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Climate Change (Mal)Adaptation as Governmentality: The Case of the Ada Sea Defense System in the Volta River Delta of Ghana

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CLIMATE CHANGE (MAL)ADAPTATION AS GOVERNMENTALITY: THE CASE OF THE ADA SEA DEFENSE SYSTEM IN THE VOLTA RIVER DELTA OF GHANA

by

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DEDICATION

For my wife, Ama Kesewaa Owusu-Daaku

“Many women do noble things, but you surpass them all”

Proverbs 31:29

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ABSTRACT

River deltas are complex natural environments that represent a confluence of many physical, biological and human processes vulnerable to the impacts of climate change. The likely biophysical impacts of climate change on deltas have received substantial attention. However, relatively little attention has been paid to the ways in which the different stakeholders of deltaic environments frame the vulnerability of residents of deltas to climate change. The Volta River Delta (VRD) of Ghana is a compelling site in which to conduct such an examination because of the clear climate-related changes taking place in the Delta, and the fact that like many major delta areas in the world, the VRD is at the end of a managed river system heavily influenced by an upstream dam.

This study aims to further our understanding of how the identification of climate-related vulnerabilities, and the selection of interventions to address those vulnerabilities, can result in unintended outcomes that enhance, instead of ameliorate, vulnerabilities related to climate change, but also proceeding from other sources. It does so by applying the theoretical framework of governmentality in examining the different positions of various actors relative to the Ada Sea Defense System (AdSDS) in order to understand how the perceptions of these actors construct the vulnerability of a particular place and its population to the impacts of climate change, identify sea defense systems (SDS) as an adaptation to climate change, and understand, experience, and respond to the outcomes of that sea defense system – particularly outcomes one could consider as maladaptive.

This exploration of vulnerability and adaptation to coastal erosion in the VRD demonstrates that the complex environments of river deltas require multidimensional approaches through which to attempt to trace observed processes of (mal)adaptation and give reason for the outcomes, good and bad, that result. This dissertation contributes to this process – in particular the politics of adaptation; and how an analysis of such politics can assist in our understanding of maladaptation. Such understanding can enable future adaptation decisions that promote the sustainability and well-being of coastal populations in Ghana and beyond.

