challenges of climate change. The NCCP aims to strengthen the country's resilience while driving sustainable economic growth by promoting an integrated approach that considers adaptation and mitigation. The emphasis on stakeholder engagement, education, and capacity building reflects a comprehensive strategy aimed at empowering communities and ensuring that all facets of society are prepared to face the impacts of climate change.

The policy seeks to address the physical impacts of climate change, emphasising infrastructure, natural resources, agriculture, food security, preparedness, and responsiveness to disasters. It has been prioritised into five thematic areas, namely: 1) agriculture and food security; 2) disaster preparedness and response; 3) natural resource management; 4) equitable social development; 5) energy, industrial and infrastructural development. These Policy Areas have been subdivided into ten programmes to address Ghana's critical climate change issues.

Through the Ministry of Environment Science, Technology and Innovation (MESTI), a National Climate Change Committee has been established to support its implementation. Members include government, non-governmental, civil society, academia, and the private sector. There is also a climate change Secretariat, which provides technical support to the National Climate Change Committee and coordinates its implementation at the national level. Additionally, the NCCP emphasises empowerment and capacity building of stakeholders, particularly in skilled climate science at the district level.

4.3.2.3. National Climate Change Policy Master Plan

The master plan, which complements the NCCP, recognises the importance of climate change to national development planning.[25] These initiatives include promoting renewable energy, improving land-use practices, encouraging sustainable transportation, and implementing climate-smart agriculture practices. The NCCP master plan highlights the leading role to be played by the Ministry of Local Government and Rural Development and the Local Government Service in implementing the national climate policy, with a significant share of resources being allocated to these institutions. However, their role does not appear recognised at the local government level.

Ghana's National Climate Change Policy (NCCP) Master Plan is a strategic framework to guide the country's response to climate change challenges while ensuring sustainable development. The policy aims to align national priorities with global climate agendas and meet the demands of both mitigation and adaptation efforts. Objectives of the National Climate Change Policy Master Plan include:

Mitigation of Greenhouse Gas Emissions: The policy emphasises reducing GHG emissions by promoting renewable energy sources, enhancing energy efficiency, and implementing sustainable land management practices. It aligns with Ghana's Nationally Determined Contributions (NDCs) under the Paris Agreement.

Adaptation to Climate Change Impacts: The Master Plan prioritises building resilience in vulnerable sectors, particularly agriculture, water resources, and coastal management. Measures include promoting climate-resilient farming techniques, enhancing water management systems, and improving disaster risk reduction mechanisms.

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[25] MESTI (2015). *Ghana National Climate Change Master Plan Action Programmes for Implementation: 2015–2020*. Retrieved from: https://www.weadapt.org/sites/weadapt.org/files/2017/ghana_national_climate_change_master_plan_2015_2020.pdf

Integration with National Development: The policy seeks to harmonise climate change initiatives with Ghana's broader development goals, including the Ghana Vision 2020 and the Sustainable Development Goals (SDGs). This integration ensures that climate considerations are mainstreamed into sectoral policies and action plans. Critical Components of the Master Plan are:

Institutional Framework: The NCCP establishes clear roles and responsibilities for various stakeholders, including government ministries, local authorities, NGOs, and the private sector. A National Climate Change Committee has been set up to coordinate climate actions at the national level.

Capacity Building: The policy underscores the importance of strengthening institutional capacity and public awareness of climate change issues. Training programs and educational campaigns are included to increase stakeholder understanding and engagement.

Financing Climate Actions: The Master Plan highlights the need for diverse financing mechanisms to support climate initiatives. This includes mobilising domestic resources, leveraging international climate finance, and encouraging private sector investments.

Research and Development: Emphasis is placed on supporting research initiatives that contribute to understanding climate impacts and developing innovative solutions. The role of scientific institutions in monitoring and evaluating climate data is critical.

Public Participation: The policy encourages the involvement of local communities and stakeholders in decision-making processes related to climate change. This participatory approach ensures that local knowledge and priorities are considered in climate adaptation and mitigation strategies.

To effectively implement the NCCP Master Plan, strategic actions have been outlined, including 1) Development of sector-specific action plans that align with the overarching policy framework; 2) Regular monitoring and evaluation of progress toward climate goals, with

mechanisms to report findings to relevant stakeholders and 3) Collaboration with international partners and regional organisations to share best practices and enhance technical capacity.

Ghana's National Climate Change Policy Master Plan is a comprehensive approach to address the multifaceted challenges of climate change. Ghana aims to build a robust framework that promotes sustainable growth while safeguarding the environment by focusing on mitigation, adaptation, integration with national development, and stakeholder engagement. The active engagement of all sectors of society will be crucial in realising the objectives outlined in the Master Plan, ensuring that Ghana remains resilient in the face of climate change impacts.

4.3.3. SUB-NATIONAL LEVEL

Ghana's approach to addressing climate change at the sub-national level is integrally linked with its decentralised local government system. Delineated in Chapter 20 of the 1992 Constitution, it constitutes a vital framework for the nation's administrative divisions, encompassing sixteen administrative regions and 261 MMDAs primarily based on population size.[26] As amended, the Local Government Act 1996 (Act 963) stipulates that the district assembly is responsible for developing, improving, and managing human settlements and the environment and maintaining security and public order in Ghana.

Within the National Development Planning Act of 1994 (Act 480) framework, the National Development Planning Commission (NDPC) provides guidelines to Ghana's local government for planning, budgeting and monitoring their activities. The planning system is said to be bottom-up, with the District Development Planning Coordinating Units overseeing development plans. Within a national framework, the Ghana Shared Growth Development Agenda (GSGDA) is the foundation for preparing medium-term plans for MMDAs, of which two are related to climate change.[27]

[26] Local Government Service. (2016). Lgs.gov.gh. https://lgs.gov.gh/about-us/

[27] NDPC (2014). Ghana Shared Growth and Development Agenda (GSGDA) II, 2014 – 2017, Medium-term National Development Policy Framework, Volume 1: Policy Framework

Though mainstreaming climate change into medium-term plans of MMDAs depends on a few factors, a significant incentive for local governments to comply with mainstreaming climate change in their development plans and the potential for additional funding is the Functional Organizational Assessment Tool (FOAT). Surugu et al. (2018) reported that the FOAT is a monitoring and assessment method used to evaluate the performance of MMDAs in their compliance with government policies, rules, laws, and procedures. These evaluations also consider signs of climate change, ensuring that all performance measures, including environmental concerns like climate change, are meticulously addressed.

The local government has a well-defined and decentralised structure through the district assembly system, which can facilitate the effective and coordinated mainstreaming of climate change adaptation. They are vested with expanded duties and authority in this decentralised framework, encompassing political and administrative jurisdictions. This empowerment enables them to play a crucial role in climate change governance by allowing them to engage directly with the issues and challenges specific to their regions. They possess deliberative, legislative, and executive powers, making them critical actors in formulating and implementing climate policies and actions at the local level.

4.3.3.1. Accra Climate Action Plan (ACAP)

Accra is Ghana's capital city, with a population of about 5 million, according to the 2021 Population and Housing Census. The Accra Climate Action Plan (ACAP) is a strategic framework aimed at addressing the impacts of climate change while promoting sustainable development within Accra.[28] The ACAP aims to enhance the resilience of Accra's communities, especially vulnerable populations, to climate-related impacts such as flooding, extreme heat, and changing rainfall patterns.

[28] *Accra Climate Action Plan 1*. (n.d.). https://www.ama.gov.gh/documents/Accra_Climate_Action_Plan.pdf

The key focus areas include:

Urban Planning: The ACAP encourages thoughtful urban planning to minimise risk exposure, incorporating green spaces, improved drainage systems, and flood-resistant infrastructure.

Sustainable Transportation: Initiatives include promoting public transport, non-motorised transportation (walking, cycling), and using electric vehicles to reduce emissions.

Waste Management: The plan outlines actions for more efficient waste management systems, targeting reduction, recycling, and promoting a circular economy to limit waste-related greenhouse gas emissions.

Water Resource Management: Addressing water scarcity and pollution, the ACAP promotes sustainable water management practices, including rainwater harvesting and the protection of watersheds.

The successful implementation of the ACAP requires collaboration among various stakeholders, including government agencies, local communities, NGOs, and private sector partners. Community involvement is crucial for identifying local needs and developing practical solutions. The plan also includes a framework for monitoring and evaluating progress, assessing the effectiveness of implemented measures, and adapting strategies as necessary based on feedback and changing conditions.

4.4. THE CLIMATE FINANCE LANDSCAPE

Ghana's climate finance landscape presents a multifaceted approach to financing initiatives that address climate change, characterised by a blend of domestic resources, international funding channels, and innovative financial mechanisms. This dynamic framework is driven by the nation’s commitment to the National Climate Change Policy (NCCP) and aligns with various strategic frameworks aimed at sustainability and resilience. Ghana has received the largest share of climate finance from bilateral channels, with the most significant funding going into agriculture, forestry, fishing and the energy sector (ARPI, 2022, p.4).

4.4.1. INTERNATIONAL SOURCES

The international funding landscape includes initiatives to enhance capacity-building efforts within Ghana, ensuring that the benefits of these funds translate into tangible improvements in climate resilience and adaptation measures.

Notable contributors include multilateral development banks, bilateral development assistance, and dedicated climate funds like the Green Climate Fund (GCF) and the Global Environment Facility (GEF). These funds are crucial for supporting large-scale projects targeting climate resilience, particularly those that benefit vulnerable communities, including farmers directly affected by changing weather patterns.

The Green Climate Fund (GCF) – a multilateral climate fund, has provided significant climate finance to Ghana since 2018 through a combined portfolio of regional and country-specific projects. Between 2018 and 2024, GCF provided about US$4.6 million to support Ghana's readiness to receive international climate finance.[29] Ecobank became Ghana's first Accredited Entity to implement GCF funds in Ghana. This accreditation allows the bank to finance up to US$250 million in climate projects (ARPI, 2022, p.44).

At the regional level, it has aligned with initiatives such as the West African Alliance on Carbon Markets and Climate Finance, the West Africa Science Centre on Climate Change and Adaptive Land Use, and the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE). ECOWAS countries, including Ghana, have accessed GEF funding to strengthen Ghana's national capacity for transparency and ambitious climate reporting.[30]

[29] GCF (2019). *Ghana*. Green Climate Fund. https://www.greenclimate.fund/countries/ghana

[30] Strengthening Ghana's National Capacity for Transparency and Ambitious Climate Reporting. (2018). Global Environment Facility. https://www.thegef.org/projects-operations/projects/9820.

4.4.2. NATIONAL AND LOCAL SOURCES

The Ghanaian government is pivotal in financing climate initiatives through budget allocations across various ministries. The Ministry of Environment, Science, Technology and Innovation (MESTI) is particularly influential, channelling funds toward projects that combat climate change. The budgetary resources for climate-related projects include allocations for enhancing local infrastructure, promoting sustainable land use, and strengthening disaster risk management systems. Domestic funding reflects the government's recognition of the climate crisis and its integration into the national budget, ensuring that financial resources are consistently available for adaptation and mitigation strategies.

Though Ghana's national climate change policy does not explicitly include a strategy for resource mobilisation, the Ministry of Finance and Economic Planning (MoFEP) continue to mobilise and track inflows from development partners, the private sector and the government to implement climate actions.[31] In 2010, the Ministry created the Natural Resource, Environment, and Climate Change (NRECC) Unit to coordinate and manage financing supporting natural resources, climate change, and green economic activities. This indicates that much government expenditure is budgeted and executed at the national level rather than at the local MMDA or district level, where the most impactful adaptation work can occur.

Local governments, however, receive funding from the District Assembly Common Fund (DACF) (Act 455, 1993). They also have the power to raise internally generated funds (IGF) under the Local Government Act 46 (1993) through various avenues like property rates from individuals. This indicates that there is still a vast gap between national and local level allocations and that the actual expenditure rates at both MDA and MMDA levels remain very low for climate initiatives.

According to Ahenkan (2020), the financial gap has led to an increased focus on private-sector investment as a significant source of climate finance in Ghana. They can invest in various

[31] Climate Policy Initiative, "Climate Finance in Ghana (2023), pp. 2-11 (climatepolicyinitiative.org)

sectors, including energy, agriculture, transport, waste, industry, and buildings. He reported that the government is urged to create awareness of investment opportunities and incentivise private firms to scale up climate change financing and investment in Ghana (p.149).

Recognising the private sector's potential in driving climate finance, Ghana encourages establishing public-private partnerships. These partnerships leverage private capital and expertise to finance climate-related projects by fostering collaboration between government entities and private investors. This approach enhances innovation in project design and implementation.

4.5. STAKEHOLDER MAPPING

Climate change represents a complex and multi-dimensional challenge that spans across various sectors of society. To effectively address this pressing issue, it is essential to grasp the diverse array of actors involved and their specific contributions. This section provides a detailed stakeholder map that categorizes key players at all levels of government, highlighting their unique roles and responsibilities.

As illustrated in Figure 8, a wide range of stakeholders is integral to tackling climate change. This includes governmental agencies, non-governmental organizations, private sector entities, community groups, and international organizations, each contributing in distinct ways.

Governmental stakeholders, for example, are crucial in shaping and enforcing policies that influence climate action. They are involved not only in the development and implementation of environmental regulations but also in monitoring progress and ensuring compliance with national and international climate commitments.

Non-governmental organizations often play a vital role in advocating for stronger climate policies, raising public awareness, and facilitating community engagement. Their grassroots efforts can mobilize support for necessary changes and hold policymakers accountable.

The private sector, meanwhile, has a significant impact through innovation, investment in sustainable practices, and the development of green technologies. Their involvement is critical for transitioning towards a low-carbon economy.

Additionally, local communities and indigenous groups bring valuable traditional knowledge and perspectives that enrich climate strategies. Their participation ensures that solutions are equitable and culturally sensitive.

Understanding these diverse roles is essential for creating effective and inclusive responses to this global challenge.

Figure 8

Key Stakeholders

(Source: Author)

4.5.1. INTERNATIONAL AND SUPRANATIONAL

Ghana recognises the role of the international community, especially international organisations and development partners, as critical for resource mobilisation, capacity development, technology development and transfer for current and future climate actions. Notable international organisations and development partners include the World Bank, the UNFCCC, the United Nations Development Programme (UNDP), UNDRR, the European Union, Germany (GIZ), and the Green Climate Fund (GCF).

Entities like the United Nations Development Programme (UNDP), the World Bank, and various donor agencies provide funding, technical support, and policy guidance for climate change initiatives in Ghana. International development organisations, multilateral agencies, and donor countries provide critical support for climate action in Ghana through 1) Technical assistance through supporting capacity building, knowledge sharing, and training in climate science, disaster management, and policy development and 2) Climate finance through Donor agencies fund climate adaptation and mitigation projects, especially those focusing on the most vulnerable sectors such as agriculture and water resources.

4.5.2. GOVERNMENT AGENCIES

The Ministry of Environment, Science, Technology, and Innovation (MESTI) is the primary government agency responsible for developing and implementing environmental management and climate change policies. MESTI is based in the nation's capital. It is responsible for formulating and implementing Ghana's National Climate Change Policy (NCCP) and coordinating the implementation of the 3 Rio Conventions.[32]

The ministry hosts the National Climate Change Committee (NCCC), coordinates the NDC process, and advocates for resource allocation at the Cabinet and parliamentary levels. Through the EPA and in collaboration with the Ministry of Finance, the ministry coordinates the NAP process in Ghana. Formed in 2012, the ministry hosts the National Climate Change Committee

[32] MESTI. Available at https://mesti.gov.gh/profile/

(NCCC), which coordinates the planning, implementation, and monitoring of climate change policies and programs at the highest level.

Environmental Protection Agency (EPA): The EPA ensures compliance with environmental regulations and policies, monitors the impacts of climate change, and enforces environmental protection laws. With its head office in the country's capital (Accra), the EPA has regional and district offices. The EPA head office is responsible for coordinating UNFCCC-led policies and programs on behalf of the MESTI.

It is the technical arm of MESTI responsible for Ghana's environmental protection and climate action. With rich experience in international reporting and coordination, the EPA coordinates the entire NAP process to ensure that the various actors, including the MDAs, MMDAs, the private sector and CSOs, perform their given roles and achieve their mandates promptly and effectively.

The EPA head office has an established climate change unit that oversees the implementation of these conventions and currently hosts focal persons of the UNFCCC and UNCCD. The unit is also responsible for coordinating Ghana's national climate change strategy. It tracks and reports implementation progress and regularly publishes progress, achievements, and challenges in the Biennial Transparency Report (BTR) consistent with the UNFCCC Decisions.

The Ministry of Food and Agriculture (MoFA) focuses on integrating climate-resilient agriculture into national strategies and supports farmers' adaptation to climate change. They are responsible for policy formulation, programming and coordination within the sector. MoFA also hosts and operates the national public agricultural extension service. MoFA is decentralised with clearly outlined responsibilities at each level.

At the national level, various departments and technical directorates are responsible for policy formulation, national programming, coordination, and regional technical support. At the

regional level, the primary activities are coordination and technical support to district offices. At the district level, extension services are operationalised with a cadre of extension officers.

The Ministry of Finance and Economic Planning formulates, implements, monitors, and evaluates macroeconomic, fiscal, and financial policies for sustainable development. It also ensures the effective mobilisation of domestic and external resources (Khan et al., 2022).

The National Development Planning Commission (NDPC) prepares long—and medium-term policy guidelines to guide development planning by the various ministerial sectors and at the district level. It facilitates mainstreaming the national climate change policy and the nationally determined contribution to district plans.

They also produce a national policy guidance framework for sector ministries and district assemblies to prepare medium-term development plans, continue mainstreaming the nationally determined contribution into the sector and district plans, and produce annual progress reports to monitor the nationally determined contribution.

The Ministry of Local Government is represented by the Metropolitan, Municipal, and District Assemblies, which oversee mainstreaming climate change into various district assembly plans. At the sub-national level, district assemblies are critical for local planning and implementation of climate initiatives. They develop integrated development plans that consider climate change impacts and are guided by the Local Government Act and the National Development Planning Act. Metropolitan, Municipal, and District Assemblies (MMDAs) are essential in mainstreaming climate considerations into local development plans. Assessments like the Functional Organizational Assessment Tool (FOAT) often influence their actions.

The National Disaster Management Organizations Act 1996 (Act 517) established the National Disaster Management Organisation (NADMO) and provides an institutional framework for addressing the adverse effects of natural and manmade disasters, particularly city flooding.

The GMET's use of climate data and information is critical to urban planning and agricultural practices. The Ghana Meteorological Agency (GMet) is vital in providing climate data, which is essential for planning for climate-related risks such as floods and droughts.

The Forestry Commission coordinates, implements, and enforces policies, laws, and regulations on developing, managing, and using forest and wildlife resources. As the primary agency responsible for forest management, the Forestry Commission is crucial in implementing these policies. It also plays a crucial role in sustainable forest management, supporting smallholder farmers, and regulating corporate activities related to climate change.

4.5.3. NON-GOVERNMENTAL ORGANISATIONS

Various NGOs advocate for climate action and work on the ground to implement adaptation and mitigation projects. Organisations like Friends of the Earth Ghana and the Ghana Environmental Advocacy Group mobilise communities and raise awareness on climate issues. NGOs also facilitate capacity building and education on sustainable practices among local populations.

These organisations are diverse, working on different climate change-related sectors and with different stakeholders. Several of them complement the development efforts of the city governments, while some work directly with the youth. In the NGO sector, many local and international NGOs in different parts of the country work in climate change education and awareness. CSOs and NGOs have a crucial role in advocating for climate action and supporting vulnerable communities:

1) Advocacy and policy influence: NGOs engage in advocacy, pushing for more robust climate policies and ensuring that the voices of vulnerable groups are heard in policy debates.

2) Implementation: These organisations often implement community-based climate projects, such as climate-resilient agriculture, water conservation, and renewable energy adoption.

3) Public awareness and education: CSOs conduct awareness campaigns to educate citizens and local communities on the impacts of climate change and adaptation strategies.

4) Youth engagement: Ghana's youth, mainly through activism, have become increasingly vocal on climate change issues. They contribute by leading advocacy campaigns and organising events that raise awareness and push for stronger climate policies. They also participate in climate education programs and foster climate action through community engagement. They develop youth-led climate innovation projects, such as eco-friendly businesses and green technologies. Examples include the Ghana Youth Climate Coalition (GYCC), SYND, and GAYO.

Private Sector: Businesses increasingly recognise the risks of climate change and the potential for sustainable practices to enhance competitiveness. The private sector supports initiatives by investing in green technologies, sustainable agriculture, and renewable energy solutions.

Some Ghanaian businesses and private-owned companies undertake activities that support climate action. This includes and is not limited to financial institutions that provide direct financing for the implementation of climate actions and private enterprises, such as privately owned small-scale enterprises, that undertake activities that support climate change adaptation. Such activities include integrating climate risks into business operations or developing and distributing non-financial products. The limited involvement of the private sector in climate change to date has been attributed to an unfriendly business environment, including high interest rates and a lack of capacity within the private sector to write bankable proposals for funding.

4.5.4. OTHER STAKEHOLDERS

Academic and Research Institutions: Universities and research organisations conduct critical studies on climate impacts in Ghana, focusing on science, technology, and innovative solutions for mitigation and adaptation. Institutions like the University of Ghana and the Kwame Nkrumah University of Science and Technology often engage in research partnerships and provide training on climate-related issues.