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LIST OF ABBREVIATIONS

AEDA ..... Ada East District Assembly

AdSDS ..... Ada Sea Defense System

AtSDS ..... Atorkor Sea Defense System

CCA ..... Climate Change Adaptation

CCV ..... Climate Change Vulnerability

COAST ..... Collaborative Actions for Sustainable Tourism

DECCMA ..... Deltas, vulnerability, Climate Change: Migration and Adaptation

DPO ..... District Planning Officer

EIA ..... Environmental Impact Assessment

EMP ..... Environmental Management Plan

EPA ..... Environmental Protection Agency

FOAT ..... Functional Organizational Assessment Tool

GoG ..... Government of Ghana

GPRS I ..... Ghana Poverty Reduction Strategy

GPRS II ..... Growth and Poverty Reduction Strategy

GSGDA ..... Ghana Shared Growth and Development Agenda

GTA ..... Ghana Tourism Authority

HIV ..... Human Immunodeficiency Virus

IMDC ..... International Marine and Dredging Consultants

IRB ..... Institutional Review Board

KSDS ..... Keta Sea Defense System

LIG ..... Livelihoods as Intimate Government

MBC ..... Maranatha Beach Camp

MEST ..... Ministry of Environment, Science, and Technology

MESTI ..... Ministry of Environment, Science, Technology, and Innovation

MOTCCA ..... Ministry of Tourism, Culture, and Creative Arts

MP ..... Member of Parliament

MWRWH ..... Ministry of Water Resources, Works, and Housing

NADMO ..... National Disaster Management Organization

NAP ..... National Adaptation Plan

NCAP ..... Netherlands Climate Assistance Programme

NCCAS ..... National Climate Change Adaptation Strategy

NCCC ..... National Climate Change Committee

NCCP ..... National Climate Change Policy

NCCPF ..... National Climate Change Policy Framework

NCCPAPI ..... National Climate Change Policy Action Programme for Implementation

NDC ..... National Democratic Congress

NDPC ..... National Development Planning Commission

NPP ..... New Patriotic Party

NRMO ..... Natural Resources Management Officer

SDS ..... Sea Defense Systems

SLR ..... Sea Level Rise

STS ..... Science and Technology Studies

TEDC ..... Trasacco Estate Development Company

UNFCCC ..... United Nations Framework Convention on Climate Change

VRD ..... Volta River Delta

CHAPTER ONE

BACKGROUND

Introduction

River deltas are complex natural environments that represent a confluence of many physical, biological and human processes vulnerable to the impacts of climate change. Deltas often support large populations, estimated at over 500 million people globally, with particular concentrations in southern and eastern Asia, and Africa. Deltaic regions are the coastal environment most vulnerable to the climate change impacts of sea level rise resulting in coastal erosion and flooding, due to the convergence of particular physical (low elevation and high flood probability, significant land erosion and gain, dependence on fluvial inputs of water and sediment, high sensitivity to changes in climate) and socio-economic characteristics (high population density, high prevalence of poverty, gender inequalities, low levels of socio-economic development and lack of connectivity with major market centers) (Ericson, Vörösmarty, Dingman, Ward, & Meybeck, 2006a; Syvitski et al., 2009; Syvitski & Saito, 2007). As such, deltas have been identified as one of the "hotspots" of climate change (de Sherbinin, 2014; Ericson, Vörösmarty, Dingman, Ward, & Meybeck, 2006b; Kuenzer & Renaud, 2012; Lwasa, 2015; Turco, Palazzi, von Hardenberg, & Provenzale, 2015; Wolters & Kuenzer, 2015),

i.e. places likely to experience increasing and more extreme climate change impacts. The aforementioned make the climate change vulnerability (CCV) of people living in deltas a matter of international significance (Foresight, 2011; Foufoula-Georgiou et al., 2011; Wong et al., 2014)

The likely biophysical impacts of climate change on deltas have received substantial attention. Some of the more significantly cited climate change impacts in deltaic environments include sea-level rise (Day, Pont, Hensel, & Ibáñez, 1995; Ibáñez, Day, & Reyes, 2014; Mikhailov & Mikhailova, 2010), saline intrusion into low-lying soils (Prandle, 2004; Roberts, Weimer, & Slatt, 2012; Wolters & Kuenzer, 2015), increased flooding from storm surges (Fagherazzi & Priestas, 2012; Hoitink & Jay, 2016; Wolf, 2009), and soil subsidence (Cahoon, White, & Lynch, 2011; Higgins, Overeem, Tanaka, & Syvitski, 2013; Wolinsky, Edmonds, Martin, & Paola, 2010). A study of the effective sea-level rise (ESLR)[1] in 40 deltas worldwide indicated that 8.7 million people and 28,000 km^2 could suffer from inundation and coastal erosion by 2050 (Ericson et al., 2006). However, relatively little attention has been paid to the ways in which the different stakeholders of deltaic environments frame the vulnerability of residents of deltas to climate change.

Such framings are important for three reasons. First, the ways in which residents of deltas frame their own vulnerability is critical for understanding the likely future adaptation pathways these populations will follow to manage the worst impacts of climate change on their lives. Climate change adaptation (CCA) pathways refer to

[1] ESLR is a net rate of global sea-level rise, the natural rate of fluvial sediment deposits and subsidence and accelerated subsidence from groundwater and hydrocarbon extraction.

decision-making options with regard to which actions will be taken to adapt to the impacts of climate change (Wise et al., 2014). Second, how policymakers and others view the vulnerability of these residents is important for understanding if these actors are creating policies and planning for a future that aligns with one envisioned by delta residents. Third, there is the potential for the perceptions and actions of delta residents and policymakers and/or others to be unaligned, which could either exacerbate the existing CCV of these residents or result in new segments of the population becoming vulnerable to the impacts of climate change (Klein, Schipper, & Dessai, 2005). I define perceptions, as used in this study, as the meaning which individuals ascribe to phenomenon – the ways in which particular processes or objects are understood, interpreted and discussed.