1) Climate research: Universities like the University of Ghana (Institute for Environment and Sanitation Studies) and other academic institutions contribute to research on the local impacts of climate change, providing evidence for policy development.
2) Teaching and knowledge transfer: Some projects seek to strengthen teaching and training in climate change. An example is the Climate Change and Sustainable Development graduate programme at the University of Ghana, where the centre offers graduate-level teaching and research in this field.
3) Training and capacity building: They offer training programs for government officials, local communities, and private sector players to strengthen their capacity to address climate change. Established in 2006, the Energy Centre (TEC) is a research institute in the Kwame Nkrumah University of Science and Technology which aims to provide training and advisory services on energy technology, policy and management and renewable energy in Ghana

Traditional authorities: Ghana has a National House of Chiefs, which serves as the umbrella institution that coordinates the activities of all traditional rulers. Such a body epitomises the importance of chiefs and traditional rulers within Ghana's governance structure. The National House of Chiefs is represented at the sub-national level by the Regional House of Chiefs, whose representatives converge at the National House of Chiefs to act essentially as an advisory institution, providing critical advice and guidance on matters of chieftaincy, customary laws, and land administration to the government.

They are also very instrumental in issues related to the environment and conflict resolution. Their roles include:

1) Community leadership: Chiefs often ensure local communities adopt sustainable land and resource management practices.

2) Conflict resolution: Traditional leaders help resolve conflicts over resource use and land, which can become more acute in the face of climate-induced pressures such as droughts or floods. The role of the chieftaincy institution relates to matters like land administration, maintenance of peace/conflict resolution, and community revenue mobilisation.

Community-based organisations: Local community groups and CBOs engage residents in sustainable practices, disaster risk reduction, and climate adaptation strategies. They play a vital role in ensuring local voices are heard in decision-making. These organisations often focus on traditional knowledge and practices that promote environmental stewardship.

4.6. NATIONAL-LOCAL GOVERNMENTS' RELATIONS

Ghana runs a constitutional presidential multiparty democracy, with power shared among the Executive, Legislative, and Judiciary branches. The president is the head of state and government, while legislative power is vested in the Parliament of Ghana. The judiciary, the third arm of government, is independent of the Executive and the Legislature.

Governance in Ghana is decentralised through the local government system. The 16 administrative regions of Ghana are further divided into 261 Metropolitan/Municipal/District Assemblies (MMDAs), each led by a Chief Executive who represents government business at the local level. Ghana's local government structure has been well planned and widely touted

as representing a clear path to the devolution of Ghana's democracy. Most national-level policies and development plans are implemented through the local government system.[33]

4.6.1. LEGISLATIVE

The relationship between national and local government is extensively regulated by laws, primarily determined by the central government. This legal framework grants the central government significant control over the activities of the local government, a factor that can either facilitate or constrain climate change governance. For instance, article 240 [2][a] of the 1992 constitution equips the Parliament to enact laws that transfer responsibilities and resources to local government, a crucial aspect of climate change governance.

The laws governing local government include the Local Government Act of 1993, Act 462; the District Assemblies Common Fund Act of 1993, Act 455; the National Development Planning [Systems] Act of 1994, Act 480; the Local Government Service Act of 2003, Act 656; and Security and Intelligence Agencies Act of 1996, Act 526.

The legislative relationships are also shaped by the Parliament of Ghana's powers to approve byelaws made by the local government. Local governments' powers and responsibilities are derived mainly from overlapping legislation that defines the scope of climate change governance and decision-making. While a strong central government maintains national power structures, it can limit the local government's incentives to drive development by providing essential infrastructure.

In addition to legislative relations, executive ties between regional and central government are significant—article 58 of the 1992 constitution vests all executive authority in the President. For instance, the president can establish new districts or dissolve existing ones and appoint chief executives who are the heads of the MMDAs. Administrative officers are appointed at

[33] Local Government Service. Retrieved fromhttps://lgs.gov.gh/local-governance-act-of-2016-act-936/

the national level and posted to the various MMDAs, with their management falling under the Office of the Head of the Civil Service, which reports to the Office of the President.

4.6.2. ADMINISTRATIVE

As a result of the decentralisation process and the Local Government Act, the sub-national governments, specifically the Regional Coordinating Council and Regional Coordinating Planning Units (RCPU), prepare medium-term development plans. Though their role is not just administrative, the development planning process requires regional and local planning units to collaborate and synergise efforts to ensure the plans are aligned with national priorities.

In local-level policymaking, the district assembly's medium-term development plan is coordinated by the Development Planning Co-ordinating Unit (DPCU) together with decentralised departments, such as the Environmental Health, Works and Physical Planning departments; decentralized agencies, including the National Disaster Management Organization, Fire Service Department, Education Service, Agricultural Directorate, Health Directorate, National Commission on Civic Education, assembly members who represent local communities, nonprofit organizations (NGOs), traditional authorities; faith-based organizations and other stakeholders.

4.6.3. FINANCIAL

Another crucial aspect is the financial relationship between national and local governments. The national government provides funding to local governments through the District Assembly's Common Fund to undertake developmental projects. However, it is essential to note that local governments have limited power in this aspect. Rates and other fees are regulated by legislative instruments developed by the Ministry of Local Government and later approved by the local government minister.

Moreover, local governments are restricted from securing loans or grants beyond a specific amount without seeking approval from the Ministry of Finance and the Ministry of Local Government. An assessment process has also been developed to test the compliance and capacity of local government to determine grant transfers. While this is intended to improve

management structures, it may also reduce the scope for local decision-making, presenting a challenge for local governments in their financial autonomy.

4.7. SUMMARY

This chapter provided a comprehensive exploration of the significant impacts of climate change on Ghana, highlighting its repercussions across various sectors including agriculture, water resources, health, energy, and overall socio-economic development. Climate change poses a multifaceted threat to the country's sustainability and resilience, which is particularly alarming given Ghana's heavy reliance on climate-sensitive sectors for economic growth and livelihoods. The broader socio-economic landscape of Ghana is intricately tied to the impacts of climate change. Job creation, economic stability, and infrastructural development are all at risk, prompting a call for integrated approaches to include climate considerations in national development policies.

In recognition of these pressing challenges, the Ghanaian government is taking steps to incorporate climate change considerations into its national development agenda. Although the country currently lacks comprehensive climate change legislation, it has developed piecemeal laws, regulations, and policies that span various sectors.

Key initiatives have been introduced, including a National Climate Change Adaptation Strategy (NCCAS) aimed to enhance the country's adaptive capacity and reduce vulnerability across different sectors. The National Climate Change Policy (NCCP) serves to guide national responses to climate change, ensuring cohesive and coordinated actions and the National Climate Change Master Plan outlines actionable steps for addressing climate change impacts.

These policies are recognised internationally for their significance in advancing Ghana's climate agenda. However, the implementation and local integration of these policies remains unclear. Local authorities' capacity to translate national policies into actionable local development plans is an area that requires further exploration and support.

The chapter emphasised the urgent need for enhanced investment in resilience-building initiatives, sustainable development practices, and climate mitigation efforts. It also underscored the importance of international collaboration and support for Ghana as it navigates the complexities of climate change and strives to achieve its climate goals. With increasing risks posed by climate change, Ghana must continue to prioritise the integration of climate considerations into all aspects of governance and development.

5. STAKEHOLDERS' VIEWS ON SMCS

5.1. CHAPTER OVERVIEW

In Chapter Four, a comprehensive analysis of results indicated that urban contexts frequently encounter marginalisation within the wider framework of climate change policymaking in Ghana. This marginalisation highlights a significant gap in addressing the unique challenges faced by urban areas in climate action. Considering these findings, Chapter Five undertakes a detailed exploration of the second and third research questions, utilising qualitative insights derived from semi-structured interviews and focus group discussions conducted with various stakeholders engaged in climate initiatives.

The findings presented in this chapter emerged from rigorous fieldwork conducted across three distinct study areas: Koforidua, Wa, and Cape Coast. Chapter Three of this dissertation provides a robust justification for the selection of these locations, emphasising their unique socio-economic and environmental characteristics that directly relate to the research focus. The diverse contexts of these urban centres offer a rich tapestry of experiences and challenges associated with climate initiatives, making them ideal for this research.

To gather deep insights, the interview questions were meticulously designed to target several critical dimensions of climate initiatives. These questions aimed to unravel complexities surrounding local efforts and stakeholder dynamics, focusing on the following fundamental inquiries.

Identifying key stakeholders and resources: A pivotal question posed to participants was: "Who are the principal actors driving climate change initiatives in these urban centres, and what resources do they bring to these efforts?" This inquiry aimed to map the landscape of responsibility and resource allocation. It involved identifying the key stakeholders—ranging from local government officials, NGOs, grassroots organizations, community leaders, to academic institutions—and understanding the resources (both financial and expertise) they contribute to climate action. Through stakeholder mapping, this chapter illuminates the

interconnected roles that various actors play in driving climate initiatives and the collaborative efforts necessary for effective action.

Understanding Climate Risks and Awareness: Another critical inquiry focused on understanding the specific risks confronted by these stakeholders: "What specific risks do these stakeholders face in their respective roles, and to what extent are they aware of the climate-related challenges impacting their communities?" This question sought to gauge the level of awareness and understanding among stakeholders regarding the climate risks that threaten their communities. The responses not only revealed perceived vulnerabilities, such as flooding, sea-level rise, and resource scarcity but also highlighted the importance of preparedness and adaptability. By assessing these dimensions, this chapter evaluates the existing knowledge gaps and identifies how stakeholders can enhance their resilience against ongoing climate threats.

Exploring Bottom-Up Initiatives and Challenges: A further focal point of this chapter is the exploration of grassroots movements: "What grassroots initiatives have been successfully implemented in these areas, and what obstacles have emerged?" This inquiry seeks to document successful local initiatives and highlight the creativity and resourcefulness of communities in responding to climate challenges. In addition to showcasing innovation, this section also examines the barriers that grassroots efforts face, including inadequate funding, policy inconsistencies, and socio-political obstacles. By understanding both the successes and the challenges, the chapter aims to present a holistic view of local responses to climate change.

Identifying Ways to Incorporate Formal Policy Frameworks and Informal Aspects: Lastly, the chapter addresses the question: "What are the prevalent informal practices, and how can they improve climate adaptation strategies in Ghana’s small and medium-sized cities (SMCs)?" This inquiry delves into the informal measures adopted by communities in response to climate threats. It examines how these practices can be integrated into formal policy frameworks, facilitating a more cohesive and effective approach to climate adaptation. The findings underscore the importance of recognizing and legitimising informal practices to enhance overall policy effectiveness.

Overall, Chapter Five intricately links the overarching research narrative by connecting theoretical insights presented in earlier chapters with the practical realities experienced by urban stakeholders. Through the lens of their lived experiences and expert knowledge, this chapter aspires to contribute to a deeper understanding of climate action at the urban level. By amplifying the voices of stakeholders—voices that often remain unheard in the broader discussions of policymaking—this chapter endeavors to elevate local perspectives and advocate for more inclusive, responsive, and effective climate governance strategies.

5.2. SUB-NATIONAL STAKEHOLDERS

Sub-national stakeholders are indispensable in Ghana's climate action landscape, where local governments, communities, businesses, and civil society organisations collectively contribute to adaptation and mitigation efforts. The impacts of climate change are often most acutely felt at the local level. The diverse stakeholders involved at this level include local government authorities responsible for implementing policies and regulations that either facilitate or hinder climate action. These authorities often work in tandem with community organisations deeply rooted in the region's socio-economic fabric, leveraging local knowledge and traditional practices to devise practical strategies for resilience.

Figure 9 provides examples of various sub-national actors operating within the three study areas, highlighting their unique contributions and areas of focus. This stakeholder map specifically illustrates decision-makers and organisations that directly address climate-related issues, showcasing how their efforts coalesce to form a broader strategy for climate resilience.

While the public is not explicitly identified within this framework, it is vital to recognise that many of the adverse effects of climate change, such as increased flooding, erratic rainfall, and health risks, will ultimately be felt by individuals and households. Therefore, while the focus here is on organised actors, the voices and experiences of the general populace remain critical to framing effective climate action initiatives. Their firsthand experiences can provide invaluable insights into the real-world implications of climate change, ensuring that strategies developed at the macro level are relevant and practical at the grassroots level.

As this study delves deeper into the examination and analysis of climate change initiatives, it emphasises not only the structural roles of these sub-national actors but also the importance of fostering collaboration among them to enhance the overall efficacy of climate action at the local level, particularly within urban environments where the impacts are often most pronounced.

Figure 9

Sub-national stakeholders

(Source: Author)

5.2.1. GOVERNMENT

5.2.1.1. Metropolitan, Municipal, and District Assemblies (MMDAs)

As the leading local governance bodies, MMDAs are crucial in integrating climate change considerations into local development plans and policies. They develop and implement integrated development plans that address the impacts of climate change and are guided by the Local Government Act and the National Development Planning Act.

The NDPC also requires the municipal assemblies to integrate climate change issues into their development plans. They oversee spatial or physical planning at all levels, collaborating with key stakeholders such as the EPA, traditional heads, the survey department, and the Lands Commission in the preparation and execution of plans.

The Physical Planning department provides valuable advice on policies related to physical planning, land use, and development and coordinates the activities of various departments, agencies, and non-governmental organisations (NGOs) to ensure adherence to planning standards. The Development Planning Unit, on the other hand, is responsible for overseeing development planning. They translate the national goals prepared by the NDPC into local Medium Term Development Plans. These plans aim to align local development initiatives with the broader national objectives, ensuring a cohesive and coordinated approach towards sustainable development at the local level. They engage in hard and soft infrastructure, such as constructing sea defence walls and using rain-water harvesters. Apply Indigenous practices and make bylaws.

5.2.1.2. Ministries, Departments and Agencies (MDAs)

The findings of this study revealed that the Ministry of Agriculture is the only decentralised sector ministry across the three study areas. The Ministry is represented by its Regional and District Agric Development Units. Their main functions include liaising with the Regional Coordinating Council (RCC) to promote, supervise, and provide technical backstops for all agricultural-related activities at the regional and municipal levels, including re-afforestation (tree planting activities).

They also formulate and implement capacity-building and training programmes for smallholder farmers and other stakeholders. They have engaged extensively in climate-related activities, including coordinating with NGOs, development Partners, and the private sector to ensure all other activities and programmes align with national regulations and policies.

Other departments and agencies, including the EPA, NADMO, the Land Use and Spatial Planning Authority (LUSPA), the Forestry Commission, and the Ghana Meteorological Agency (GMet), have been mandated to implement efficient strategies to reduce climate change impacts through effective coordination with their head offices.

National Disaster Management Organisation (NADMO): Established under the National Disaster Management Organizations Act of 1996, NADMO manages responses to natural and manmade disasters, focusing on mitigating the effects of incidents like city flooding. They work closely with MMDAs to prepare for disasters and enhance community resilience.

According to research participants, the NADMO has two primary responsibilities related to climate change planning and management: first, to develop national, regional, and district disaster management plans aimed at preventing and mitigating the consequences of disasters; Second, NADMO is responsible for ensuring the establishment of sufficient facilities for technical training and educational programs that raise public awareness, implement early warning systems, and promote overall preparedness for both its staff and the public.

Ghana Meteorological Agency (GMet): GMet provides essential climate data and forecasts for urban planning, agricultural practices, and disaster readiness. Their information helps local governments and communities identify risks and develop resilience strategies.

Forestry Commission: This agency is responsible for the management and sustainable use of forest and wildlife resources. It plays a vital role in policy enforcement related to climate change, supporting local communities in sustainable practices and regulating corporate activities that impact the environment.

Land Use and Spatial Planning Authority (LUSPA): The LUSPA is responsible for performing spatial, land use, and human settlement planning functions within the national development planning system established under the National Development Planning Commission Act, 1994 (Act 479) and the National Development Planning (System) Act, 1994 (Act 480). LUSPA is also tasked with preparing and providing the technical human settlements planning component as required by the National Development Planning Commission for inclusion in national development plans or infrastructure plans prepared by the Commission by Acts 479 and 480.

Department of Gender: In conversation with the Department of Gender, they promote implementing activities that address the rights of women and children to advance women's status and ensure the growth, survival, and development of our children. Since its establishment, the Ministry has spearheaded national drives to overcome the challenges of gender inequality. So far, they have not engaged in any.

5.2.2. NON-GOVERNMENTAL ORGANISATIONS

Various NGOs work at the grassroots level to implement climate adaptation and mitigation projects. They engage in advocacy, public awareness campaigns, and capacity-building initiatives targeting local communities. These organisations often coordinate with MMDAs and other stakeholders to enhance local climate action.

In this study, examples of NGOs identified by research participants included CIKOD in Wa Municipality and the Green Africa Youth Organisation in the Cape Coast Metropolis. Learning about their active engagement with traditional authorities in the study areas was also interesting. They engage in activities such as climate change education and capacity building at the local level, including teaching communities about climate-smart agriculture, sustainable livelihoods, and disaster preparedness.

Local youth organisations are becoming more active in climate advocacy. They engage in campaigns, educational programs, and community projects to promote awareness and action on climate change.

Private Sector: Local businesses and enterprises increasingly recognise the importance of sustainable practices. These stakeholders engage in green technologies, sustainable agriculture, and renewable energy investments while supporting community initiatives. At the subnational level, private sector organisations play an important role in climate action through waste management and Corporate Social Responsibility (CSR) programs supporting local communities' climate resilience efforts. Examples include Zoomlion Ghana Limited.

5.2.3. OTHER ACTORS

Academic and Research Institutions: Universities and research organisations at the local level conduct studies on climate impacts specific to their regions. These institutions help provide data-driven insights that inform local policies and practices. Community-based organisations (CBOs) often mobilise community members around climate issues, promoting sustainable practices and fostering resilience. They also serve as links between communities and higher-level governance structures.

5.3. RISKS AND VULNERABILITIES

The vulnerability of small and medium-sized cities to climate change is a critical concern, particularly in regions like Sub-Saharan Africa. These cities often lack the necessary infrastructure, resources, and institutional capacity to mitigate the impacts of climate risks such as flooding, heat waves, and droughts. Hence, this section explored the extent to which key stakeholders recognise the effects of climate change. The goal was to see if increased recognition leads to some sort of action at the local level.

Given that most of the stakeholders were senior officials of their organisations, most were familiar with the term “climate change” and provided some practical examples of how it affects their everyday lives.[34] Some expressed that the current harsh weather conditions, especially during the rainy season and harmattan, are due to the changing climate. Most importantly, they

[34] Key informant interviews in the Wa municipality

believed that human activities such as the indiscriminate felling of trees, poor farming practices, overgrazing, bush burning, and construction activities have significantly changed the natural environment in their cities.

In analysing extreme weather events, two key descriptive variables were used regarding the frequency: frequently (the event occurred many times within a year) and occasionally (the event did not occur regularly, twice, or thrice a year). Flooding was reported as the most common climatic impact experienced in the 3 study areas, and this is more highly recognised as a problem by the government than by non-governmental organisations. This may be because urban water adaptation issues are linked to other development-related issues. Climate vulnerabilities in Ghana's smaller cities are a pressing concern, as these areas face numerous challenges related to climate change. These vulnerabilities can be categorised into the following:

5.3.1. FLOODING

Flooding: The three study areas were particularly susceptible to flooding due to their geography and insufficient drainage systems. Events like the annual rainy season often result in severe flooding, displacing communities and damaging property. According to research participants, the frequency of its occurrence is believed to have increased over the last decade as rainfall patterns have changed. However, these changes have become more pronounced in most of their local communities due to the growth of unplanned and informal settlements and poor drainage systems for stormwater.[35]

These effects are exemplified by heavy rainfalls and associated annual floods, which have negatively impacted informal settlements and buildings. Flooding sometimes contaminates water supplies, causing waterborne diseases to rise, while urban heat contributes to heat-related illnesses.

[35] "In some parts of the city sections, proper drainage systems for stormwater, vegetation covering, and sewerage are absent" (Interviewee in the New Juaben South Municipality, Koforidua)

5.3.2. EFFECTS ON URBAN INFRASTRUCTURE

Many smaller cities in Ghana have inadequate infrastructure to cope with climate impacts. Poor drainage systems lead to flooding during heavy rains, damaging roads, homes, and other critical infrastructure. Smaller cities often lack the resilience infrastructure that larger urban centres might have, such as comprehensive disaster management systems, emergency response capabilities, and community support networks. This reduces their ability to respond effectively during climate crises.

Interestingly, the three study areas have also seen an increase in informal settlements and unregulated buildings due to a lack of enforcement of land-use planning restrictions. For example, large quantities of waste are generated and collected by city private enterprises. However, due to the weak involvement of households in paying for the service and weak enforcement of environmental legislation, indiscriminate waste disposal and poor waste management appear to be widespread in communities.

In Cape Coast, this has resulted in the indiscriminate dumping of household waste into water bodies. They also expressed that the agricultural and fisheries sectors have been impacted due to extreme weather events, resulting in reduced marine ecosystems and fish supply and the extinction of some species.

5.3.3. HEAT STRESS

Aside from flooding, responses varied in some sectors. For instance, stakeholders in Wa mentioned that the current impacts of high temperatures are considered a threat to the water supply of residents in the municipality. Increased temperatures and reduced rainfall are expected to exacerbate the current conditions. As a result, they frequently experience drought and extremely high temperatures, which affect farming activities.[36] Rising temperatures and

[36] "Agriculture suffers the most from climate change because it is rain-fed, and due to the harsh weather conditions, productivity is impacted" (MOFA, Wa)

urban heat islands affect health and productivity in smaller cities. Vulnerable populations, particularly the elderly and those with pre-existing health conditions, face increased health risks as heat events become more frequent. The lack of green spaces also exacerbates heat stress and reduces residents' overall well-being.

5.3.4. AGRICULTURAL IMPACTS

Agriculture is the backbone of many smaller cities' economies but is highly vulnerable to climate change. Erratic rainfall and extreme weather events affect crop yields, threatening food security and livelihoods. Climate-related stresses can lead to increased resource competition, further exacerbating local tensions.

Other interviewees also reported how changes in weather conditions have affected crop and livestock production, further leading to the relocation of some young people to nearby cities. Infrastructure is primarily situated in coastal and floodplain areas, making it vulnerable to many hazards such as sea level rise, salt intrusion, tidal surges, flooding, and coastal erosion. The transport system reflects problems found with other infrastructure systems. It is vulnerable due to insufficient maintenance and is naturally exposed to environmental and climate hazards.

The findings of this study also revealed that some community activities, especially those related to agriculture and natural resource use, contribute to climate change's accelerated effects on food security. At the risk of causing bushfires, compromising soil fertility, and increasing carbon dioxide emissions, farmers in this village and its nearby settlements find bush burning a more convenient method of clearing the land at the start of each cropping season, just as in many other communities across Ghana.

Besides bush burning, residents indiscriminately prune tree branches or, in some instances, cut down trees for firewood – the primary energy source for cooking—or burn them in sand mounds to produce charcoal sold to augment incomes, especially during lean agriculture seasons. For others, the charcoal trade is the primary means of earning and sustaining a livelihood. Over time, its neighbouring communities, characterised by extensive savannah

plains and sparse trees, have gradually lost their tree cover, causing problems such as desertification, soil erosion, flooding, and increased greenhouse gases.

5.3.5. COASTAL EROSION

Furthermore, Stakeholders in Cape Coast highlighted that coastal erosion and rising sea levels were frequently recorded as significant climate impacts. Some research participants mentioned that these events have caused massive damage to the sensitive ecosystem around the Fosu Lagoon in recent years. Several management problems have emerged that negatively affect the municipality's development and use of water resources. Participants mentioned that natural and human factors threaten marine and coastal resources. The situation is exacerbated by the lack of scientific knowledge and information about the coastal area and an up-to-date management plan to effectively address coastal ecosystems' dynamic challenges.

This underlines the urgent need to effectively design and implement new approaches for managing coastal resources in sensitive tropical environments. Although inadequate and, in some cases, lack of logistics and resources have been named as the core challenges to addressing coastal zone issues, the limited capacity for coastal zone managers has also been found to play a significant role in the poor management of our coastal areas.

Addressing these vulnerabilities will require a multi-faceted approach involving local governance, community engagement, infrastructure investment, and education to build resilience against the adverse effects of climate change in Ghana’s smaller cities.

5.4. BOTTOM-UP CLIMATE-RELATED INITIATIVES

It is not a definitive list of the three municipalities' initiatives, as the interviews did not aim to provide a comprehensive overview. Table 2 summarises that some of these initiatives and projects were pursued in response to prevailing environmental challenges such as deforestation, perennial bushfires, water scarcity, and soil infertility. Although these projects have the potential to reduce vulnerability to climate change and enhance adaptation, they cannot be

considered as climate change adaptation and mitigation. It should be noted that the actions contained within this document are not all the adaptation actions within the three cities.

5.4.1. FLOOD MANAGEMENT

Poor drainage systems and informal urban development were widely considered major contributors to flooding incidents in Koforidua. In this light, the medium-term development plans in the New Juaben South Municipality[37] Seek to improve and provide sound drainage systems by constructing communal drainage systems and desilting drains. Research participants added that the public has regularly engaged in desilting chocked gutters and drainage systems, often considered adaptive measures to withstand perennial floods. The regional and district offices of the NADMO have been instrumental in providing timely assistance with the help of a disaster management plan.

The Wa Municipal Assembly has also taken the initiative to undertake engineering projects such as constructing communal drainage systems, often used as adaptive measures to withstand perennial floods. With the support of the local government, the public has also been involved in regularly desilting chocked gutters and storm drains to manage stormwater in the cities.

In addition, it was discovered that since perennial flooding is a significant concern, especially during the rainy season, the Regional and Municipal NADMO offices have been instrumental in providing education on flood management, usually done in collaboration with the EPA. The office of the NADMO has offered training on modern disaster prevention and management techniques, usually for communities affected by floods. Like Koforidua and Wa, Cape Coast recognises the impacts of flooding as a significant concern, especially during the rainy season. As research participants emphasised, poor drainage systems are attributed to the major causes of floods.

[37] New Juaben South Medium-Term Development Plan (2018-2021)

5.4.2. TREE PLANTING ACTIVITIES

In all three study locations, tree planting was recorded as a significant climate-related activity carried out regularly.[38] A notable example highlighted by research participants was the recent Green Ghana project led by the Government of Ghana.[39] This initiative aims to support the national tree-planting agenda purposely aimed at restoring green spaces within all cities.

As part of the Green Ghana Day campaign, the Government of Ghana provided free seedlings to all individuals, government and non-governmental organisations, traditional leaders, and educational and religious institutions. In this regard, most local communities within Cape Coast, Wa and Koforidua had a set time to green their environments by planting trees to restore lost ones and expand green spaces while reducing urban heat in the cities.

Another example mentioned by research participants in Wa was the European Union Resilience Against Climate Change REACH Project, which also embarked on yearly tree-planting exercises in selected districts in the Upper West Region of Ghana, including the Wa Municipality. According to them, the REACH Project aims to support farmers with sustainable farming methods and promote agriculture conservation through agroforestry to enable farmers to build resilience against climate variability. In Wa, because of the dry weather and over-dependence on these trees as firewood, the expectation was that they would plant more trees, but that has not been the case.

5.4.3. EDUCATION AND AWARENESS

Interviews with officials from the EPA regional office in Koforidua demonstrated that the Agency, in collaboration with several other stakeholders, including the Municipal Assembly and other non-governmental organisations, have engaged in several sensitisation programmes related to climate change and environmental management issues. For example, establishing an

[38] Cape Coast Metropolitan Medium Term Development Plan (2018-2021)

[39] Boateng, S. (2022, March). PRESIDENT LAUNCHES GREEN GHANA DAY 2022 EDITION – Forestry Commission. Fcghana.org. https://fcghana.org/president-launches-green-ghana-day-2022-edition/

environmental education team in the EPA regional office has expanded ecological education, awareness raising, and hygiene and health education activities.[40]

In collaboration with various NGOs, environmental education and sensitisation were conducted in schools, supported by media work involving TV and radio broadcasts. Beneficiaries of these public awareness programmes include school children, churches, the media, and sometimes the public. The programmes aim to raise awareness of disasters through intensive public education and sensitisation programmes focusing on improving environmental sanitation by enforcing environmental bylaws and raising awareness of climate change and how it impacts livelihoods and public health.

Like Koforidua, the EPA regional office in Wa is mainly concerned with environmental conservation. It organises programs to sensitise rural communities (especially women) to the sustainable use of fuelwood and undertakes woodlot projects in the municipality.

The interview findings also revealed that a locally based non-governmental organisation, the Center for Indigenous Knowledge and Organisational Development (CIKOD), has been involved extensively in environmental educational programmes. Research participants highlighted that CIKOD has been involved in several initiatives designed to improve the ability of traditional leaders to lead their communities in managing natural resources and to play meaningful roles in decision-making, especially on environmental issues and climate change. Community development focuses on strengthening sustainable food systems, traditional health systems, natural resources management and traditional women's leadership.[41]

It was also discovered that the EPA, in collaboration with several other stakeholders, including the Wa municipal assembly and some other non-governmental organisations, have engaged in

[40] Key interview, EPA, Koforidua

[41] "I have attended a few sensitisation workshops on solid waste management organised by development partners, which has helped me understand the importance of solid waste management, but there is still more work to be done" (CIKOD, Wa)

several sensitisation programmes related to climate change and environmental management issues. Some sensitisation programmes focused on educating the public about acquiring building permits, noise pollution and general environmental management. These public awareness programmes' beneficiaries include school children, churches, the media, and sometimes the public. Radio programmes on flood management and prevention of bushfires have also been organised to educate the public. Regarding physical planning, there are quarterly Statutory Planning Committee Meetings where key stakeholders meet to track and review local plans.

The key informant interviews also showed that in Cape Coast, the EPA, in collaboration with several other stakeholders, including the Municipal assemblies and non-governmental organisations, have engaged in several sensitisation programmes related to climate change and environmental management issues. Beneficiaries of these public awareness programmes include school children, churches, the media, and sometimes the public. GAYO, a youth-led NGO, focuses primarily on community development and environmental sustainability.

They collaborate with local communities to educate young people and children on how to adapt to climate-related impacts. GAYO also recently launched the "campus eco-clubs initiative-University of Cape Coast Chapter," where they seek to educate and empower tertiary students to create public Awareness of the need for environmental preservation and protection. Recently, GAYO and the Center for Coastal Management at the University of Cape Coast hosted a training program to raise public awareness about ocean conservation and resource management. They highlighted the importance of protecting the oceans for survival and the marine ecosystem.

Also, the Ministry of Agric has supported the Cape Coast Metropolis in training farmers in crop production, livestock and poultry production, and other management technologies. Although funds are insufficient, through a partnership with CSOs, we can organise sensitisation campaigns periodically. In addition, there are fragmented activities and programmes across the Assembly, government institutions, and Civil Society Organisations (CSOs). Participants say the central government coordinates these programmes to ensure efficient natural resource

utilisation. As an ICLEI – Local Governments for Sustainability member, the Cape Coast Metropolis seeks to drive urban sustainability by learning from other sister cities elsewhere.

5.4.4. CAPACITY BUILDING PROGRAMMES

To increase local capacity, several capacity-building workshops have been organised for stakeholders in different forms. For example, EPA officials and other key stakeholders have regularly been engaged in training workshops related to climate change.[42] According to research participants, these training workshops seek to deepen participants' understanding of climate-related issues and how they are addressed at all levels.

Research participants also added that the New Juaben South Municipality was recently involved in district-level vulnerability assessments nationwide as part of its National Adaptation Plan (NAP) process. This initiative aimed to understand better the impacts of the changing climate at the local level to build adaptative capacity and resilience in the context of the forthcoming NAP document. Consequently, a training workshop was held where stakeholders learned about a continuing vulnerability assessment conducted as part of Ghana's National Adaptation Plan.[43]

Additionally, to increase local capacity, urban stakeholders, including Municipal Coordinating Directors, Municipal Planning Officers, and Budget and Agricultural Officers, are often engaged in conferences, seminars, and training programs about environmental management and climate change issues. An example of this came from one of the officers of NADMO, who mentioned that every year, at the beginning of the rainy season, they sensitise communities in the Municipality about potential risks such as floods. One of the Municipal Planning Officers confirmed this in a similar claim that households are usually informed through announcements on radio stations, particularly on weather conditions.

[42] "These workshops seek to provide information on what is happening at the national level" (EPA, Koforidua).

[43] "As part of Ghana's National Adaptation Plan, we were involved in a training workshop on vulnerability assessment", (Municipal Assembly, Koforidua)

5.4.5. WASTE MANAGEMENT

Considering that improper waste disposal is a significant challenge across the 3 study areas, another initiative mentioned by research participants relating to addressing climate change is the reduction of solid waste. Some Planning officers in Koforidua's New Juaben South Municipality highlighted that the local governments have distributed communal waste containers at vantage locations within the cities for households and the public to control improper waste disposal. In addition to this, regular clean-up exercises were organised in collaboration with other stakeholders to clean up the municipality while managing the solid waste landfill sites.

Due to poor drainage systems and informal urban development, Koforidua faces challenges with flooding, particularly during the rainy season. Efforts are underway to improve the drainage systems, with plans for constructing communal drainage systems and regular desilting of choked gutters. For example, the interviews revealed that Koforidua is a beneficiary of the Ghana Secondary Cities programme, which aims to improve urban management and services. Research participants noted that with this programme, infrastructure will be enhanced to withstand the impacts of climate change.

It was interesting to learn that some households had acquired door-to-door waste collection services provided by Zoomlion Ghana Limited in all 3 study areas.[44], a private sector organisation that oversees cleaning major streets and drains within the city centres. The study uncovered in Wa that due to tonnes of waste generated in the municipality, a recycling plant is being constructed with the support of Zoomlion Ghana Limited.

[44] Zoomlion is a private company which works in collaboration with the municipal assembly to collect solid waste in the municipality.

In the Cape Coast Metropolis, the Green Africa Green Organization (GAYO) has also designed the Sustainable Community Project to help manage household waste in urban areas.[45] Through household education on pit composting, the project sought to eliminate inappropriate disposal of solid organic waste and provide nutritious organic food to families through organic farming.

Additionally, GAYO has worked with the Cape Coast Metro and other key stakeholders to render sustainable waste management services, including regular beach clean-up exercises. Waste Wise Cities Challenge, which brings together cities looking to improve the management of their municipal solid waste with mentor cities, saying it was "an important moment in the history of city-to-city collaboration". This is the official beginning of the collaboration between cities looking for support in managing their rubbish and mentor cities committed to sharing their good practices and expertise.

5.4.6. SUSTAINABLE AGRICULTURE

Research participants in Koforidua expressed that Agricultural Extension Officers and their field supervisors are usually trained in soil testing, climate forecasting, and other valuable practices for smallholder farming.[46]. Additionally, research participants noted that there are instances where the capacity of local farmers is built and strengthened to increase productivity and enhance the living standards of vulnerable groups through the acquisition of alternative livelihood skills.

Another example highlighted by key informants during the interviews was within the context of climate-smart agriculture; the interviews conducted in the Wa municipality demonstrated that Agricultural Extension Officers and their field supervisors are usually trained on different

[45] "We intend to include more households in the future as the project is still in the early stages". (GAYO, Cape Coast)

[46] "Through these capacity building and training programmes, smallholder farmers were encouraged to use newly improved and drought resistant crops and traditional farming practices such as mixed cropping and mulching to conserve soil nutrients and water as adaptive measures". (Department of Agric, Wa Municipality)

aspects relating to soil testing, climate forecasting and other valuable practices for smallholder farming.

Some informal discussions with research participants also revealed that some locally based NGOs are keen on providing organisational development support to traditional authorities, Indigenous institutions, and local community groups with the right tools to develop sustainable local food systems, natural resource management, and local governance.[47]

It was also found that the Savanah Agriculture Value Chain Development Project (SADP), which the Government of Ghana implemented through the Ministry of Food and Agriculture, aimed to address disruptions in Ghana's food systems. It builds on earlier successes under the Savannah Zone Agriculture Productivity Improvement Project (SAPIP) and Savannah Investment Programme (SIP). According to research participants, the project is expected to:

1) Contribute to the Government's industrialisation agenda, including the One District One Factory.
2) Support skills development and entrepreneurship for women and youth and build resilient food systems in the savannah areas of Ghana's northern and middle belts.
3) Facilitate private sector investment in value chains associated with meat production, improved productivity, and feedstock production of rice, maise, and soybeans.
4) Projects where farmers have embraced climate-smart agricultural practices, such as conservation farming, to mitigate the impacts of erratic rainfall patterns.

[47] "In terms of managing the need to rely on dams and dugout wells to get enough water to meet our domestic and agricultural needs" (Wa Municipality)

5.4.7. COASTAL MANAGEMENT

Key informants in Cape Coast revealed that with financial support from USAID, the University of Cape Coast (UCC) undertook the Fisheries and Coastal Management Capacity Building Project by building local capacity to adapt to climate change.[48] The primary objective of this flagship project was to enhance the sustainable governance of Ghana's marine and coastal resources, with Cape Coast being no exception.

The project's overall objective was to enhance the capacity for sustainable fisheries and management of coastal resources. The goal of USAID's technical and financial assistance is to increase UCC's ability to create and deliver relevant and high-quality educational programs, essential research, and advisory services that will support the sustainable management of fisheries and coastal resources and advance the social and economic development of the country.

Additionally, the goal of this capacity-building program was to support organisational and individual learning, which fosters social capital and trust as well as the development of knowledge, skills, and attitudes. Successful learning also creates an organisational culture and capabilities that allow the university to set goals, meet deadlines, find solutions to issues, and design flexible processes that support national development.

Another remarkable project in Cape Coast in late 2011 when Bonn became the first German municipality to receive approval to implement a cooperation project as part of the Service Agency's Programme to Support Municipal Climate Change Mitigation and Adaptation Projects (FKKP). This was the project to restore Fosu Lagoon in Cape Coast.[49] For the inhabitants of Cape Coast, the lagoon is of significant environmental, economic, cultural and religious significance. In addition to providing local fishermen with their livelihoods, it is also

[48] USAID capacity building project. Retrieved from https://ccm.ucc.edu.gh/project/usaid-ucc-fisheries-and-coastal-management-capacity-building-project

[49] Retrieved from https://www.h-brs.de/en/izne/restoration-fosu-lagoon-cape-coast-ghana

a habitat for rare plants and animals. In addition to being significant to the local climate, it also provides a recreational space for the local population.

Table 2

Bottom-up climate-related initiatives by sub-national stakeholders

Sectors/focused areas	**Bottom-up climate-related initiatives**	**Stakeholders**
Agriculture and forestry	Re-afforestation (tree planting activities).	· National Government · Local Government (Cape Coast Metropolitan Assembly) · Forestry Commission · NGOs, e.g. GAYO
	Training of agricultural extension officers.	· MOFA
Environmental management	Environmental impact assessments of developmental projects.	· EPA
	Environmental education and awareness campaigns.	· EPA · Local government · NADMO · Information Services Department · NGOs, e.g. GAYO · Schools, Churches
Water and coastal management	Use of traditional knowledge. Hard and soft infrastructure, e.g. construction of sea defence wall.	· National Government · Local Government · Traditional authority · Fisherfolks association
Waste management	Hard and soft infrastructure, e.g., solid waste management and segregation.	· Local Government (CCMA, NJSM, WM) · Zoomlion Ghana Limited · NGOs

Flood and disaster management	Hard and soft infrastructure, e.g. construction and regular maintenance of storm-water drainage systems, desilting and dredging of chocked gutters. Education and awareness creation.	· NADMO · Local Government · EPA · NGOs
Urban planning	Building permits. Enforce land use and spatial planning laws. Zoning laws.	· LUSPA · Local Government

(Source: Author)

5.5. VARYING INITIATIVES, COMMON BARRIERS

5.5.1. ABSENCE OF LOCAL CLIMATE POLICIES

An inquiry into the challenges demonstrated that the three study areas lacked local climate policies and action plans, making it difficult for relevant stakeholders to prioritise climate change issues in their jurisdictions.[50] Research participants indicated that the lack of political will to design policy instruments can be attributed to limited consideration of institutionalising climate concerns into development planning decision-making processes.

In this regard, mainstreaming climate change issues into development planning remains a choice for stakeholders.[51] Some interviewees also opined that implementing national climate policies becomes difficult because local needs are not considered at the national level. Stakeholder interviews in Cape Coast, however, revealed that the absence of institutional

[50] "We are not mandated to make climate decisions at the local level relating to needs of the Municipality", (Cape Coast Metro).

[51] "Without a statutory law mandating local governments to initiate climate change issues, it will remain an issue for discussion without concrete actions to address it" (New Juaben Municipality, Koforidua)

arrangements to ensure the effective implementation of national climate is linked to the perception that the climate problem is considered a central government task outside the mandate of local governments.

Others further said that unless this is done, climate change issues will consistently be underestimated and under-resourced at the district level. For example, one of the interventions indicated that while flood management is essential for the Metropolis, national policies fail to incorporate detailed elements of coping strategies leading to oversimplified measures.

In addition, fragmented power structures result in unclear duties and responsibilities at the local level in Wa. Some research participants opined that the central government's interest and overarching roles in local governance contributed to low participation in climate-related initiatives. Consequently, local-level stakeholders mostly only autonomously initiate and implement significant projects if they seek prior approval from the central government.

Discussions held with key informants in Koforidua indicated that the relationship between central and local governments in Ghana remains challenging because local-level policy actors are inadequately involved in national-level policy formulation processes. This is because a few representatives are invited to attend national-level consultative workshops where the selected attendees are assumed to disseminate information to local communities. Besides the limited numbers from the local level, the invited participants must be sufficiently prepared to contribute meaningfully, given the time frame and other factors.

5.5.2. LIMITED TECHNICAL CAPACITY

Limited technical expertise and administrative capacity can impede policy implementation. Local government officials and non-governmental civil society organisations in Wa and Cape Coast attested they needed sufficient technical skills for long-term climate change adaptation and mitigation planning. According to them, limited knowledge of climate science and vulnerability assessments of current and future risk limits the development and implementation of appropriate projects and programmes.

Similarly, interviews with stakeholders in Koforidua established that inadequate technical capacity was one of the main barriers faced in their respective cities. To this end, research participants emphasised that many stakeholders in smaller municipalities need more technical expertise on climate change. For example, one of them explained that, apart from a few senior officials or heads of departments who have in-depth knowledge about issues related to climate change at the national and international levels, the rest of the staff need more experience and skills. [52]

Additionally, interviews with NGOs in Wa indicated that most officials needed scientific knowledge to discuss the city's specific areas and needs. Wa's lack of technical expertise is mainly due to recruiting experts and consultants from the capital city, Accra. In an informal conversation with the Municipal planning unit and the EPA offices, it was found that only a few officials are usually invited to participate in some training programmes either in the country or elsewhere.

5.5.3. ORGANISATIONAL CONSTRAINTS

Effective implementation of climate policies requires strong institutional capacity and governance structures. Policymakers often face challenges in building the necessary institutional arrangements, coordination mechanisms, and capacities to ensure policy coherence, monitoring, and enforcement.

Related to limited technical capacity are organisational constraints, which include the absence of dedicated offices and inadequate staffing. Human resource constraints were a significant barrier to effectively implementing climate-related projects at the local level.[53] With limited

[52] "Though we know that a lot of policies exist at the national level, we are not meaningfully engaged at the local level. We always must rely on the national government and development partners to provide technical backstop on climate change issues since we barely get engaged in some of these capacity building programmes either at the national or international levels", (New Juaben South Municipality, Koforidua)

[53] "We don't have the human resources to lead and coordinate all projects and unfortunately, climate change is not one of our priority areas", (Wa Municipality)

staffing capacities, organisational set-ups remain a barrier due to inadequate internal resources to enable and progress adaptation efforts. A few interviewees confirmed that sometimes, other bigger municipalities have more staff and departments, unlike the smaller ones.