The third reason of unalignment has already expressed itself in the form of sea defense systems (SDS)[2] in the Volta River Delta (VRD) of Ghana (see Figure 1.1). Between 2001 and 2004, the Government of Ghana (GoG[3]) implemented the construction of a sea defense system in the Keta area of the VRD consisting of a 9km road, flood control and sea defense structures and land reclamation (Angnuureng, Appeaning Addo, & Wiafe, 2013; Boateng, 2009) commonly called the Keta Sea Defense System (KSDS). Later on, between 2008 and 2014, the GoG implemented the construction of a 2.7km-defense system, in addition to the rehabilitation of a road destroyed by erosion (Andoh, 2014; Blagogee, 2014) between Srogbe and Kplortorkor in the Keta municipality. This development is commonly known as the Atorkor Sea Defense System (AtSDS). In the

[2] A sea defense system is usually any combination of seawalls, land reclamation technology such as groins, and revetments and roads that are used to protect a coastline from further erosion and flooding.
[3] I use GoG to refer to not only government officials but the policies, procedures and documents that constitute the governing of the country Ghana.

Ada East district of the VRD, such a sea defense project which began in 2013 was completed at the beginning of 2016 (Open Governance, 2017) and involves a combination of onshore works, beach reclamation and protective barriers (Asare Boadu, 2014; Bollen et al., 2010; IMDC, 2011). This development is (unsurprisingly) known as the Ada Sea Defense System (AdSDS). A literature review and preliminary dissertation research respectively revealed that both the KSDS and AdSDS are creating negative impacts. In Keta, the sea defense system is creating greater erosion downshore, east of the system (Angnuureng et al., 2013; Appeaning Addo, Jayson-Quashigah, & Kufogbe, 2011; Boateng, 2009). In the Ada East district , Mensah & Fitzgibbon (2013) hypothesize that the AdSDS will increase saltwater intrusion further inland because of the permanent opening of the Volta River estuary as part of the construction of the AdSDS. The estuary was hitherto seasonally opening and closing which regulated the amount of salinity inflow upstream (Mensah & Fitzgibbon, 2013b). Fieldwork for the preliminary dissertation research I conducted in the Ada East district in the summer of 2014 suggested that residents living behind the AdSDS were not entirely satisfied with the structure as the sea was able to rise above the wall at high tide and continually flood their homes. Some residents living further away, who were yet to be protected by the AdSDS at the time, viewed the structure as a "waste of resources" because they articulated that they had no fallback in the event of a loss of livelihood from general economic pressures or a personal accident, and yet the GoG deemed it better to protect them from the ravages of the sea. One resident's comments are indicative of this sentiment:

> I think this [the sea defense] is a complete waste of time. The government is spending billions of Cedis[4] on this while people have no access to loans or can't get help if something should happen and they lose their jobs right now. Look, we are in a carpentry shop, if something should happen and I should cut my hand right now, I won't be able to work and there will be no government support for me. (Owusu-Daaku & Diko, 2017, p. 42)

Given the nation's economic challenges at the time of the study – electricity crises, rising deficit and debt, and low world market prices for Ghana's oil and gold exports (AfDB, OECD, & UNDP, 2016) , it is not surprising that community members bemoaned monetary challenges and the inability to keep up with rising prices of goods and services rather than the visible threat from the environment.

The information outlined in the prior paragraph illustrates how, in the VRD, the visions of local populations and policymakers appear unaligned on the surface. This apparent lack of alignment actually masks a deeper, more complex alignment of interests that explains the ways in which local populations and policymakers come to desire and appreciate a particular adaptation intervention, in this case a sea defense system, as an adaptation to climate change even though it potentially creates other negative impacts on the intended and unintended beneficiaries - otherwise known as a maladaptation[5] (Barnett & O'Neill, 2010).

[4] The local monetary currency of Ghana. The rate of the Ghana Cedi (GH₵) to the dollar ($) as at June 9th, 2017 was GH₵1=$0.23

[5] Barnett & O'Neill (2010) define maladaptation as "action taken ostensibly to avoid or reduce vulnerability to climate change that impacts adversely on, or increases the vulnerability of other systems, sectors or social groups."