Further investigation on organisational barriers indicated that no dedicated departments or committees oversee climate project implementation in the 3 study areas. For instance, the Municipal Assembly in Koforidua, Wa, and Cape Coast are governed by the Chief Executives, who work with their development planning offices to ensure that climate change concerns are mainstreamed into medium-term plans. Considering this, research participants highlighted that having relatively limited organisational capacities and fewer departments means less engagement in climate-related initiatives.[54]

The interview results demonstrated that currently, there are no appointed officials to coordinate climate-related projects in most decentralised government agencies. Like the Municipal Assemblies, other organisations, such as the EPA, needed dedicated departments, which makes it quite challenging to focus on climate issues at the local level. As reported by some key informants, the absence of administrative structures to support projects related to climate change makes it challenging at the regional level.[55]

Some research participants believed that leadership was another facet of organisational coordination since there is a lack of clarity in assigning duties to efficiently implement national programs on the local level.

[54] "A gender desk officer has been created at the District Assembly level and in some decentralised departments such as the Ghana Education Service to support gender mainstreaming of local development, but in the case of climate change, there was no such thing as climate change desk officer" (Wa Municipality)

[55] "Even though we organise some educational programmes on climate change, bigger projects are handled by our Climate Change department, which is based in the EPA head office in Accra" (EPA, Koforidua)

5.5.4. INADEQUATE FINANCE

Implementing climate change policies requires significant financial resources. Policymakers face challenges securing adequate funding for mitigation and adaptation measures, particularly in developing countries. Balancing policy implementation costs with other societal needs can be a significant challenge, especially when short-term costs are more visible than long-term benefits.

Further investigation into the challenges revealed other areas, such as insufficient funding throughout the three research areas. Interviews with government officials discovered that budgetary and financial constraints hindered local governments' ability to implement climate-related initiatives adequately.[56] In conversation with one of the budget officers from the Wa Municipality, it was gathered that more budgets from the central government and limited district revenues were needed.

The primary funding source for them is the District Assembly Common Funds (DACF)[57] From the central government. The DACF, a significant revenue source for MMDAs, has specific purpose areas for funding allocation, and the list does not include an allocation for climate disaster risk reduction. Research participants acknowledged that limited internally generated funds (IGF) from property rates, taxes, and levies lead to prioritising development needs, suggesting that future climate concerns compete with immediate local development concerns.

[56] "We do not have a budget for climate change, and it is difficult to allocate finance for climate change-related projects as they compete with other developmental projects like education, sanitation, health, etc", (Cape Coast Metro)

[57] District Assembly Common Fund was established under District Assembly Common Fund Act 455, 1993 and is a development facility to assist districts in implementing development programmes. In 2007 the fund increased from 5%-7.5% of all national tax revenue. This is then shared among district assemblies based on criteria established by the DACF team and approved by parliament.

Besides this, the lack of transparency and accountability in many government projects leads to the misuse and misappropriation of public funds, which fails to complete numerous projects. To that end, key informants stated that local access to private-sector financing is sometimes challenging.

The NGOs interviewed faced the challenge of accessing bilateral and multilateral funds due to the complex nature of mobilising and accessing them, which limited them from undertaking many projects.[58] Others added that though the municipality may encounter donor funding related to climate change, accessing these funds will require going through the national government, which is a complex situation.[59] Climate change funds might be available from donors and development partners, but accessing these funds requires that climate change issues be articulated. Since such skills are rare, officials fail to secure climate funds from international sources. This has demoralised most of them from working with donor agencies.[60]

5.5.5. Absence of Local Climate Data

The interview results demonstrated a need for more local climate data to inform planning and decision-making. However, this hinders stakeholders' ability to develop climate change response strategies. Like the cases of Wa and Koforidua, research participants noted that the need for more data makes planning for current and future risks associated with climate change ineffective. Notably absent are baseline data, vulnerability assessments, and GHG emissions of their respective cities. The lack of scientific data and extensive databases was attributed to inefficiency.

[58] "For us to access climate finance from donor agencies, we need the technical expertise which is lacking at the local level. We cannot always wait for the national government to bring money for climate change projects, which never comes most of the time" (New Juaben South Municipality, Koforidua).

[60] Many climate adaptation strategies and projects are never fully implemented or funded because they often lack coordination, ownership, and accountability

In Cape Coast, a few interviewees mentioned that the data gap results in deficiencies in financial and development planning since MMDAs are often allocated funds based on their capacities. Also, the inadequate staff and poor facilities for weather forecasting and related activities have undermined the ability of the cities to provide adequate support and information to all sectors and stakeholders so that they can better adapt to the impacts of climate change. For instance, there needs to be more staff to collect data from manual stations, and training is required for people to work at new stations as they are built.

5.5.5. POLITICAL INTERFERENCES

Political pressures, short-term considerations, and vested interests can hinder the development and implementation of ambitious climate policies. Political interference challenges involve conflicts between politicians' policy-decision makers and technocrats. Political interference, as reported by key informants, manifested in different forms. Examples included politically driven projects that are not environmentally friendly, such as building in waterways.

Sometimes, too, there is a conflict of interest where politicians attempt to save votes by ignoring the enforcement of bylaws to protect electorates. Such tendencies result in mistrust between government agencies and local communities.[61] One of the officials interviewed reported having been confronted by a politician who asked him to stop evicting residents who had built in an unauthorised space. These examples show that some politicians may prevent the implementation of some climate change projects.

Another aspect highlighted by some research participants is the time frame in electoral cycles where decision-makers influence the life cycle of some projects. For instance, one of the interviewees in Koforidua confirmed that the problems of Municipal Chief Executives' short-term cycles often result in project delays and uncertainty. Others added that appointing

[61] "It is very difficult for regulatory agencies since we are forced to comply with directives from politicians and in some cases, the newly appointed government official may not continue with existing projects"

municipal chief executives based on political instead of merit-based criteria leads to a loss of efficiency, professionalism, and expertise.

5.5.6. INEFFECTIVE STAKEHOLDER ENGAGEMENT

Discussions with key informants in Koforidua and Wa indicated that local actors must be more adequately involved in national-level policy formulation processes. Besides the limited numbers, the invited participants must be sufficiently prepared to contribute meaningfully because the draft documents are not shared before meetings to solicit contributions. Also, invitations to participate in consultative workshops are often given within a short time frame that does not allow adequate preparation and participation of individuals.

Despite the importance of collaboration in implementing climate change projects, one of the factors identified by research participants was the difference in organisational goals and needs. For example, while the goals of local governments, departments and agencies were to oblige to some requests from the national government, non-governmental organisations were focused on meeting the requirements of their donor agencies. It was established that ineffective collaboration and stakeholder engagement resulted in duplication of efforts. This lack of coordination is due to over-dependence on the skills of the project leads instead of the legitimate organisations. This has contributed to failed projects.

Another reason there needs to be more collaboration, and partnership is the perception that some stakeholders are superior to others. Some research participants also identified the over-centralisation of work and approvals as a significant institutional constraint that often results in unnecessary delays and other inefficiencies. For these reasons, it was common to hear comments such as climate change is the work of the national government due to unclear roles.[62] For instance, they cited examples such as officials at the national level who tend to review

[62]"There are series of stakeholder meetings, but in reality, we work in silos" because of perceived superiority (Cape Coast Metropolis)

documents and need to become more familiar with the current conditions and attitudes of the municipality.

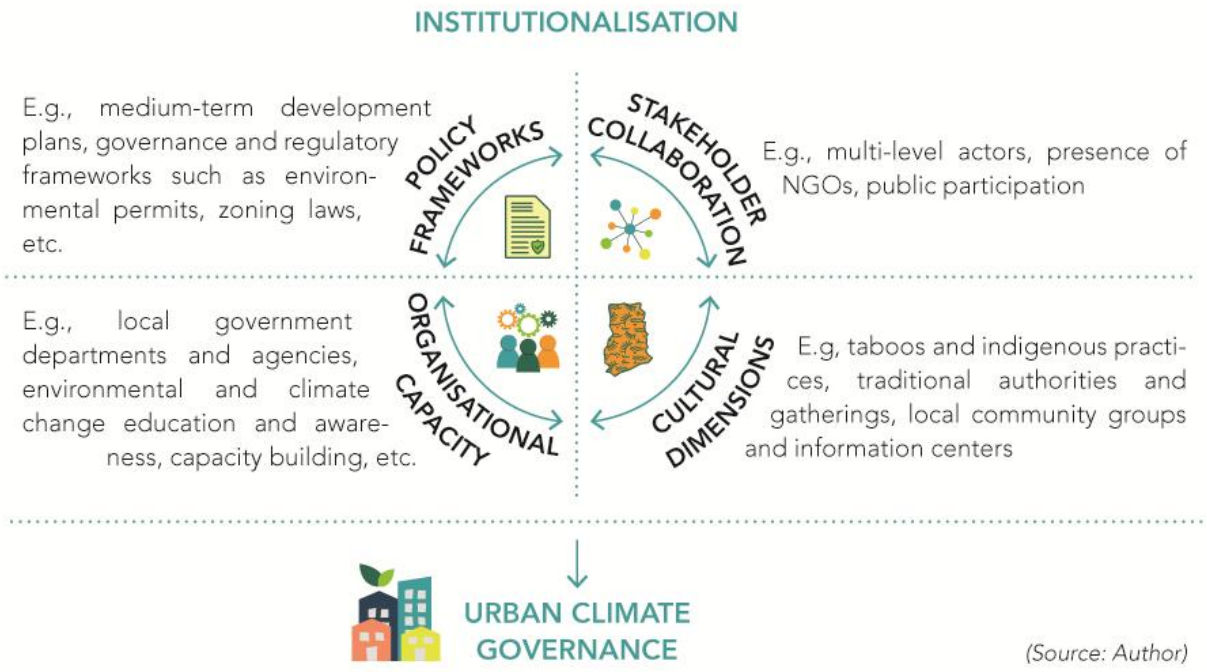
5.6. VERIFICATION OF CONCEPTUAL FRAMEWORK

Figure 10 introduces a refined conceptual framework derived from valuable insights collected during stakeholder workshops and focus group discussions to address these challenges and improve local resilience. This framework is designed to respond directly to the third research question, emphasising various institutionalised tools and techniques SMCs are using to adapt to the effects of climate change. These resources guide adaptation strategies and build local governments' capacity to engage with climate issues proactively.

The framework emphasises four essential elements for developing robust local climate policies: policy frameworks, Organizational Capacity, Stakeholder Collaboration, and cultural dimensions. By focusing on these elements, the conceptual framework seeks to empower SMCs to enhance their adaptive capacity and resilience against climate change, ultimately leading to more resilient urban environments. This holistic approach underscores the interconnected nature of policy, capacity building, collaboration, and cultural context, highlighting that progress in one area can positively influence others.

Figure 10

Revised Conceptual Framework



5.6.1. POLICY FRAMEWORKS

5.6.1.1. Medium-Term Development Plans

Without explicit local climate policies, the case studies reveal that climate change adaptation efforts can be successfully integrated into the working of SMCs through the formulation of medium-term development plans. These plans are crucial as they align with national priorities and guidelines. Local governments are mandated to prepare and submit these development strategies to the National Development Planning Commission (NDPC). In this process, they must consider fostering resilience against the adverse impacts of climate risks.

Research participants stressed the importance of mainstreaming climate-related concerns within these medium-term plans. Doing so strengthens the local response to climate issues. It enables a framing that accurately reflects local needs, mainly because certain national policy actions may not be applicable within specific local contexts. This tailored approach allows for

a more effective policy response that resonates with the distinct climate challenges faced by different jurisdictions.[63]

In Koforidua, for instance, stakeholders have identified several targeted areas within their recently developed medium-term plan that address climate adaptation. These areas include enhancing the built environment, improved waste and sanitation management, strategies to bolster revenue collection, and initiatives to generate job opportunities for the unemployed.[64] These priorities illustrate a comprehensive understanding of the local climate challenges, effectively addressing environmental sustainability and socio-economic development.

Key informants pointed out that mainstreaming climate change considerations is best initiated through pilot projects within critical sectors of the local government. This strategic approach encourages innovation and serves as a platform for collaboration among various stakeholders. Referring to findings from Chapter 4, participants highlighted various climate-related projects and program areas that have been successfully undertaken. These include climate-smart agriculture practices, sustainable land management initiatives, ecosystem restoration efforts, and disaster risk reduction strategies.

For example, to counteract the increasing frequency and severity of floods, the local governments across the three study areas have implemented adaptive measures, such as constructing robust drainage systems. These infrastructures are designed to effectively channel stormwater, preventing flooding in residential areas. Furthermore, some local governments have initiated sustainable waste management practices, striving to build resilient urban communities that can withstand climate-related challenges.

[63] "This idea of developing our medium-tern plans is better because it ensures that strategies are contextually relevant, and it resonates with local stakeholders since it addresses specific needs unique to the community or urban area" (New Juaben South Municipality, Koforidua)

[64] New Juaben South Medium-Term Development Plan (2018-2021)

Discussions in Wa revealed a growing commitment to sustainable agriculture projects. Local and traditional authorities have highlighted the crucial role of clearing riparian vegetation, which has been identified as a significant contributor to river soil erosion and sedimentation. This challenge ultimately impacts stream flow and water availability. In response, they are adopting several remedial measures, including raising community awareness about the detrimental effects of deforestation around water bodies and promoting initiatives for preventing bushfires.

The overarching consensus among stakeholders is that adaptation efforts can seamlessly integrate into urban governance. This is facilitated by the fact that municipal assemblies and other sectoral organisations are already taking proactive steps to address the pressing impacts of climate change on their communities. Through these initiatives, they are cultivating an adaptive local governance framework that prioritises sustainability and resilience in the face of climate challenges.

5.6.1.2. Urban Planning Regulations

Governance and regulatory frameworks are crucial in shaping local governments' responses to environmental challenges, particularly climate change. These frameworks establish the guidelines that govern urban environments, ensuring that climate concerns are incorporated into various aspects of city management. Integrating climate responses into urban planning includes zoning regulations, infrastructure development, and land use strategies, aiming to create sustainable urban spaces.

For instance, urban planning regulations ensure that developments are resilient to climate impacts such as flooding, heat waves, and rising sea levels. This proactive approach involves analysing potential climate risks during the planning phase, which can significantly reduce the vulnerabilities of urban infrastructure and populations.

Urban planning has emerged as a critical avenue for institutionalising climate change mitigation strategies. Stakeholders in different study areas, such as Koforidua, Wa, and Cape Coast, emphasised incorporating climate considerations into spatial planning processes. This

structured approach facilitates informed land use decisions that can accommodate urban growth while addressing environmental sustainability.

Zoning laws are essential for local governments to manage land development and resource use. Establishing specific guidelines for how land can be utilised, these laws help ensure that developments adhere to sustainability practices and are equipped to handle future climate risks. Moreover, collective enforcement of bylaws and extensive community engagement help gain public support and participation in urban planning initiatives.

5.6.1.3. Environmental Permits and Assessments

Environmental permitting is another vital mechanism for addressing climate change in urban areas. Through Environmental Impact Assessments (EIAs), local governments can evaluate the potential environmental effects of proposed projects, determine their significance, and ensure compliance with environmental regulations. Ghana's Environmental Protection Agency (EPA) plays a key role in this process.

In cities like Koforidua, Wa, and Cape Coast, small-scale projects are subjected to a screening process. Environmental permits issued by the EPA enable these projects to commence while ensuring that any deficiencies identified are addressed. This process typically takes around 24 months from permit issuance to project commissioning, allowing for thorough evaluations and adjustments. Additionally, in the case of larger projects facing public dissent, the EPA organises public hearings to gather community feedback. The requirement for two-thirds of the panel members to be residents ensures that community interests are represented, fostering a transparent decision-making process. Once a project is approved, the EPA communicates the decision to local authorities, making details accessible to stakeholders. A 21-day public notice accompanies the final Environmental Impact Statement (EIS) report, further promoting transparency and community engagement.

The institutionalisation of the EIA process is crucial for effective climate governance. By embedding mechanisms for monitoring and accountability, local governments can track the implementation and outcomes of climate-related actions. This monitoring is vital for evaluating

the effectiveness of local climate policies and ensuring they achieve the intended results. Regular reporting enhances accountability and builds community trust in governance processes. By involving the public and local stakeholders in evaluating the success of climate initiatives, governments can adapt practices based on community feedback and experience, leading to more effective and resilient urban environments.

In summary, integrating climate change into urban planning through regulations, environmental permits, and ongoing monitoring is essential in building sustainable cities that can withstand the challenges posed by a changing climate.

5.6.2. ORGANIZATIONAL CAPACITY

This section delves into the multifaceted approaches needed to institutionalise climate change within local government organisations. It emphasises the importance of establishing robust structures that leverage human and financial resources to ensure effective coordination and provide comprehensive technical policy advice. Creating specific institutional frameworks within local governments and related entities aims to guarantee that climate policies receive the attention they deserve and are actively executed. These frameworks facilitate coordination among various sectors and stakeholders engaged in climate action. For instance, dedicated agencies, departments, and units are essential for implementing climate projects effectively.

Institutionalising climate responses is not solely about administrative structures; it also involves nurturing a climate awareness and education culture. This cultural shift is pivotal in engaging citizens, enhancing public understanding, and generating widespread support for climate initiatives. Public campaigns designed to educate communities about vital topics such as waste management, flood prevention, and sustainable practices are instrumental in achieving this goal. Programs aimed at fostering climate literacy, implemented in schools and community centres, work to not only inform but also empower individuals to participate actively in climate action.

5.6.2.1. Local Government Departments and Agencies

Addressing the far-reaching impacts of climate change necessitates collaboration and understanding across numerous key sector ministries and agencies—not solely those focused on environmental issues. Meaningful collaboration among diverse organisations encourages information sharing and collective problem-solving. Participants in discussions held in Cape Coast noted that local-level government ministries, departments, and agencies are crucial for revealing the interconnectedness of climate adaptation measures with other developmental objectives. This alignment allows optimal resource allocation and embedding climate resilience directly into the core administrative processes.

The findings from Wa also revealed significant strides in integrating climate change adaptation planning into existing organisational frameworks. This integration lays the foundation for a cohesive and comprehensive strategy tackling climate-related challenges. Participants expressed that formalised organisations empower local actors, enhancing their ability to respond effectively to climate threats. As government agencies, such as the Land Use and Spatial Planning Agency, evolve to prioritise climate action, they increasingly incorporate climate-sensitive strategies into urban planning practices.[65]

In Koforidua, many research participants highlighted that assigning clear roles and responsibilities to government departments, such as the Environmental Protection Agency (EPA) and the Forestry Commission, simplifies implementing national climate change policies at the local level. This structured approach enables the smooth execution of climate-related initiatives and projects.

Establishing specialised organisations and departments ensures efficient monitoring of these policies and projects while fostering collaboration among various departments to embed climate considerations into their operational frameworks. Stakeholders in Cape Coast

[65] "The creation of a climate change desk will ensure that climate change is a top priority when urban planning and decision-making processes are carried out, resulting in more effective and focused climate change policies and initiatives, (Cape Coast Metro)

recommended creating dedicated climate change units within essential agencies, especially the Municipal Assemblies. These units would facilitate continuous learning and knowledge exchange among various stakeholders, enhancing the overall capacity to respond to climate change.

Integrating national climate policies into local government departments fortifies cross-sectoral coordination and ensures that environmental issues are woven into all facets of regional development. This holistic approach significantly reduces the risk of fragmented efforts that lack cohesion. Furthermore, existing units within the Ministry of Agriculture actively collaborate with Metropolitan, Municipal, and District Assemblies (MMDAs) to implement various national policies, projects, and programs. During focus group discussions, participants shared examples of how issues related to gender and disability have been adeptly mainstreamed within climate initiatives and how administrative and governance structures are in place to support these efforts.

Nevertheless, specialised departments or agencies are critical for fostering capacity development, informing policy decisions, and ensuring effective integration of climate considerations. These entities support diverse stakeholders, including municipal employees, legislators, community organisations, and the public, through training sessions, knowledge-sharing platforms, and technical assistance. Municipalities can promote sustainable community development by actively empowering residents to address climate change.

While national government resources principally fund climate-related projects at the regional level, creating dedicated climate change focal points or units can significantly enhance integrating environmental and climate risk into development planning. These units should possess the authority and capacity to manage cross-sectoral integration within government operations and projects. Their role would extend to fostering cooperation among various government ministries by identifying interlinked issues and dismantling silos that hinder effective climate action. Organisations often have targeted functions that can yield substantial co-benefits while not directly addressing climate change. For example, the Department of Gender may not directly focus on climate issues at the local level. However, its initiatives can

contribute to broader climate objectives by promoting equity and inclusivity in climate action strategies.[66]

5.6.2.2. Education and Awareness Creation

As highlighted in Section 5.3.3, the three municipalities have undertaken extensive initiatives to enhance stakeholders' awareness of environmental challenges, particularly climate change. The research participants emphasised that increasing climate change awareness and education is crucial in empowering stakeholders to make informed decisions and understand relevant adaptation measures.

Education has become a primary tool employed by various stakeholders, including government ministries, departments, agencies, non-governmental organisations (NGOs), and private sector actors, to facilitate the exchange of information and knowledge. For instance, empowering local leaders and community members through informal discussions, workshops, and educational forums fosters an environment where grassroots efforts drive climate initiatives. [67] The emphasis on public awareness campaigns also plays a significant role. Stakeholders noted that education is a vital conduit that bridges the gap between scientific understanding and traditional ecological knowledge, making climate change more tangible and applicable to daily life.

Climate change education frequently stresses integrating traditional and indigenous knowledge with modern scientific approaches. This integration enriches the understanding of climate change and contextualises scientific data in a manner that resonates with community members, making it actionable. Furthermore, community-led initiatives—backed by local cultural practices and enhanced through educational outreach—have the potential to catalyse environmental NGOs, significantly influencing urban climate governance.

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[66] Department of Gender (Wa Municipality)

[67] "Education is a good tool for local actors because as we organize these sensitization programmes, we tend to learn a lot from each other which influence our work", (GAYO, Cape Coast)

Stakeholders from Cape Coast pointed out that institutions such as schools, universities, and research organisations are pivotal in fostering climate education. These institutions serve as knowledge hubs, providing essential information, innovative research, and collaborative opportunities for effective climate action. They work with other entities to conduct relevant research, including studies on sustainable agricultural practices that address current and future challenges. The information flow within these systems is critical, encompassing quality access to data, performance monitoring, and transparent reporting. However, information gaps and difficulties interpreting knowledge can hinder effective climate responses.

5.6.2.3. Capacity Building Programmes

Implementing capacity-building training programs was a key focus across all three study areas under investigation. This emphasis stemmed from the recognition that many sub-national stakeholders struggle to harness opportunities arising from climate change due to a lack of essential skills and knowledge. Consequently, various governmental ministries, departments, and agencies (MDAs) alongside NGOs have sought to build and enhance vulnerable populations' adaptive capacities and local institutions' capacities.

This includes key stakeholders such as agricultural extension officers, National Disaster Management Organization (NADMO) members, Environmental Protection Agency (EPA) staff, and municipal assembly officials whose roles closely address climate change. Research participants indicated that investing in these capacity-building initiatives has empowered local communities to design and implement action plans at the regional level proactively. In Wa, for example, municipal staff and elected officials have participated in relevant conferences, workshops, and training courses aimed explicitly at bolstering their capability to respond to climate change. These capacity-building programs aim to equip officials with the necessary skills and knowledge to adapt to the multifaceted challenges posed by changing climatic conditions. They cover many topics, including sustainable agricultural practices, innovative water conservation techniques, and effective disaster risk reduction strategies.

Addressing the need for capacity building is particularly crucial for technical and non-technical staff within such departments to ensure they are adequately equipped to meet current and future challenges. Furthermore, capacity-building workshops and educational programs enhance knowledge and awareness of climate change and create a stronger stakeholder network. This network enables relevant actors to respond more effectively to urban needs through a coordinated and concerted approach. By strengthening the collective capacities of participants, these initiatives pave the way for a more unified and efficient response to climate-related challenges.

5.6.3. STAKEHOLDER COLLABORATION

5.6.3.1. Multi-level Actors

Institutionalising climate action at the urban level is a multifaceted endeavour that necessitates the active involvement of diverse stakeholders. This includes government entities, the private sector, civil society organisations, and local communities. Such collaborative partnerships enable cities to harness a rich pool of resources, knowledge, and expertise, thereby enhancing the effectiveness of their climate initiatives.

A crucial element of institutionalised climate action is establishing channels facilitating citizen participation. This approach fosters a sense of local ownership over climate solutions and empowers community stakeholders to engage meaningfully in decision-making. By doing so, local communities become vital contributors to developing and implementing climate strategies tailored to their unique contexts.

For instance, partnerships with the private sector may lead to deploying green technologies, initiating renewable energy projects, and promoting sustainable urban development practices. Community participation ensures that climate actions resonate with and respond to the local population's specific needs and priorities, particularly vulnerable groups often most affected by climate-related impacts.

In examining the multi-level governance framework in Ghana, municipalities play a significant role in engaging and coordinating with external stakeholders involved in climate change and environmental initiatives. Stakeholders have highlighted that successful climate governance requires collaboration among various governmental and non-governmental actors, creating avenues for efficient adaptation strategies. Alignment and coordination among different levels of stakeholders—national, regional, and local—enhance the effectiveness of climate actions, facilitating the transfer of resources and support. For instance, local governments in Koforidua noted that horizontal coordination within a single level of government strengthens institutional capacity to respond to climate challenges.

Three tiers of government actively participate in managing climate change, and decisions made at higher levels significantly influence cities' capabilities and resource availability to mount effective responses. Participants in the research indicated that local governments often benefit from financial assistance and other forms of support from higher governmental levels.

Moreover, local municipalities strive to shape the priorities of these upper echelons to suit their climate action agendas better. On the other hand, while environmental agencies at both national and subnational levels assume pivotal roles in climate governance, their influence can be limited by a lack of authority and connections to key actors in other domains. This limitation underscores how interpersonal relationships among staff members are intrinsic to the institutional framework and play a crucial role in determining the success of policy implementation measures.

5.6.3.2. Non-Governmental and Civil Society Organisations

Additional evidence of how climate change could be embedded within urban governance can be seen through the strategic maximisation of the impact of non-governmental organisations (NGOs) and civil society organisations (CSOs) at the local level. These entities are instrumental in promoting inclusive and participatory decision-making processes that actively engage local communities, Indigenous groups, and a diverse array of stakeholders in the planning, implementing, and evaluating climate adaptation policies and programs.

This collaborative approach ensures that local knowledge, needs, and perspectives—essential elements that reflect each community's unique context—are effectively integrated into crucial decision-making processes. In discussions held in Wa and Cape Coast, several NGOs shared valuable insights on how such a participatory culture has normalised within their constituencies.

One of the stakeholders illustrated how establishing NGOs has proven to be a robust mechanism for increasing awareness across various crucial areas, such as climate resilience, disaster risk reduction, sanitation issues, and overall environmental management. These organisations have played a significant role in educating the public and mobilising community action around these pressing issues. Government officials recognised that the NGOs and CSOs that have established effective partnerships with governmental bodies have overcome typical challenges. Their active involvement in various projects has enhanced community engagement and fostered better communication and collaboration between the government and the local populace.

Furthermore, research participants in Cape Coast noted the emergence of youth-led advocacy organisations that primarily focus on promoting environmental sustainability and community development. These organisations are vital in empowering and equipping young people with the skills and knowledge necessary to advocate for ecological education and sustainable practices. Among these groups, the Green Africa Youth Organization is a recognised actor in the Cape Coast Metropolis. This organisation has been working with local communities to address specific groups' vulnerabilities, such as children, youth, and women. These groups often bear the brunt of climate change impacts, exacerbated by existing social and structural inequalities. By focusing on these initiatives, the Green Africa Youth Organization aims to enhance resilience against climate-related challenges and promote social equity within the community.

Through these interconnected efforts, the role of NGOs and CSOs becomes increasingly vital in shaping urban governance frameworks that prioritise climate change adaptation, promote social inclusion and empower vulnerable populations. Their ongoing commitment to stakeholder engagement and community capacity building underscores the potential for transformative change in addressing the urgent challenges posed by climate change at the urban level.

5.6.3.3. Trans-national Climate Networks

In discussions with stakeholders, it became evident that certain cities seek to expand their climate-action jurisdictions by engaging in various strategies, many of which hinge on establishing transnational networks. During the fieldwork phase, it was noted that the cities of Koforidua and Wa had minimal or no substantial engagement with these transnational climate networks. While both cities participated in sister-city partnerships, the emphasis has predominantly revolved around economic, social, and cultural exchanges. Unfortunately, this focus has limited their proactive engagement in addressing climate change-related issues at a broader, international level.

In contrast, Cape Coast is a notable example; it is a recognised member of the International Council for Local Environmental Initiatives (ICLEI) and has formed a strategic partnership with Bonn, Germany. This collaboration allows Cape Coast to tap into valuable resources, knowledge, and networking opportunities through the Cities and Climate Programme and the Resilient Cities Initiative. These initiatives significantly benefit the city by facilitating a structured exchange of ideas and best practices and fostering learning networks that connect local communities, practitioners, policymakers, and researchers.

Participants in the research highlighted that such partnerships play a crucial role in developing tailored climate solutions that are ingeniously crafted to cater to the unique needs and characteristics of the urban population in Cape Coast. This localised approach ensures that solutions are relevant and deeply rooted in the area's socio-economic and environmental context.

By promoting collaboration and enabling the sharing of best practices, these transnational networks notably enhance municipalities' capacity to draw upon one another's experiences and expertise. This collaborative dynamic empowers cities to implement climate change solutions with increased effectiveness and efficiency. Municipalities can glean vital insights into innovative approaches, strategies, and legislative frameworks adopted elsewhere by scrutinising their counterparts' successes and challenges.

Moreover, knowledge sharing among various stakeholders is pivotal in fostering the dissemination of environmentally conscious practices within local government structures. It ensures that all administration levels— local officials and regional policymakers—are engaged and contributing to sustainability advancement efforts. Forming these networks and partnerships facilitates the exchange of technical expertise and opens doors to essential resources and financial opportunities that may otherwise be inaccessible. This multi-layered collaboration helps to create a robust and interconnected framework for tackling climate change, ultimately leading to more resilient urban environments.

5.6.3.4. Public Participation

The diverse tools highlighted by stakeholders encompassed the vital role of public participation in urban climate governance. Discussions in Wa illustrated how the municipality actively engages all stakeholder groups and the public by regularly hosting town hall meetings whenever new projects arise from the municipal assembly. This inclusive approach informs key actors about ongoing initiatives and fosters a collaborative environment where community members can voice their concerns and contribute ideas. Recognising that climate change is a universal challenge, these meetings provide invaluable platforms for knowledge sharing and information dissemination, allowing participants to become active players in their communities.

In contrast, the experience in Koforidua and Cape Coast revealed a different dynamic, where town hall meetings had broader reach and engagement. Here, essential agencies such as the Land Use and Spatial Planning Authority (LUSPA) and various ministries that cover multiple local government departments often play crucial roles in promoting a holistic approach to climate discussions.

Participants in the research emphasised that effective urban climate governance can significantly benefit from addressing a broad spectrum of needs and perspectives by including various stakeholders—particularly marginalised communities. This inclusiveness is not merely an additive aspect; it is fundamental to ensuring that climate actions do not perpetuate existing inequalities but contribute to equitable outcomes that uplift all members of society. Engaging communities in climate governance empowers citizens, providing them with a sense of ownership over the sustainability of their cities and instilling a strong sense of community agency in climate initiatives.

Integrating local communities into the climate governance framework enables cities to harness unique local knowledge and expertise. Citizens often possess deep insights into their environments, shaped by lived experiences, that can prove invaluable in formulating effective climate strategies. This synergy between local knowledge and scientific expertise facilitates the development of more nuanced and context-specific climate solutions and enhances the community's overall understanding of climate issues.

Stakeholders have noted that public participation serves as an essential catalyst in overcoming the barriers that often hinder the implementation of climate policies. By involving communities in decision-making, cities can address potential resistance and foster greater acceptance of climate initiatives. This participatory approach transforms climate actions from being viewed as top-down impositions into collective endeavours that reflect the community's will and aspirations.

Moreover, community engagement in climate governance is pivotal for strengthening local capacities for climate action. Through these participatory processes, citizens gain critical knowledge and build valuable networks that enable them to engage actively in climate governance. This capacity building is particularly significant for vulnerable communities that are often the most affected by climate change, empowering them to advocate for their needs and priorities in the face of escalating environmental challenges.

5.6.4. CULTURAL DIMENSIONS

In the context of climate governance, stakeholders across the three study areas highlighted the vital role of institutionalisation through cultural dimensions. This emphasis stems from the influence of traditional authorities, the significance of taboos, the wealth of indigenous knowledge, and the prevalence of unwritten practices that shape community dynamics.

5.6.4.1. Traditional Authorities

The focus group discussions in all three study areas illuminated the prominent presence of traditional authorities, who occupy a unique and revered position within their respective traditional regions. Participants articulated that these authorities serve as the custodians of the land, holding significant sway over natural resource management through the application of traditional customary laws. This leadership role is crucial when specific resources or ecosystems are vulnerable to environmental shifts. In such scenarios, communities often turn to their traditional authorities to initiate customary rites to preserve these resources.

Furthermore, traditional authorities play a critical role in mediating conflicts surrounding resource use, conflicts that the pressures of climate change can aggravate. Despite their potential influence, integrating these traditional leaders into contemporary climate governance frameworks poses substantial challenges. Many traditional authorities profoundly understand local ecosystems and historical practices, enabling them to participate meaningfully in governance discussions. However, bridging the gap between modern institutional structures and local traditional systems remains complex.

The significance of traditional authorities in climate governance is steadily increasing, as their leadership often shapes crucial local decision-making processes and facilitates community engagement. Their contributions can span the spectrum from high-level policy formulation to grassroots implementation initiatives, underscoring their role as essential connectors between local communities and modern governance structures.

These traditional leaders embody a wealth of indigenous knowledge in numerous communities, offering invaluable insights for crafting effective and culturally resonant climate adaptation strategies. Their respected positions within the community allow them to mobilise local action and ensure adherence to environmental regulations. This is particularly critical in areas where government ministries and agencies may be scarce or ineffective, making community-based governance the dominant force.

For instance, in Wa, participants highlighted the impact of climate change-focused durbars—public gatherings that promote dialogue and education about sustainable practices. These durbars, typically organised by the Centre for Indigenous Knowledge and Organisational Development (CIKOD) in partnership with local government and environmental bodies like the Environmental Protection Agency (EPA), bring together various stakeholders, including traditional authorities. During these platforms, community members discuss the sustainable management of vital resources such as farmland, water, and forests, fostering collective learning and shared responsibility.

Moreover, traditional chiefs collaborate with local government actors during cultural festivals, National Sanitation Days, and other national observances, strengthening the bridge between tradition and modern governance. Some participants expressed the need to incorporate qualified chiefs into government institutions like the EPA to enhance their contributions to national policy formulation and implementation.

Chiefs also advocate integrating the House of Chiefs into national policy frameworks. Meanwhile, local government actors have voiced their expectations that the central government facilitate decentralisation efforts and ensure that climate mitigation and adaptation strategies

are embedded within sectoral and District Assembly policies. The interplay between traditional authorities and modern governance structures presents opportunities and challenges in pursuing effective climate change adaptation. It illustrates the importance of respecting and integrating cultural dimensions into contemporary climate governance practices.

5.6.4.2. Taboos and Indigenous Knowledge

Indigenous knowledge and practices, developed and refined over countless generations, offer profound insights into sustainable environmental management, agricultural methodologies, and the conservation of natural resources. This vast repository of unwritten knowledge passed down meticulously from elders to younger generations, encompasses a range of taboos and customs that reflect a deep understanding of the environment and its intricate systems.

In climate governance, many indigenous practices present practical, locally adaptive solutions to pressing environmental challenges, demonstrating resilience in changing climatic conditions. For instance, in the local communities across the three study areas, rainwater harvesting stands out as a traditional practice with significant potential. This method involves collecting and storing rainwater in large barrels strategically placed under the roofs of houses, allowing families to stockpile this precious resource during the rainy season.

However, such practices have declined due to the introduction of modern conveniences such as installed wells and boreholes. Despite this shift, the community's reliance on Indigenous weather forecasting methods remains strong, with seasoned farmers utilising cues from nature—such as the behaviour of certain animals or the flowering of specific plants—to determine the optimal timing for planting various crops.

An intriguing example from our fieldwork in Cape Coast showcased the unique traditional practices observed by local stakeholders. Certain days of the week are designated as fallow periods for farmers and fisherfolk—days when no agricultural work or fishing is permitted. These periods are not subjective; they serve a vital ecological purpose, allowing the land, forests, seas, and rivers to replenish naturally. This cyclical approach to resource management

ensures long-term sustainability and continuity in ecosystem function, reinforcing the harmonious relationship between the community and their environment.

Traditional mangrove conservation methods illustrate indigenous strategies' effectiveness in addressing contemporary challenges. Climate change has amplified concerns over coastal erosion and storm surges, so communities have turned to habitual practices that protect these critical wetlands. These communities recognise that mangroves serve as natural barriers against sea-level rise and provide essential habitats for diverse marine species.

Community-led initiatives in these regions have increasingly focused on conserving biodiversity, driven by a profound belief in the sanctity of sacred forests. These forests are regarded as vital ecosystems and revered dwelling places for ancestors and deities believed to have sustained the community throughout history. The flora and fauna within these sacred groves are often unique, serving crucial medicinal and ceremonial purposes that further imbue them with cultural significance. Most research participants agreed that these traditional practices have shown remarkable sustainability, environmental friendliness, and cost-effectiveness.[68]

Additionally, traditional fisheries management practices reflect a sophisticated understanding of marine ecosystems. Practices such as establishing non-fishing days and enforcing taboos on certain species have been employed to prevent overfishing and ensure the replenishment of fish stocks. While these methods have proven beneficial historically, there is a growing recognition of the need to integrate them more fully with formal management practices to enhance their effectiveness.

[68] With limited or no technology, our smallholder farmers continue to plant different crops together since it is a practice from our ancestors, but it helps us get a good harvest even with the changing weather conditions", (MOFA, Wa)

By finding a balance between traditional customs and modern regulatory frameworks, communities can work towards achieving better results in the stewardship of their natural resources.[69]

5.6.4.3. Community Engagement

Discussions in Koforidua revealed the vital role of informal communication channels in fostering effective dissemination of information regarding climate change. Local information centres have become essential hubs, facilitating community access to crucial knowledge. Community radio broadcasts, delivered in local languages, ensure that messages reach every corner of the community, bridging gaps in understanding and engagement.

To enhance this communication, journalists must receive specialised training. They need to grasp the intricate causes and effects of climate change while being equipped to translate complex climate terminologies into accessible language for the local population.

Local authorities have taken proactive steps to support establishing community-based groups that are pivotal in strengthening integration and collaboration on climate governance. These initiatives thrive on participatory approaches, involving local communities and traditional leaders in planning and implementation. Such involvement empowers the community and enriches the decision-making process with Indigenous knowledge and perspectives.

Moreover, forming networks and alliances offers cities significant opportunities to access much-needed technical support and funding. These collaborations enhance cities' capacities and foster partnerships around research and development projects. By staying engaged through these networks, cities can remain at the forefront of the latest advancements in climate science, adaptation strategies, and technological innovations.

[69] "It is a taboo to go fishing on certain days of the week since it is assumed that riverbanks are protected", (Fishermen Association, Cape Coast)

Establishing such networks creates invaluable forums for promoting and coordinating collective efforts to confront climate change challenges. By working together at regional, national, and global levels, these collaborations can significantly amplify the impact of climate action initiatives, ensuring a more robust response to this urgent issue across various scales.

5.7. CHAPTER SUMMARY

Chapter Five of this dissertation provided a comprehensive exploration of the interconnectedness between climate change adaptation and local governance, with a particular focus on small and medium-sized cities (SMCs) in Ghana. The chapter delved into the complexities faced by local actors engaged in climate adaptation efforts, illuminating both the opportunities for and obstacles to effective climate governance.

Despite the strong international and national emphasis on combatting climate change, evidenced by a plethora of policy documents that advocate for coordinated multi-level responses to climate risks, the chapter reveals a gap in how these policies are translated into practice at the local level. Through rigorous analysis, the findings underscored the need to understand stakeholders' perspectives on the mechanisms employed by SMCs to address climate change challenges.

The empirical evidence presented in this chapter highlights that the impacts of climate change are significantly manifested across the three study areas examined. However, several critical challenges hinder SMCs from achieving effective urban climate governance. Key issues include:

Absence of Local Climate Policy Instruments: There is a notable lack of tailored local policies that specifically address the unique climate risks faced by these cities. This gap leaves local governments without the necessary frameworks to guide their climate adaptation strategies.

Organizational Constraints: Many local governments including the study areas encounter structural barriers that limit their ability to implement effective climate initiatives. Issues such as inefficient bureaucracies and poor interdepartmental coordination often impede progress.

Inadequate Financial Resources: A consistent theme emerging from the findings is the financial shortfall that local governments experience when attempting to fund climate-related projects. This limitation severely restricts their ability to adapt to and manage the effects of climate change.

Furthermore, the chapter assessed the conceptual framework outlined in Chapter Two, emphasizing the pivotal role that multi-level governance systems play in shaping urban climate actions. This analysis yields four critical dimensions derived from the empirical data collected across the study areas, which reflect specific subnational contexts that influence climate action. A visual representation of these dimensions is available in Figure 10, which provides clarity on their interrelations and impacts.

Participants from the research expressed a strong consensus on the necessity of institutionalizing climate change within urban governance frameworks. They provided practical examples of various tools and mechanisms that could facilitate this integration process effectively. While existing tools often serve multiple development priorities, the findings suggest that this multi-faceted approach sometimes detracts from the focus on climate objectives. As a result, climate considerations may become secondary to other pressing developmental agendas.

The chapter asserted that institutionalizing climate responses at the local level is crucial for ensuring the effectiveness and sustainability of climate strategies. By embedding climate initiatives within local governance structures, communities and local governments are better equipped with the essential resources, coordination mechanisms, and capabilities needed to address the climate crisis systematically. This institutional embedding not only enhances resilience but also fosters equity and sustainable development within urban environments.

In summary, Chapter Five intricately connected empirical findings with theoretical frameworks, offering a nuanced perspective on how the informal institutionalization of climate actions can serve as a practical response mechanism in developing countries. The insights gleaned from this chapter contribute significantly to enhancing resilience and adaptive capacity

in the realm of urban governance, providing valuable lessons for policymakers and stakeholders aiming to navigate the challenges posed by climate change.

6. DISCUSSION OF FINDINGS

6.1. CHAPTER OVERVIEW

This chapter provides a thorough investigation and interpretation of the research findings obtained throughout the study. It serves as a pivotal section that not only elaborates on the outcomes but also contextualizes them within existing knowledge and theoretical frameworks.

Section 6.2 summarises the key research findings by directly addressing the three primary research questions outlined in the introduction of the study. This summary will dissect the most significant data and insights drawn from the study, presenting a clear and comprehensive overview of the results. Each research question will be addressed systematically, elucidating how the findings correspond to the initial hypotheses and objectives set out at the beginning of the research. By focusing on the critical data points, the section also highlights any unexpected result, providing insight into how these may influence future research or practical applications.

Following this summary, Section 6.3 engages in a deeper interpretation of the findings, drawing explicit connections to existing literature in the relevant field. This portion is essential, as it situates the research outcomes within broader theoretical frameworks and prior empirical studies. By critically analysing how the current findings align with, confirm, or even contradict previous research, we can assess the significance and originality of the study's contributions to the ongoing discourse in this area. This linkage not only reinforces the relevance of the research but also aids in identifying potential gaps in the literature that future studies might address.

Throughout the discussion, we will explore the implications of the findings on both academic understanding and practical applications. Furthermore, consideration will be given to the limitations of the study and how these may influence the interpretation of results. Finally, suggestions for future research directions will be proposed, encouraging the continued inquiry into the themes and questions raised by this study. With this detailed analysis, the chapter aims to illuminate the broader impact of the findings and their role in advancing knowledge and practices within the discipline.

6.2. SUMMARY OF RESEARCH FINDINGS

This dissertation presents a comprehensive exploration of the argument that, in addition to the conventional top-down policy tools, it is critical for cities in developing countries to institutionalise existing informal tools and practices to adapt to the multifaceted impacts of climate change effectively. To substantiate this proposition, the study examined three pivotal issues of concern.

First, it addressed the necessity of expanding the focus beyond developed countries, highlighting the unique circumstances and challenges developing nations face in climate change. Second, it highlighted the status of small and medium-sized cities (SMCs) as a primarily overlooked category in climate action discourse. Finally, it investigated the rationale behind the institutionalisation approach, particularly emphasising its potential advantages for developing countries. Table 3 summarises the findings derived from a detailed case study conducted in Ghana and outlines the various dimensions of the research.

While the urban climate dynamics of climate change have been extensively studied within the developed world, there remains a significant gap in research addressing these phenomena in developing countries, particularly in sub-Saharan Africa. The study sought to fill this void, positioning itself as one of the few focused investigations into Ghana's climate strategies. Consequently, the first research question delved into Ghana’s methodology for addressing climate change across different levels of government while also examining the interrelations between national and local governance structures.

Figure 7 in Chapter Four revealed that Ghana has proactively prepared and submitted numerous climate-related policy documents at the international level under frameworks such as the UNFCCC Convention, its Kyoto Protocol, and the Paris Agreement—ratified by Ghana in 2016. At the national level, establishing a national climate change policy in 2013 marked a significant milestone, complemented by the introduction of a national climate change adaptation strategy in 2012. Notably, the Accra Climate Action Plan, adopted in 2021, represents a pioneering effort at the local level, addressing climate action comprehensively.

The study also aimed to deepen the understanding of subnational climate initiatives, particularly within the context of small and medium-sized cities, an area that needs more scholarly attention. In this context, the second research question explored the bottom-up climate-related initiatives implemented in SMCs. Data collected from three distinct study areas revealed a rich diversity in geographical and ecological contexts and a variety of socio-economic sectors relevant to climate priorities.

Chapter Five provided compelling findings that indicated a lack of presence among key national entities—such as the Ministry of Environment—at the subnational level. Nevertheless, these organisations collaborated with local stakeholders, including the Environmental Protection Agency (EPA) and the Ministry of Local Government, to integrate climate change considerations into local governance practices.

Moreover, the analysis highlighted a correlation between the grassroots initiatives and the specific challenges stakeholders face within these communities. The absence of local climate policies was a significant barrier, leading to limited stakeholder engagement in numerous climate-related projects. The study further observed that with restricted access to data at the sub-national level, the localisation of national climate policies could have been more robust, primarily due to discrepancies between national intentions and local needs.

In the end, the data from the case study reinforces the hypothesis that institutionalising climate change practices is a more advantageous approach for developing countries. By proposing a framework that illustrates how climate actions can be fundamentally integrated into the operational practices of local governments, this study presents a novel contribution to existing literature.

The findings indicate that informal tools, particularly traditional knowledge, comprise various techniques, customs, and belief systems related to agricultural practices, natural resource management, and community resilience. These informal methods empower local communities to effectively respond to and navigate the various environmental changes precipitated by

climate change, showcasing the intricate link between cultural practices and climate adaptation strategies.

Table 3

Summary of findings

Research question and hypotheses	Data collection tools	Key research findings
How is climate change addressed across various levels of government in Ghana?	Documentary review. Semi-structured interviews.	In response to international commitments and national needs, Ghana, under the leadership of the Ministry of Environment, has prepared high-level strategic documents under the UNFCCC processes to address climate change comprehensively. Climate change issues did not gain much interest at the national and sub-national levels until 2012, when the first policy instrument was adopted at the national level. The Accra Climate Action Plan is the only policy instrument at the sub-national level. Due to Ghana's decentralisation system, conflicts exist between national-level policies and localised actions.
What specific roles do SMCs play in the context of implementing national-level climate policies, and what barriers do they encounter in this process?	Semi-structured interviews	There are different stakeholders. However, a few are present at the local level. The Ministry of Environment and some departments are in the capital city. Floods are the most common climate-related impacts, and local initiatives are adaptation-focused rather than mitigation. Local-level actors and authorities often need an understanding of the nature and functioning of the various

		components of the international and national climate change framework. Local governments need to work on implementing national-level policies due to, among other factors, limited resources, capacity, and competing demands for developmental projects.
What are the prevalent tools and techniques and how can they improve climate adaptation strategies in Ghana's SMCs?	Focus Group Discussions	Medium-term development plans are the main formalised tools for mainstreaming climate change in SMCs. Many informal institutions, such as unwritten rules, taboos, and traditional knowledge, guide stakeholders in environmental conservation.

(Source: Author)

6.3. DISCUSSION OF RESEARCH FINDINGS

6.3.1. LOCAL CLIMATE POLICYMAKING IS A MISSING PIECE

The findings presented in Chapter Four support the first hypothesis that climate change policy instruments are primarily focused on national and international levels rather than local levels in Ghana. This pattern highlights a critical gap in climate governance. The subsequent discussion aims to elaborate on the key observations from the research findings, the implications for climate policy, and suggest pathways forward.

6.3.1.1. Influence of International Agreements

Ghana's commitment to international climate agreements, such as the UNFCCC, has guided its national climate policies. The ratification of significant agreements, such as the Kyoto Protocol and the Paris Agreement, has catalysed the development of formal climate-related frameworks and reports, including the National Climate Change Policy and Nationally Determined Contributions. While these efforts demonstrate a commendable alignment with global climate goals, they also reflect a tendency to prioritise international obligations over

addressing local issues. The resulting national policies often overlook the specific climate vulnerabilities faced by local communities, which can lead to a mismatch between policy intentions and real-world impacts.

The existing national frameworks were developed to fulfil international reporting requirements rather than to establish a holistic and locally relevant climate action agenda. This is evident in the findings, which indicate that none of the NDCs analysed explicitly mention local-level actions. Instead, they generally address urbanisation as a significant challenge, reinforcing the narrative that local contexts are secondary in national climate discourse.

The underlying implication is that while Ghana is enacting policies that adhere to international expectations, these policies may need more contextual understanding to drive meaningful local climate action. The influence of international commitments, as noted by scholars such as Dovie et al. (2019) and Adu-Boateng (2015), reinforces the relevance of global frameworks in shaping national policies. However, while these commitments can catalyse action, they must not overshadow local needs. The lack of engagement from local stakeholders in the planning and implementation of national climate strategies can perpetuate a cycle where local contexts are inadequately addressed, leading to ineffective responses to climate challenges.

6.3.1.2. Dominance of National-level Policy Frameworks

The findings in Section 4.3.3. raise critical questions about realigning national climate strategies to be more inclusive of local perspectives. Ghana's national policies must evolve through active consultation with local governments and communities to genuinely reflect and address local realities. Engaging these stakeholders can facilitate the development of contextually relevant and effective climate policies that resonate with their specific needs and challenges.

The absence of robust local-level climate policies hinders effective adaptation and mitigation efforts and risks exacerbating existing vulnerabilities. Local climate policymaking is crucial, enabling tailored responses considering various regions' unique geographical, social, and

economic contexts. Effective policies must be shaped by local knowledge, needs, and conditions to ensure an appropriate and impactful approach to climate resilience.

The existence of the Accra Climate Change Action Plan as the sole local-level policy instrument highlights an essential gap in climate governance across Ghana. This limitation implies that other regions lack the necessary frameworks to assess their climate vulnerabilities and respond accordingly. In contrast, cities in developed nations have made substantial advancements in developing localised climate policies adaptable to specific conditions, suggesting a robust model for Ghana to emulate.

Kern's research (2019) posits that national climate policies fundamentally shape urban responses to climate challenges, providing direction and resources for localised actions. However, an analysis of Ghana's NDCs reveals a troubling trend: these documents rarely articulate specific implications for urban areas, much like other countries. The overwhelming focus on national interests often neglects local adaptations for fostering genuine climate resilience.

Notably, the Accra Climate Change Action Plan emerges as a critical exception within this framework, representing the first local-level initiative designed explicitly to address climate change. Its formulation is pivotal for establishing a city-specific approach to climate challenges, reflecting the urban population's unique needs, conditions, and priorities. Stehle et al. (2022) contend that local climate policies are vital to ensuring that interventions adequately address the needs of those most impacted by climate repercussions.

Furthermore, as highlighted by Adjaison and Amoah (2024), Accra's progressive approach can potentially create invaluable peer-learning opportunities for other cities within Ghana, encouraging a domino effect of localised climate action planning across the country. For instance, cities like Amsterdam and Barcelona have developed detailed climate action plans that align urban development strategies with environmental sustainability and address climate mitigation and adaptation. Such proactive measures allow them to respond more effectively to

the peculiar challenges of climate change, demonstrating the advantages of synchronised national and local efforts (Addaney, 2022).

The research underscores the necessity of recognising and prioritising local climate policies that address the unique needs of communities most affected by climate change. Hunter (2020) emphasises that local climate policies and action plans ensure that initiatives resonate with the immediate needs of affected populations. By neglecting to incorporate local perspectives, national policies risk becoming obsolete and ineffective. The focus must shift towards creating adaptive policies that engage local stakeholders actively in the planning and implementation stages.

While Ghana has made significant strides at the national level in addressing climate change, the continued absence of dedicated and effective local climate policies poses a substantial barrier to sustainable development and resilience. By prioritising the development of robust local frameworks that acknowledge and address the unique challenges faced by communities, Ghana can significantly enhance its capacity to respond to climate challenges and bolster resilience in areas most vulnerable to climate impacts. Such concerted efforts will advance national commitments and contribute to achieving sustainable development in an increasingly uncertain climatic future.

6.3.2. CONFLICTS BETWEEN NATIONAL AND LOCAL GOVERNMENTS

The interplay between Ghana's national and local government structures reveals significant conflicts in effectively localising climate policies. The findings from Chapters Four and Five confirmed the hypothesis that conflicts inhibit the implementation of national policies at the local level. This dynamic is critical in understanding the broader implications of decentralisation efforts, particularly concerning climate governance.

6.3.2.1. Weak Decentralisation

Chapter 4 underscores that despite the theoretical framework provided by Ghana’s 1992 Constitution, local governments function under a significant power restriction. The findings corroborate the assertion that they lack autonomy, which indicates that the national government

retains the final say on virtually all climate-related initiatives. Notably, while the Local Government Act aims to empower district assemblies, the practical implications of this are limited—climate actions remain peripheral rather than central in local governance agendas.

Weak decentralisation manifests prominently in the Ghanaian context, where the process is insufficiently robust. Despite the constitutional provisions theoretically empowering local governments, the reality outlined by Musah-Surugu et al. (2019) indicates a centralised system where the national government retains substantial control over local climate initiatives. This centralised authority undermines the potential autonomy that district assemblies might exercise in crafting bespoke responses to climate challenges that resonate with their unique local conditions.

The literature highlights the critical need for capacity building within local governance structures. Yeboah-Assiamah (2016) highlights that effective governance requires the framework of decentralisation and the accompanying power and resources to effectuate change. In contexts where local authorities are underfunded and lacking expertise, their ability to create and implement effective climate action plans diminishes. Providing training for local officials, access to climate data, and incorporating climate considerations into local development frameworks, such as the District Medium-Term Development Plans (DMTDPs), becomes vital. These steps are necessary to build the foundational capacity required to address climate change at the local level adequately.

6.3.2.2. Institutional Fragmentation

Institutional fragmentation emerges as a recurrent theme that further complicates climate governance in Ghana. The findings suggest an ineffective coordination among various governmental agencies and stakeholders, leading to a disjointed response to climate change. The lack of a comprehensive framework for inter-agency collaboration exacerbates this issue, as governmental bodies operate in silos, failing to harness collaborations that might enhance climate resilience. Efficient governance necessitates a holistic approach where different levels of government and stakeholders work together to develop cohesive climate strategies.

The stakeholder mapping mentioned reveals a dominance of national actors, who, while resourceful, may need to be adequately equipped to address the specific environmental challenges faced at the local level. The role of subnational actors is crucial, yet their involvement in national policy formulation is minimal. This is particularly concerning, as it indicates a top-down approach that must recognise the invaluable insights and localised knowledge that district-level representatives could contribute to national discussions.

The assumption that these representatives will consult their communities before attending national workshops further perpetuates disconnects between the levels of governance. Moreover, Ghana's current national policy framework appears to need more precise definitions of the roles and responsibilities of urban centres. The blurring of lines among various levels of governance—national, regional, and municipal—reflects a governance landscape that is crowded yet unclear. This, combined with overlapping authorities and responsibilities, creates confusion and limits effective urban climate action.

The findings also highlight the conflict between traditional land management practices and modern urban planning regulations. This tension indicates a broader struggle to integrate modern scientific approaches with time-honoured local traditions, which can lead to missed opportunities for effective climate adaptation strategies. The traditional custodians of natural resources, such as local chiefs, play a significant role in maintaining sustainable practices. However, their knowledge and practices often need to be more utilised in formal policy discussions.

6.3.2.3. Lack of Policy Coherence

Urban climate actions are intricately tied to many relationships among actors operating at different governance levels. The absence of a coordinated approach to mainstreaming climate change between national and local actors has resulted in a significant gap in planning and integration at the regional level. Given the persistent misalignment between national agendas and localised needs, translating national policies into actionable local strategies remains a formidable challenge.

Thus, fostering cooperative relationships among diverse stakeholders at all governance levels becomes essential. Coordination efforts should focus on compliance with national policies and promoting local innovation and adaptation strategies that address immediate environmental challenges.

Local governments often operate under constraints dictated by central government mandates, which can severely limit their capacity to innovate or prioritise climate action effectively. The complexity of statutory duties poses challenges, where some obligations are compulsory while others allow for discretionary action. This disparity necessitates a more profound exploration of urban governance, as the national government holds a leadership role within this framework. A vital gap exists in fostering more potent connections and collaboration between national stakeholders and local municipalities, which could enhance the alignment of urban adaptation activities.

Often, local authorities need to be adequately consulted in developing national climate policies, leading to a disconnect in translating these policies into actionable local measures. The absence of precise mechanisms to guide local governments creates fragmented efforts and undermines opportunities for synergy across different levels of governance. In this regard, strengthening horizontal and vertical policy coordination mechanisms can ensure local governments receive the necessary guidance and resources to align their initiatives with national climate objectives.

Despite national climate policies and frameworks in countries like Ghana, there remains a significant gap between national intentions and local capabilities for implementation. For climate action to be effective, national policies must be localised and tailored to the specific contexts of regions and communities. This involves practically translating broad national goals into concrete, actionable policies that local governments can execute and monitor.

Actions should not solely reflect national priorities but inform local realities, capacities, and resources. For instance, while the Ghana National Climate Change Policy outlines several overarching goals, local-level policies must detail how these will be achieved within the specificity of communities, considering their unique challenges and priorities.

Further complicating the landscape is the duality of environmental and developmental concerns. Local governments face the dilemma of prioritising immediate developmental needs over long-term environmental sustainability. In cities like Koforidua and Wa, climate adaptation efforts have focused on acute issues such as flooding and waste management, relegating broader environmental issues—like biodiversity conservation and renewable energy—to the sidelines. This tendency reflects a typical pattern in urban contexts where developmental pressures overshadow environmental considerations.

While local governments are often on the front lines of climate change adaptation, they frequently do so without adequate support from national policies. Local authorities are left to implement anticipatory measures against climate impacts like flooding. At the same time, the national agenda often focuses on long-term infrastructure projects and mainstreaming climate actions in development plans. Santiago is a notable example of this disconnection due to its centralised national political system with fragmented administrative structures (Romero-Lankao et al., 2013)

Another conflict is the disconnect between policymaking processes and local populations' needs, resulting in climate initiatives that may need to be aligned with local realities. This deficiency often stems from inadequate public outreach and consultation, where local populations are neither informed about nor involved in climate-related decision-making processes. Such gaps highlight the necessity for enhanced participatory frameworks to bridge the distance between national directives and local execution.

The discrepancies between national policies and local implementation efforts further exacerbate Ghanaian cities' challenges in climate governance. The lack of coherent policy alignment results in an environment where local realities are often overlooked in national planning, leading to strategies that may not resonate with or address local needs. This misalignment undermines the effectiveness of climate initiatives and risks fostering a sense of alienation among local populations who feel disenfranchised from decision-making processes that impact their lives.

The study further reveals insights into global governance modes regarding climate adaptation, highlighting that regulation is not the predominant approach. Aylett (2015a) and Musah-Surugu et al. (2018) articulate that successful climate governance relies heavily on participatory methods and partnerships with the private sector. The shift towards information dissemination and collaborative efforts underscores a growing recognition of the importance of stakeholder engagement in crafting viable climate strategies. As Ghana navigates the complexities of decentralisation, local realities must inform national policies to ensure a cohesive and impactful response to climate change.

The lack of policy coherence between national and local governments significantly impedes the efficacy of climate initiatives at the local level. A misalignment in objectives undermines the ability of local authorities to implement practical climate actions, as evidenced by the increasing frequency of climate-related impacts like flooding. Research by Ampaire et al. (2017) highlights that these local concerns must be more adequately reflected in national climate policies. Such discrepancies indicate the urgent need for explicitly integrating local climate challenges within broader national frameworks.

6.3.2.4. Gaps between National Policies and Local Needs

The implications of rapid urbanisation in Ghana must be considered. As urban areas expand, they face unique vulnerabilities to the effects of climate change, exacerbated by development challenges such as inadequate infrastructure and service delivery. African cities, including Ghana's, are particularly susceptible to climate risks, making local climate action even more critical. The findings from Section 5.4 indicate that urban greening, water management, urban agriculture, and education are key sectors for climate action. It is essential to emphasise the potential of these sectors to enhance climate resilience while addressing various socio-economic issues urban populations face.

A noteworthy observation from the findings is the predominant focus on adaptation measures, with comparatively little attention given to mitigation actions. While adaptation is crucial for building resilience, there is a growing need for a holistic approach that integrates adaptation and mitigation strategies in climate action plans. For example, initiatives in waste management

not only address the immediate concerns of urbanisation and health but can also include components aimed at reducing emissions. Comprehensive policies that recognise the interplay between adaptation and mitigation will be essential for maximising the impact of local climate actions.

Recent literature highlights the inextricable link between climate adaptation and broader development goals. The findings suggest that adaptation strategies must be integrated into existing development frameworks to address immediate urban needs and contribute to long-term resilience. In Ghana, development plans have historically prioritised conventional urban needs such as housing and transportation, often at the expense of climate considerations. This underscores the necessity for a paradigm shift that elevates climate adaptation within the development agenda, necessitating collaboration across various sectors and stakeholders.

6.3.3. LACK OF LOCAL CAPACITY

The findings outlined in Section 5.5 of the study critically examined the barriers faced by SMCs in Ghana as they seek to localise climate actions. In line with the third hypothesis, the following sub-sections discuss the nature of these barriers and their implications for climate action within urban contexts in Ghana.

Respondents pointed to regulatory barriers, shortages of trained personnel, limited financial resources, and competing priorities as major challenges hindering the three cities' ability to develop and operationalise comprehensive actions. This lack of capacity was particularly pronounced in cities in the Global South, where resource constraints and capacity gaps were more severe and might be worsened.

6.3.3.1. Regulatory Barriers

One of the primary barriers identified is regulatory constraints that limit the capacity of local governments. While local authorities possess considerable power over land-use planning, waste management, and building permits, their effectiveness is often curtailed by inconsistent regulations and inadequate legal frameworks. The discrepancy between national climate policies and local implementation can lead to clarity and efficiency. With clear guidelines, local

governments may be able to enforce climate actions effectively, showcasing the need for a more cohesive regulatory framework that empowers SMCs.

A significant takeaway is that climate governance in cities like Wa, Koforidua, and Cape Coast is narrowly tied to national policies, often needing more local adaptation plans. This reliance on national directives can reduce the responsiveness of local governance structures to specific climate challenges. Boateng's (2023) findings further indicate that SMCs need national guidance to make decisions, which can slow the ability to act effectively and adaptively.

6.3.3.2. Resource Constraints

Financial constraints compound this capacity gap, as local government budgets often need to allocate more resources for climate initiatives. Reliance on external funding and unsteady financial support further complicate establishing sustainable climate management practices.

Castán Broto and Bulkeley (2013) observed that wealthier cities are generally more inclined to pursue ambitious and innovative projects that leverage cutting-edge technologies and strategies for climate resilience. In contrast, cities with more limited financial resources might find themselves restricted to low-budget projects that may lack the effectiveness required to address the multifaceted impacts of climate change.

The issue of insufficient funding emerges as a crucial barrier to implementing practical climate projects. The text indicates that local government budgets often align with central government priorities, which can restrict the scope of climate initiatives. Studies by Musah-Surugu et al. emphasise that local budgets tend to rely on national allocations, limiting the ability of cities to pursue ambitious projects. A recurring theme in the literature is that wealthier cities can engage in more innovative and technologically advanced projects. In contrast, less affluent cities often must settle for low-cost measures due to these budgetary restrictions.

At the same time, capacity constraints significantly impede local climate action. Many local governments in Ghana need more technical expertise and human resources to develop and implement comprehensive climate strategies. It is essential to investigate mechanisms for

fortifying local governments with the necessary skills and funding to enhance their climate resilience.

In Ghana, the findings suggest that smaller municipal councils (SMCs) significantly rely on external financial and technical assistance from the national government and various ministries. However, this assistance often comes as broad, generalised policies that fail to address the unique challenges faced by local governance regarding climate change. Such an approach can render cities more susceptible to climate-related risks, as it does not incorporate localised strategies tailored to specific vulnerabilities.

Leck and Debra (2015) underscore that local governments across Africa, particularly in intermediate and smaller urban areas and adjacent peri-urban and rural regions, frequently grapple with inadequate professional and financial resources necessary for essential operations, including providing crucial services and infrastructure.

The findings in Section 5.5.2 conveyed that SMCs in Ghana significantly depend on external resources while struggling with inadequate professional and financial capacities. This dependency exposes them to vulnerabilities and can lead to misalignment between national policies and local realities, leaving SMCs ill-equipped to address climate risks effectively.

Moreover, as Patterson and Huitema (2019) highlighted, resource constraints encompass the availability of funds and the critical capacity to utilise and manage available resources effectively. This necessitates financial inputs and the development of skills and institutional frameworks to ensure maximum impact in the face of climate risks.

Governance and institutional shortcomings compound the barriers to adaptive capacity, exacerbate vulnerability, and impede resource flow. Stakeholders report limited technical expertise at the subnational level, often resulting from a lack of sector ministries that can drive climate initiatives locally. This organisational disconnect not only limits the development of targeted climate programs but also highlights the existing resource gap that SMCs need to address climate change effectively.

6.3.3.3. Data Constraints

Data limitations are another significant barrier impacting climate actions. The local governance structures often need more adequate data to inform their decision-making, rendering them less effective in planning and implementing initiatives. The absence of reliable climate data hampers their ability to anticipate climate-related challenges and develop tailored responses. Consequently, fostering partnerships with research institutions and leveraging technology to improve data collection and dissemination can provide local governments with the information required for effective climate action planning.

6.3.3.4. Ineffective Collaboration

The findings indicate that some stakeholders think that climate change planning is often seen merely as an "add-on" to existing frameworks (Kithiia & Dowling, 2010, p. 474), undermining its potential effectiveness. A municipal-level study conducted in South Africa by Pasquini et al. (2013) illustrates that adaptation strategies face constraints due to the myriads of responsibilities and existing legislative gaps concerning climate change considerations. This complexity generates confusion regarding roles and responsibilities among various stakeholders involved in climate adaptation planning.

This indicates that multi-stakeholder collaboration does not guarantee favourable outcomes, as local political dynamics often influence government performance. As observed in other contexts like South Africa, the challenges of insufficient coordination personnel underscore the complexity of implementing collaborative frameworks for climate action (Pasquini & Shearing, 2014).

6.3.4. COMBINING FORMAL AND INFORMAL INSTITUTIONALISED TOOLS

The findings presented in Chapter Six discuss the fourth hypothesis. It posits that informal methods of institutionalising climate actions will assume a more significant role in developing countries than their developed counterparts. The chapter delves into the varying degrees of institutionalisation of climate responses observed across the three study areas, highlighting the

different organisational frameworks that have emerged based on local knowledge, socio-economic conditions, and available resources.

6.3.4.1. Existing Regulatory frameworks

A crucial revelation from the findings is that in all three study areas, where local climate change policies and plans are notably absent at the city level, stakeholders have identified several existing regulatory frameworks. These frameworks have influenced how climate change considerations are integrated into broader governance practices. This underscores an adaptive approach, where the lack of formal policies does not hinder the recognition of regulatory influences on climate action.

In exploring specific developments pertinent to the three study areas, the chapter emphasises the critical role of medium-term development plans devised by municipalities. These plans have emerged as foundational tools for enhancing the integration or mainstreaming of climate change considerations into urban governance frameworks. This observation aligns with previous scholarly works by Olazabal and Ruiz De Gopegui (2021) and Woodruff and Stults (2016), which underscore the potential for local governments to weave climate adaptation into pre-existing planning cultures and governance structures in various innovative ways.

Research examining climate governance within urban contexts has increasingly highlighted that integrating climate considerations into urban development planning remains a paramount focus, particularly in the Global South's rapidly urbanised regions. Within this discourse, Cobbinah (2019) argues for the synergy between climate and spatial planning, noting that such integration can significantly influence land use decisions and transportation systems.

Furthermore, improving access to contextually relevant climate information for sub-national development planners, community stakeholders, and private sector actors is vital. This access enhances understanding of local climate risks within their specific geographical contexts. The chapter emphasises that such invaluable information must be systematically incorporated into sub-national development planning processes. Doing so would empower local actors to build resilience against climate impacts while promoting better coordination among institutions and

bolstering local capacities for climate change adaptation, as highlighted by Asibey et al. (2022) and Cobbinah et al. (2019).

In the context of Ghana, mainstreaming climate change into municipal governance structures is regarded as one of the most pivotal facets of institutionalisation. In this process, SMCs play a vital role in facilitating the localisation of policies established at the national level, ensuring that their implementation aligns with local realities. The successful integration of climate adaptation strategies into urban planning, land use management, and the legal and regulatory frameworks is crucial, as it encourages urban planners to rethink conventional approaches to land use and infrastructure design. This sentiment echoes the findings of Kithiia (2010), who highlights the necessity of adaptive measures.

Moreover, existing research has documented that numerous critical climate change impacts and associated risks are closely linked to water systems—issues such as flooding, droughts, and challenges in water supply, sewage, and sanitation management. Patterson and Huitema (2019) contributed significantly to this understanding by providing data elucidating these connections. Francesch-Huidobro et al. (2017) also contributed valuable insights through their case studies of cities like Hong Kong, Guangzhou, and Rotterdam, demonstrating that climate adaptation practices are heavily influenced by the level of exposure to flood risks and the specific methodologies employed in addressing these vulnerabilities.

6.3.4.2. Organisations

A robust organisational structure is critical for effectively implementing urban environmental and climate action initiatives. This analysis reveals moderate organisational changes across the three study areas – Koforidua, Wa, and Cape Coast indicating a developing municipal climate governance framework. Taking proactive steps to establish dedicated climate change desks is primarily attributed to recruiting climate change desk officers tasked with coordinating relevant activities and creating a structured response to climate challenges.

Furthermore, these desks work in conjunction with a network of committed non-governmental organisations (NGOs), which enhance the capacities of local governments through advocacy,

technical support, and community engagement. Awareness creation and education are vital strategies for successfully implementing climate change adaptation programs.

As Saheli et al. (2019) highlighted, enhancing public awareness of natural hazards and promoting preparedness and responsive actions are practical and cost-efficient strategies for regional governments. The study recommends developing educational programs across all levels of society to ensure comprehensive understanding and engagement. When communities lack awareness of their vulnerabilities and the associated risks posed by climate change, it becomes exceedingly challenging for them to accept and support initiatives put forth by various stakeholders.

Therefore, advocacy and continuous awareness of the ongoing effects of anthropogenic climate change is essential for building the local adaptive capacity necessary to address these challenges effectively. The analysis underscores the necessity of integrating organisational capacity with community engagement and educational initiatives to create a more sustainable approach to urban environmental and climate action. A well-informed community, coupled with a dedicated organisational framework, can significantly enhance local resilience to the impacts of climate change.

6.3.4.3. Networks

The institutionalisation of climate actions through collaboration is crucial for enhancing the effectiveness of urban governance. This study examines city governments' engagement with diverse stakeholders, including government ministries, departments, and agencies; non-governmental organizations (NGOs); the private sector; academia; traditional authorities; and transnational climate networks across three study locations.

This finding aligns with Westman and Castan Broto's work in 2018, which observed network governance in 15 Chinese cities. Their work illustrated how partnerships can fulfil essential governance functions even within authoritarian regimes. They emphasised that such networks can facilitate access to critical resources, such as information, technology, and funding, thereby enabling localized climate action.

In another analysis, Huang et al. (2018) explored the diffusion of solar water heating systems in Rizhao and Shenzhen, demonstrating that the coordinated actions of multiple stakeholders catalyse the urban energy transition in China. Their research highlights that the success of these initiatives is contingent upon the alignment between emerging technologies and the specific urban development contexts rather than solely reliant on aggressive governmental interventions.

While evidence of the significant role of transnational climate networks in providing resources and learning opportunities for cities like Cape Coast remains limited, the context of these networks offers insightful implications regarding their potential benefits. Haupt et al. (2020) articulate that transnational city networks serve as platforms for city-to-city learning, fostering knowledge exchange, enhancing adaptation and resilience efforts, securing funding opportunities, and establishing informal relationships built on mutual trust.

However, the effectiveness of these learning processes in translating into actionable practices remains ambiguous, particularly for smaller cities striving for policy support (Chelleri & Haupt, 2018). Although specific data on Cape Coast's engagement with transnational networks is scarce, such international collaborations may provide invaluable resources and educational opportunities to address local challenges effectively.

Recently, city networks have also emerged as pivotal configurations of urban climate governance, leading to the scaling up of experimental implementations, particularly in developed countries (Thi et al., 2020). Similarly, Boehnke et al. (2019) argue that collaborative governance has become the most prevalent mode in small and medium-sized cities in the Netherlands, where municipal governments are facilitators, empowering other actors to undertake climate actions.

Gram-Hanssen et al. (2018) also discussed promising local-based networks initiated by Danish municipalities to promote energy retrofitting single-family homes, complementing national policies. Over the past decade, several scholars have contended that cities' involvement in transnational governance frameworks can markedly enhance their capacity to reduce

greenhouse gas (GHG) emissions, contingent upon specific contextual factors (Kern & Bulkeley, 2009; Bulkeley & Betsill, 2013; Hickmann, 2017; Stehle, 2022).

Historically, NGOs have played a pivotal role in shaping public discourse around climate-related issues in Ghana. Their efforts in agenda-setting have been instrumental in raising awareness about emerging environmental problems. Many stakeholders noted that their initial introduction to climate change topics came through community sensitisation programs organised by these NGOs. These programs have informed residents about climate impacts and encouraged community dialogue and engagement in climate resilience efforts.

The findings presented in Section 6.4.2 corroborate those of Musah et al. (2019) and Yaro et al. (2015), demonstrating that NGOs play a critical role in spearheading climate change awareness initiatives in Ghana. Strategies employed for agenda setting and awareness creation encompass various mediums, including advertisements, radio discussions, community durbars, school seminars, and climate competitions. For instance, Olazabal and Pascual (2015) highlight the significance of information exchange, effective communication, and participatory decision-making processes in fostering collaborative relationships between visionaries and policymakers, ultimately working towards establishing a shared vision for climate action.

6.3.4.4. Cultural Beliefs

Understanding climate change adaptation in Ghana's SMCs necessitates an examination of cultural dimensions, as sub-national climate action is deeply interwoven with cultural and societal contexts. Traditional institutions and local customs are pivotal in shaping community responses to environmental challenges. For instance, traditional leaders, or chiefs, embody authority and influence within their communities, ensuring that cultural norms and values contribute to climate adaptation strategies (Boehnke et al., 2019).

The empirical evidence of this research indicates that informal governance structures, including the authority of chiefs, significantly enhance coordinated and integrated climate action. The study highlights various cultural elements contributing to resilience, such as taboos, indigenous knowledge systems, traditional durbars (gatherings), and community radio initiatives.

Integrating traditional knowledge in urban climate governance is particularly vital in Ghana, where such systems have historically guided local communities in adapting to environmental fluctuations (Häußler & Haupt, 2021).

Frick-Trzebitzky (2017) posits that the interplay between customary authorities and formal governmental and private institutions significantly influences land and water governance in the context of flooding in Accra. In analysing strategies for climate adaptation in SMCs, best practices emerged, emphasising the importance of community engagement in raising awareness of climate change impacts and promoting sustainable livelihoods (Boehnke et al., 2019).

The coexistence of chieftaincy and local government actors presents challenges and opportunities to implement practical climate actions. Boateng and Larbi (2021) affirm that informal governance structures can catalyse sustainable climate change adaptation and mitigation initiatives when empowered with appropriate resources, including financial support, capacity building, and effective inter-stakeholder coordination. Additionally, fostering partnerships between traditional leaders and government entities, along with non-governmental organisations, is crucial for establishing resilient decision-making frameworks, ultimately enhancing the adaptive capacity of local communities. Recognising the value of traditional knowledge and governance mechanisms may provide a pathway toward more resilient and sustainable urban environments as communities navigate the complexities of climate change.

6.4. CHAPTER SUMMARY

This chapter delved into an in-depth analysis and interpretation of the research findings, providing a crucial examination that situates the results within existing literature and theoretical frameworks.

In Section 6.1, the chapter emphasised the importance of contextualising the findings, allowing for a comprehensive understanding of their significance in the broader academic discourse. This section outlined the methodical approach taken to address the core research questions introduced earlier in the study.

Section 6.2 summarised the key insights derived from the research, particularly focusing on three pivotal issues: the need to broaden the climate change discussion to include developing countries, the overlooked status of small and medium-sized cities (SMCs) in climate action dialogues, and the rationale behind institutionalizing informal tools and practices. The research revealed that while much has been done concerning climate dynamics in developed nations, there is a substantial gap concerning the impacts and responses in developing countries, particularly in sub-Saharan Africa. The findings from the case study in Ghana illustrated the country's proactive steps in climate policy formulation, including the establishment of a national climate change policy and the adoption of the Accra Climate Action Plan.

In Section 6.3, the chapter critically interpreted these findings, linking them to existing scholarly work and evaluating how the results either confirm or contradict previous studies. This analysis highlights the originality of the research and its potential contributions to enhancing academic understanding and informing practical applications in addressing climate change.

The chapter also acknowledged the study's limitations, detailing how these constraints may impact the interpretation of results. To conclude, it proposes directions for future research that would further explore the themes raised, thereby encouraging ongoing inquiry into the climate adaptation strategies of developing nations and the role of SMCs within that framework.

Overall, this chapter not only reflects on the outcomes of the research but also emphasized its relevance and significance in advancing knowledge and practice within the climate adaptation discourse.

7. CONCLUSION AND RECOMMENDATION

7.1. CHAPTER OVERVIEW

Section 7.1 reflects on the conceptual and methodological processes employed throughout the research. This reflection aims to offer insights into the decision-making processes, challenges faced, the rationale behind the chosen methodologies, and how these may impact the interpretation of the findings.

The research's limitations will then be discussed in detail, addressing any potential biases, constraints, or gaps that may affect the validity or generalizability of the results. Acknowledging these limitations is essential for framing the findings within a realistic context and guiding future research endeavours.

Finally, the chapter will conclude with several recommendations for future research. These recommendations will be informed by the insights gained from our findings and the limitations identified, suggesting potential areas of inquiry that could further advance understanding in this field and build upon the groundwork laid by this study.

This dissertation presents a compelling case for shifting beyond traditional top-down policy frameworks, emphasising the need for cities in developing countries, especially Ghana, to prioritise institutionalising existing informal tools and practices.

Such measures are essential for these urban areas to adapt effectively to the profound impacts of climate change. Through a comprehensive examination of the various tools employed by three of Ghana's SMCs, the study particularly highlights the often-overlooked informal mechanisms that significantly enhance urban climate governance at the local level.

This exploration led to the formulation of three integral research questions. The insights from this research culminate in critical conclusions and targeted recommendations that hold

considerable relevance for Ghana and other developing nations dealing with similar climate-related barriers.

7.2. REFLECTIONS

This dissertation significantly enhances the understanding of urban climate governance by examining how the institutionalisation of climate actions can effectively address climate change in small and medium-sized cities (SMCs). The central theme of this research revolves around the institutionalisation of urban climate governance, which was thoroughly explored in Chapter 2.6. In this section, I reflected on the practicality and relevance of this conceptual framework while simultaneously discussing the dissertation's key contributions to the existing literature.

A substantial body of literature already delves into cities' vital role in urban climate governance; however, a notable scarcity of studies focused specifically on how local governments implement and institutionalise climate actions. This research addresses this gap by emphasising the relationship between various governance tools that comprise the conceptual framework, thus illuminating their respective roles in managing climate change within urban settings.

The conceptual framework's development yielded novel insights crucial for understanding the intricacies of institutionalisation in urban climate governance. The findings provide valuable perspectives on different institutional dimensions relevant to the mainstreaming processes in climate change adaptation. The research also indicates the importance of examining the evolution of cultural dimensions over time, as these elements play a pivotal role in assessing the durability and overall impact of climate governance strategies.

Unlike previous studies that predominantly address larger metropolitan areas, this dissertation focused on SMCs, utilising them as the primary unit of analysis. This focus enriches the literature concerning the potential roles and capacities of SMCs in addressing climate change. Given the research questions in the first chapter, an in-depth qualitative case study approach was deemed most appropriate for this investigation.

The three case studies analysed in this study showed how various sub-national stakeholders confronted climate change through their unique capacities and institutional systems. Each case study is structured to highlight specific climate vulnerabilities inherent to the local context and concentrates on one or two sectors within each city. It is pivotal to acknowledge that these case studies do not claim to represent all SMCs in Ghana or are universally applicable to all climate-relevant sectors. Instead, they illustrate best practices and distinctive challenges SMCs face in their climate governance efforts.

This research also illuminates the limitations inherent in qualitative case study research. Nonetheless, it emphasises the usefulness and relevance of adopting a local authority perspective to comprehend better the intricacies of governance mechanisms, modes of operation, and capacities of SMCs. Such insights provide essential lessons for the diffusion of climate governance practices and avenues for improvement across various contexts.

The dissertation carefully examines how local authorities in the different case study cities address diverse aspects pertinent to climate change, including urban planning, flood management, and waste disposal. Each case study reveals the complexity of interactions between city governments and key stakeholders involved in specific climate actions. Notably, the research uncovers that not all categories of stakeholders are equally represented or engaged in formulating and implementing sectoral climate governance strategies.

Several specific tools were identified when employing the conceptual framework to analyse existing governance tools in Ghana. For instance, while policy instruments, organisational capacity, and collaboration emerged prominently as principal dimensions in Chapter Two's framework, the SMCs in Ghana also revealed another dimension: cultural systems. This reflects the practical interplay of various traditional forms of climate governance present within Ghana's SMCs. Recognising that urban climate research seldom emphasises the cultural dimension of governance, this dissertation contributes by investigating this often-overlooked aspect.

Eventually, the case studies provided practical examples of how climate actions—especially adaptation strategies—can be effectively institutionalised within SMCs. By highlighting the unique contexts and challenges these cities face, the research advocates for incorporating culturally informed approaches to urban climate governance, thus enriching the broader discourse on climate action and its implications for sustainable urban development.

7.3. LIMITATIONS AND FUTURE RESEARCH

Exploring urban climate governance within the framework of small and medium-sized cities (SMCs) in developing countries introduces a complex dimension to multilevel governance, a dynamic not typically encountered in other regions globally. This unique context opens several avenues for future research, which can significantly enhance our understanding of urban climate strategies.

7.3.1. INSTITUTIONALISING ADAPTATION IN LARGER CITIES

One of the primary areas for future inquiry involves how city governments can effectively institutionalise adaptive strategies to confront climate change challenges, particularly in large metropolitan areas and megacities. Examining the interplay between multilevel authorities and how their influence manifests across these global urban settings is essential.

The conditions in developed and developing countries may present contrasting scenarios, especially given the inadequate national policies on climate change found in developing contexts. Despite potentially having sufficient resources due to a top-down governance model, these cities' engagement levels and stakeholder involvement warrant deeper investigation. This includes analysing which governance modes they employ, as understanding these dynamics could reveal effective methods for managing climate impacts.

7.3.2. ANALYSIS IN DEVELOPED COUNTRIES

The findings from existing studies suggest that city size plays a crucial role in climate governance. Thus, applying a similar conceptual framework to SMCs in developed nations could yield valuable insights into the differences and gaps in governance approaches. For

instance, assessing whether cities in developed regions possess more structured regulations, comprehensive policies, and greater access to resources, expertise, or participatory networks would be pertinent. A thorough analysis of these disparities could illuminate international best practices and pitfalls in urban climate governance, contributing to a richer understanding of what succeeds and fails.

7.3.3. Focus on Climate Change Mitigation in the face of Rapid Urbanisation

Another vital research direction involves evaluating how cities in developing countries can incorporate mitigation strategies into their climate action plans, especially against rapid urbanisation, likely exacerbating greenhouse gas emissions. This inquiry should also consider how the paradigm of multilevel governance might evolve amidst increasing climate pressures.

It raises critical questions: How are these cities navigating the complexities of climate change, particularly when local authorities may struggle with limited capacity? Moreover, for effective local climate policymaking, it is crucial to integrate mitigation measures—such as reducing emissions from transportation, energy consumption, and waste management—into overall strategies that contribute to broader national and global climate objectives.

7.3.4. Focus on Quantitative Studies

Lastly, pursuing quantitative research could provide a more representative understanding of how local authorities govern climate issues. Expanding the sample size and utilising measurable indicators could offer significant insights and lessons. Presently, there is a trend among researchers to focus on small, localised case studies, influenced by the prevailing view that adaptation efforts are inherently local (Nalau & Verall, 2021). This approach, however, poses challenges for generalisation and may obscure effective adaptation strategies applicable across varying contexts. Therefore, a quantitative approach could bridge these gaps and enhance the field's ability to draw scalable conclusions about climate governance effectiveness.

Addressing these dimensions in future research enriches our comprehension of urban climate governance. It equips policymakers with the insights needed to develop more robust and effective strategies for mitigating and adapting to the challenges posed by climate change

7.4. CONCLUSION

7.4.1. CLIMATE CHANGE AT DIFFERENT GOVERNANCE LEVELS

An extensive desk research methodology was meticulously employed to investigate climate governance in Ghana. This resulted in a detailed account of existing climate change policy documents outlined in Chapter 4. This analysis unveiled a multitude of local nuances that demanded further exploration in subsequent chapters.

A key finding revealed that the dynamics between national and local government entities intricately shape the engagement of Ghanaian cities in climate action. The degree to which administrative, legislative, and financial responsibilities are decentralised significantly influences the capacity of cities to initiate and sustain practical climate actions. The study emphasises that the active participation of local stakeholders is vital in the mainstreaming process, facilitating a crucial balance between the requirements imposed by the national government and the realities of local circumstances.

Moreover, the analysis exposes a critical deficiency in local climate policymaking within Ghana's broader climate action framework. Despite more than three decades of climate change governance at the national level, intensive adaptation efforts are by no means mainstreamed in local administrations.

While national policies, such as the Ghana National Climate Change Policy (NCCP), offer essential guidelines, the local governance landscape often faces underfunding and insufficient development. Given the pervasive data gaps at the local level, the study advocates for establishing specific standards, clear-cut requirements, and comprehensive needs assessments—all conducted in close collaboration with local governments to inform and shape more effective climate strategies.

The study recommends forging partnerships with local universities and research institutions to conduct region-specific climate assessments. Such collaborations can provide necessary insights to local entities, as illustrated in the work of Ampaire et al. (2019), which underscores the importance of establishing stronger connections between national and international research bodies and government ministries.

This would ensure that governmental authorities' information needs align closely with research agendas, allowing scientific evidence to inform policy planning and decision-making processes meaningfully. Furthermore, it is critically important for local governments to be actively engaged in developing national-level policies and international commitments concerning climate change. The research highlights a significant gap in our understanding of how both positive and negative feedback loops in policymaking interact across various government levels, marking this as an urgent area for future research focus.

7.4.2. EXPLORING THE ROLE OF SMCS

This dissertation substantially contributes to the body of literature by delving into how Ghana's SMCs are dealing with the challenges posed by climate change and the barriers that hinder the implementation of national-level policies. Chapter Five addresses these issues, revealing that climate change increasingly affects urban areas of all sizes, complicating efforts to separate climate action from broader developmental needs.

Considering Ghana's heightened vulnerability to climate impacts—such as droughts, floods, and coastal erosion, there is a distinct and often overwhelming focus on adaptation efforts at the local level. However, the study identifies several interrelated barriers to climate action, including 1) insufficient inclusion of diverse stakeholders in the policy formulation process, which fosters a pervasive lack of awareness and limits ownership of existing policies, 2) inadequate coordination in implementing climate adaptation measures, leading to fragmented and ineffective sectoral responses, and 3) the development of policies that are poorly informed by empirical research reflecting local needs and constraints.

As highlighted by Patel et al. (2020), local authorities often face numerous challenges that hinder effective governance, such as limited financial resources, inadequate personnel training, and a lack of reliable data for informed decision-making. These obstacles underscore the need for a more robust support system for local entities tasked with climate action.

The study recommends fostering synergies between climate strategies and broader developmental frameworks to tackle these pressing challenges. A coordinated approach seamlessly integrating climate-focused thinking into development programs is essential, given that climate impacts significantly affect development processes. The stagnation of climate actions observed in the three study areas can be attributed mainly to the absence of decentralised functions and the lack of adequately trained personnel at the local level.

This highlights an urgent need for substantial capacity building, enhanced resources, and strengthened competencies within urban governance structures.

7.4.3. How is Urban Climate Governance Institutionalised

The effective institutionalisation of climate responses at the local level is a crucial component in the fight against climate change, particularly within SMCs. To delve into this complex issue, stakeholder workshops were conducted to gather insights and experiences from various sub-national actors regarding existing and emerging tools that can bolster urban climate governance. In many developing nations, including Ghana, the framework for local governments' engagement in climate action is predominantly shaped by national climate policies. However, the success of these policies is largely contingent upon their effective communication and implementation at the local level.

In addition to formal institutions, an exploration of informal institutions reveals that community norms, local practices, and social networks significantly influence climate governance. Informal mechanisms enhance local authorities' ability to address climate change effectively, allowing for greater adaptability and fostering collaborative efforts among community members. Research conducted by Murphy (2018) demonstrates that in many SMCs, grassroots initiatives and the integration of local knowledge play a pivotal role in developing adaptive

responses to climate challenges. This underscores the importance of recognising and verifying the contributions of community-driven efforts alongside more formal structures.

The research findings indicate that better policies and formal structures are not sufficient in isolation to effectively implement climate strategies. Instead, informal institutionalisation methods are integral to creating a comprehensive approach to local governance. This is especially pertinent in the context of climate adaptation actions, which have increasingly become anticipatory and heavily influenced by local insights and informal planning practices.

Given that local climate policymaking remains a significant gap within Ghana's broader climate strategy, there is an urgent need to empower local governments. This empowerment should provide them with essential tools, resources, and capacities to formulate and execute effective climate action plans. By promoting a more coordinated and inclusive strategy that harmonises national and local efforts, there is a more significant potential to cultivate resilient, sustainable, and climate-aware communities throughout Ghana.

It is important to note that the emphasis on the informal aspects of institutionalisation does not negate the importance of formal systems. Instead, it calls for a nuanced understanding of how these two realms coexist and interact. Acknowledging the complexities and challenges that arise from relying solely on informal mechanisms, especially in climate change, is essential to fully appreciate their role in fostering resilience.

Since climate change is a multifaceted and entrenched issue—often called a "wicked problem"—it necessitates innovative multi-sectoral solutions. This reality compels a re-evaluation of traditional governance modes and encourages the development of experimental and collaborative approaches, incorporating shadow systems and other facets of institutional architecture.

Established institutional cultures and structures may resist transformative change, while legislative and political barriers can substantially hinder progress. Sub-national stakeholders in Ghana have become deeply engaged in influencing the nation’s climate policies and actions at

the community level. Integrating traditional knowledge with grassroots leadership and contemporary solutions enables these stakeholders to ensure that climate actions are feasible and contextually relevant.

In conclusion, collaboration among local governments, civil society, the private sector, and community organisations is imperative to enhance resilience and achieve sustainable development in the face of climate change. While the focus within Ghana's SMCs has been on informal rules and behaviours that affect practices within various organisations, it remains crucial that formal regulations and laws are equally considered within the institutional framework. By fostering holistic and inclusive climate governance, communities can better navigate the complexities of climate change and work towards a sustainable future.

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APPENDIX

Appendix 1: Supplementary data

Title of Article	Year of publication	Research methods	Reference
Institutional innovation in urban governance: The case of climate change adaptation	2019	Case study	Patterson & Huitema (2019)
Science and institution building in urban climate-change policymaking	2014	Case study	Hughes & Romero-Lankao (2014)
Urban governance and the transition of energy systems: Institutional change and shifting energy and climate policies in Berlin	2007	Case study	Monstadt (2007)
Something borrowed, everything new: innovation and institutionalization in urban climate governance	2011	Review	Anguelovski & Carmin (2011)
Institutional capacity for climate change responses: an examination of construction and pathways in Mexico City and Santiago	2013	Case study	Romero-Lankao et al. (2013)
Institutional challenges to climate risk management in cities	2010	Review	Fünfgeld (2010)
Strengthening institutional and financial mechanisms for building urban resilience in India	2020	Case study	Govindarajulu (2020)
Institutionalizing climate change mitigation and adaptation through city advisory committees: Lessons learned and policy futures	2019	Case study	Göpfert et al., (2019
Complementing institutional with localised strategies for climate change adaptation: a South-North comparison	2012	Case study	Wamsler & Lawson, (2012)
Do institutional structures matter? A comparative analysis of urban carbon management policies in the UK and Germany	2016	Case study	Marsden & Groer, (2016b)
The enabling institutional context for integrated water management: Lessons from Melbourne	2013	Case study	Ferguson et al. (2013)

Integrating climate change into governance at the municipal scale: an institutional perspective on practices in Denmark	2014	Case study	Wejs (2014b)
Institutional inertia in a changing climate Climate adaptation planning in Cape Town, South Africa	2016	Case study	Taylor, (2016)
Crafting Adaptive Capacity: Institutional Bricolage in Adaptation to Urban Flooding in Greater Accra	2017	Case study	Frick-Trzebitzky, (2017b)
Beyond inputs and outputs: Process-oriented explanation of institutional change in climate adaptation governance	2019	Case study	Patterson (2019)
Institutional deficit and lack of legitimacy: the challenges of climate change governance in Hong Kong	2012	Case study	Francesch-Huidobro (2012)
Municipalities, Politics, and Climate Change: An Example of the Process of Institutionalizing an Environmental Agenda Within Local Government	2014	Case study	Pasquini &Shearing (2014)
Infrastructure and institutions: Stakeholder perspectives of stormwater governance in Chicago	2017	Case study	Cousins (2017)
Institutionally configured risk: Assessing urban resilience and disaster risk reduction to heat wave risk in London	2015	Case study	Zaidi & Pelling (2015)
Institutionalizing the urban governance of climate change adaptation: Results of an international survey	2015	Case study	Aylett (2015b)
Out of the Comfort Zone: Institutional Context and the Scope for Legitimate Climate Adaptation Policy	2014	Case study	Tennekes et al. (2014)
Exploring institutional adaptive capacity in practice: examining water governance adaptation in Australia	2015	Case study	Bettini et al., (2015)
Water scarcity and institutional change: lessons in adaptive governance from the drought experience of Perth, Western Australia	2013	Case study	Bettini et al., (2013)
Institutional pathways to municipal energy companies in the UK: Realising co-benefits to mitigate climate change in cities	2018	Case study	Roelich et al., (2018)
Urban low carbon transitions: institution-building and prospects for interventions in social practice	2019	Case study	Horne & Moloney, (2019)
The Socio-institutional Dynamics of Urban Climate Governance: A Comparative	2013	Case study	Aylett (2013b)

Analysis of Innovation and Change in Durban (KZN, South Africa) and Portland (OR, USA)			
Institutional drivers of adaptation in local government decision-making: evidence from Chile	2017	Case study	Valdivieso et al., (2017)
Negotiating Institutional Pathways for Sustaining Climate Change Resilience and Risk Governance in Indonesia	2019	Case study	Lassa (2019)
The absence of institutional entrepreneurship in climate adaptation policy - in search of local adaptation strategies for Rotterdam's unembanked areas	2017	Case study	Duijn & van Buuren (2017)
Flood Protection in Venice under Conditions of Sea-Level Rise: An Analysis of Institutional and Technical Measures	2012	Case study	Munaretto et al., (2012)
Institutional Capacity, Climate Change Adaptation and the Urban Poor	2008	Case study	Dodman & Satterthwaite (2009)
Building urban and infrastructure resilience through connectivity: An institutional perspective on disaster risk management in Christchurch, New Zealand	2020	Case study	Huck et al., (2020)
Urban Water Crises under Future Uncertainties: The Case of Institutional and Infrastructure Complexity in Khon Kaen, Thailand	2018	Case study	Friend & Thinphanga (2018)
Adapting institutions: exploring climate adaptation through institutional economics and set relations	2015	Case study	Roggero (2015)
Assessing barriers and enablers in the institutionalization of river-basin adaptive management: evidence from the Maipo Basin, Chile	2020	Case study	Vicuña et al., (2020)
An institutional analysis to address climate change adaptation in Tenerife (Canary Islands)	2018	Case study	Hernandez et al., (2018b)

Appendix 2: Introductory Letter

UNIVERSITY OF PUBLIC SERVICE
LUDOVIKA

FACULTY OF PUBLIC GOVERNANCE AND INTERNATIONAL STUDIES
DOCTORAL SCHOOL OF PUBLIC ADMINISTRATION SCIENCES

HEAD OF DOCTORAL SCHOOL

Budapest, 3 February 2021

To Whom it May Concern

LETTER OF RECOMMENDATION FOR DATA COLLECTION AND RESEARCH WORK

This is certify that **BOATENG Ama Kissiwah** (born on 3 March 1990, Koforidua, Ghana) is a PhD student of the University of Public Service, Doctoral School of Public Administration Sciences in Budapest, Hungary.

She is conducting a research entitled '**Planning for climate change in 21st century cities: The role of local governments'** under the supervision of Associate Professor KORONVÁRY Péter and Research Fellow OLAZABAL Marta. She needs to collect data from your organization, your cooperation will be highly appreciated.

I shall be highly grateful for your support and cooperation.

Your sincerely,

Nemzeti Közszolgálati Egyetem

Dr. KISS György DSc
Head of Doctoral School

H-1083 Budapest, 82 Ülői út | +36 1 432 9000
POSTAL ADDRESS H-1441 Budapest, P.O. Box 60 | antk@uni-nke.hu, en.uni-nke.hu

Appendix 3: Interview Guide

Identification of the stakeholder

- Who are the key stakeholders involved, and what are their roles?
- Resources available

How does climate change impact the priority areas in your city?

What are some examples of bottom-up initiatives adopted to respond to the impacts of climate change?

- How are national climate policies localised?
- Do you have any local climate plans or policies to serve as a guide?
- Any allocated budget to support implementation?
- How are other stakeholders, especially NGOs, the private sector, development, and development partners, involved in these solutions?
- In your opinion, how will decentralisation change in the growing climate crisis?

In your opinion, what are some barriers that hinder your efforts to respond to climate change in your city?

Appendix 4: Agenda for stakeholder workshops and focus group discussions

Time	Activities	Action By
Opening		
10:00-10:10	Registration Of Participants	
10:10-10:20	Welcome And Opening Remarks	
10:20-10:30	Overview Of Phd Research Presentation Of Preliminary Findings of PhD	
Introduction To Focus Group Discussions. Stakeholders present themselves and their functions in their respective organisations. Initial discussions on climate Change Impacts and How Municipalities Are Responding. Further Discussions On The Barriers Faced By Urban Stakeholders And How To Address Them By Way Of Institutionalization. Examining the Conceptual Framework by identifying tools for the institutionalisation of climate responses. Which ones are more in the Context of Ghana?		
13:15-13:45	Plenary Presentations (Each Group Presents Outcomes from their Group Discussions)	Facilitators/Group Members
13:45-13:50	Follow-up Q&A Session	Moderator
13:50-13:55	Closing Remarks/Next Steps	

Appendix 5: List of Stakeholders (Interviews and Workshops)

Case study area	Stakeholders	Organisations	Number of interviewees	Number of participants in FGDs
Wa	Local Government	Wa Municipal Assembly	2	5
		Municipal Environmental Health		1
	locally based NGO	Center for Indigenous Knowledge and Organizational Development (CIKOD)	2	2
	Decentralised Ministries, Departments and Agencies	EPA	1	1
		Regional and Municipal NADMO	2	2
		Ministry of Agriculture		1
		Land Use and Spatial Planning Authority	1	1
		Department of Gender	1	1
		Social Welfare Dept		1
		Water Resources Commission		1
		Information Services Dept		1
		State Housing Company Ltd		1
		Fire Services Dept		1
	Research and academia	University of Development Studies	1	1
	Private Sector Organization	Zoomlion Ghana Ltd.		2
Koforidua	Local government	New Juaben South Municipality	2	3
	Decentralised Ministries, Departments and Agencies	EPA	3	2
		Regional and Municipal NADMO	2	2
		GMET		1
		Land Use and Spatial Planning Authority		1
		Forestry Commission		2
		Department of Gender	1	3
		Department of Children		3
		Water Resources Commission		1
		Information Services Dept		1

		Department of Rural Housing		1
		Ghana National Association of Teachers		1
	Research and academia	Koforidua Technical University		1
	Private sector organisation	Zoomlion Ghana Ltd.		2
Cape Coast	Local government	Cape Coast Metropolis	2	3
	locally based NGO	Green Africa Youth Organization (GAYO)	1	3
		Environmental Justice Foundation		2
		Cape Coast Youth Development Association		2
	Research and academia	University of Cape Coast	2	2
	Private sector organisation	Zoomlion Ghana Ltd.		1
		Fishermen Association		2
		EPA	1	1
		Community Water and Sanitation		1
		CEIA		1
		GMet		1
		NADMO		1
		MOFA		2
		Hydrological Services Dept		1
		Forestry Commission		1

Appendix 6 List of Publications

1. Boateng, A. K. (2023). Localising centralised climate policies in Ghana: Insights from 3 local governments. *Urban Research & Practice*, *16*(3), 470–482. https://doi.org/10.1080/17535069.2022.2129173

2. Boateng, A. K. (2022). Non-Governmental Organisations (NGOs) Role in Driving Urban Climate Governance: The Case of CIKOD and GAYO in Ghana. *European Scientific Journal, ESJ*, *18*(26), 95. https://doi.org/10.19044/esj.2022.v18n26p95

3. Ampong-Ansah FB et al. (2021) Partnership and collaboration in healthcare delivery in Ghana. J Public Affairs. https://doi.org/10.1002/pa.2175

4. Boateng A.K. (2022). Non-Governmental Organisations (NGOs) Role in Driving Urban Climate Governance: The Case of CIKOD and GAYO in Ghana. European Scientific Journal, ESJ, 18 (26), 95. https://doi.org/10.19044/esj.2022.v18n26p95

5. Boateng A.K. (2024) Local governments' constraints in implementing national climate policies: Insights from the New Juaben South Municipality of Ghana. Pro Publico Bono (Accepted in Pro Publico Bono in Dec 2024 and awaiting final publication).

6. Boateng A.K. (2024) Institutionalisation as a Key Approach to Climate Crisis Management in Local Administrations: Experiences from Ghana's Cape Coast Metropolis. (Submitted to AARMS in 2024, awaiting review comments)

Appendix 7: Conferences Attended

Name of conference	Title of presentation	Date	Venue
Smart Cities International Annual Conference, 6th edition	Green Hotel Development Towards the Building of Resilient Cities in Ghana	6 December 2018	Bucharest, Romania
Global Green Growth Knowledge Platform Annual Conference	Energy Efficient Buildings: Policy and Practice Landscapes in Ghana	19 October 2019	Seoul, South Korea
PhD Workshop on 'Adapting to Climate Change. The interplay between international and domestic institutions in the context of climate finance	The role of Institutions and Multilateral Climate Finance in Ghana's Urban Adaptation Governance.	11 December 2019	Leuven, Belgium
International Society for Third-Sector Research (ISTR) Annual Conference	Sustainable Urban Futures in Africa: A cross-city analysis of non-state actors' role in Ghana's urban climate governance.	5 – 10 July 2020	Virtual
International Society for Third-Sector Research (ISTR) Annual Conference	The third sector's role in driving urban climate governance: insights from two major small and medium-sized cities in Ghana	12 – 15 July 2022	Montreal, Canada
Innovate4Cities Conference		September 2024	Online

Appendix 9: Curriculum Vitae

Ama Kissiwah Boateng

boatengamakissiwah@gmail.com

PROFILE

- International development professional with 10 years of experience in environmental regulations, climate change policies, sustainability initiatives and governance.
- Skilled in reviewing environmental impact assessment reports and climate change policies to support decision-making processes at various levels of government.
- Conceptualized and facilitated interactive training workshops on climate change and environmental management to build the capacity of government and non-governmental stakeholders.
- Collaborated with stakeholders from different regions including Africa, Europe, the Caribbean, and North America to build meaningful partnerships and knowledge transfer.
- Supervised daily administration processes by implementing enhanced document preparation workflows, ensuring that data was up-to-date and easily accessible.
- Advanced proficiency in Microsoft Office Suite, including Excel, Word, PowerPoint, Teams, and SharePoint for workplace efficiency and improve organizational workflow.
- Hold a Masters in Climate Change and Sustainability (Ghana), pursuing a PhD in Public Administration in Hungary.

PROFESSIONAL EXPERIENCE

Independent Consultant (remote) Oct. 2024 - present

International Institute of Sustainable Development

- Conduct in-depth reviews and assessments of national climate adaptation policies to identify priority areas across different countries.
- Design and maintain extensive databases that classify national climate policy actions, serving as the foundation for developing knowledge products.

Independent Consultant (remote) May 2024 - present
Burch Energy Services Portland, United States

- Research and compile information on energy efficiency measures on residential and commercial properties to aid organizational decision-making.
- Prepare annual benefits reports focusing on environmental, social and economic benefits to support ongoing projects in local communities.
- Assist the operations team in administrative processes such as digital filing systems and records management to improve productivity and foster overall office management.

UN Climate Change Regional Collaboration Centre for the Caribbean St. George's, Grenada
Senior Climate Change Officer September 2022 – March 2024

- Collaborated with international stakeholders including government and non-governmental organizations to strengthen partnerships while managing confidential and politically sensitive situations.
- Achieved an 80% engagement rate with stakeholders by utilizing Constant Contact software to draft and distribute monthly newsletters.
- Prepared annual work plans by coordinating with various departments to ensure effective allocation of financial and human resources.
- Supervised daily operations including recruiting consultants, tracking project expenditures and organizing regular team meetings to ensure the successful execution of projects.
- Leveraged Microsoft SharePoint for organizing documents and enhancing team collaboration and improving overall organizational workflows.

Research Officer (remote) July 2020 –August 2022

- Liaised extensively with national focal points across 16 countries to identify gaps and opportunities in national climate policy frameworks.

- Facilitated 20+ training workshops and webinars to build the capacity of stakeholders on the importance of climate mitigation and adaptation policy frameworks.
- Developed knowledge products including quarterly and annual reports, briefing notes, and promotional materials, tailored to the needs of different stakeholders.
- Simplified office administration processes by enhancing document preparation workflows, and database management to ensure up-to-date and timely dissemination of information.

Municipal Liaison Officer — September 2014 – July 2016
Environmental Protection Agency — Koforidua, Ghana

- Performed environmental impact assessments for development projects in 26 municipalities to ensure compliance with local and national environmental regulations.
- Participated in monthly enforcement activities including field inspections, investigations, and sample collection to assess adherence to environmental regulations.
- Organized a series of environmental management awareness programs which led to the creation of comprehensive technical reports for senior officials and decision-makers.
- Resolved various environmental complaints through active listening and management of sensitive issues which led to constructive dialogue among stakeholders.

EDUCATION

PhD Public Administration — Sept. 2018 – July 2025 (anticipated)
Ludovika University of Public Service
Budapest, Hungary

Post Grad. Dip. Urban Management Tools for Climate Change — June – July 2017
Erasmus University — Rotterdam, Holland

Master of Science Climate Change and Sustainable Development Aug. 2016 – May 2017
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