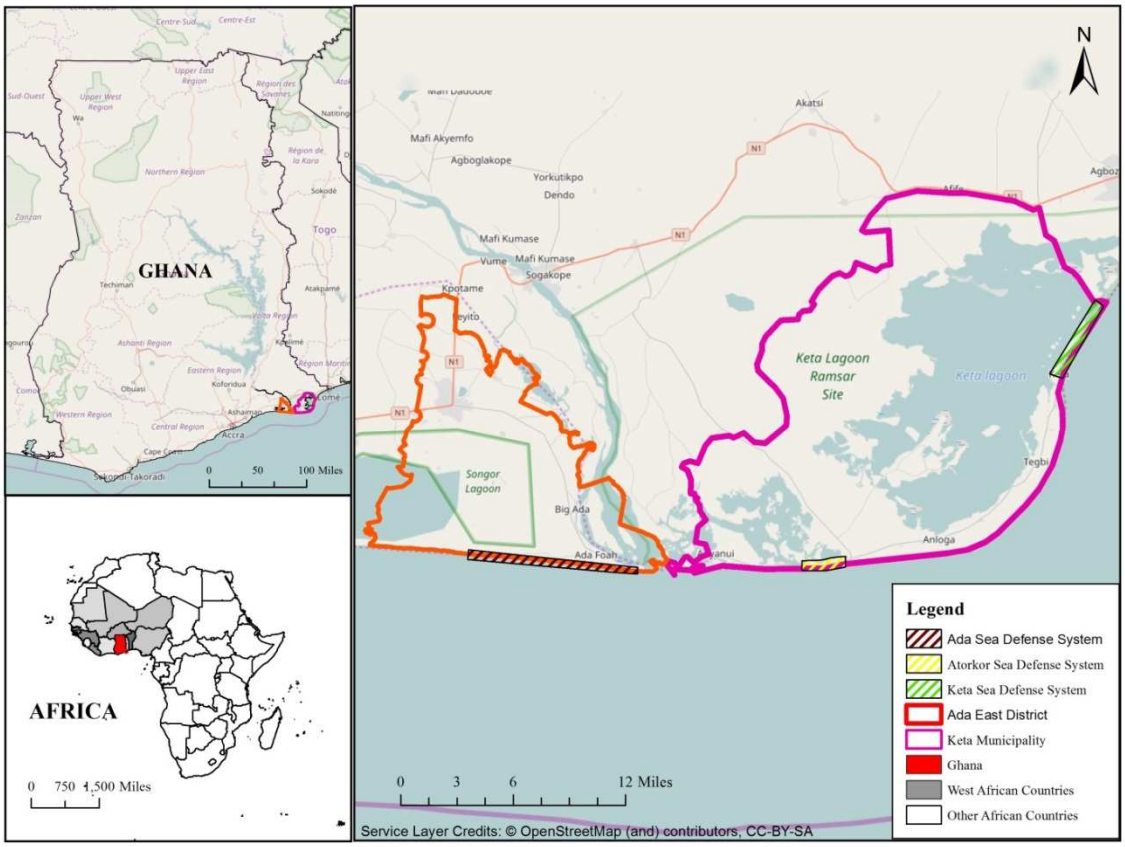

Figure 1.1 Map showing the Ada East district and the Keta municipality and the sea defense systems within them. Map created by Stephen K. Diko

There is emerging work on maladaptation to climate change – what it is, how to identify it, how it can come about, why it must be prevented, and how to prevent it (Atteridge & Remling, 2013; Barnett & O'Neill, 2010; Barnett, O'Neill, Waller, & Rogers, 2013; D'Alisa & Kallis, 2016; Jones, Carabine, & Schipper, 2015; Juhola, Glaas, Linnér, & Neset, 2016; Magnan, 2014; Magnan et al., 2016; Scheraga & Grambsch, 1998). However, recent scholarship by Juhola et al. (2016) that seeks to redefine the concept of maladaptation argues that for an adaptation to qualify as maladaptive it must be an intentional response to climate change. If we accept this framing of maladaptation, a new question emerges – why are certain adaptations consistently chosen despite their maladaptive effects? The case of sea defense systems in the VRD is illustrative of this

question and serves as an appropriate case through which to provide an answer. The AdSDS in particular illustrates how various actors take advantage of the (mal)adaptations afforded by the construction of a sea defense system – a concept I call (mal)adaptation opportunism, which I explain in further detail in Chapter Six. As a result of the (mal)adaptation opportunism the AdSDS affords, I focus particularly on that sea defense system as the illustrative example in the VRD of climate change (mal)adaptation as governmentality.

The other point the prior paragraph highlights is how this choice of intervention of sea defense systems reflects the fact that a majority of the work done on climate change impacts in the VRD has quantitatively assessed mainly physical impacts and generally proposed hard engineering solutions (such as sea defense systems) and management structures to coastal erosion and SLR (Boateng, 2010, 2012). My research complements these mainly quantitative and physical impact assessments and their hard engineered solutions in the form of sea defense systems by focusing on the social aspects and impacts of the sea defense systems as an adaptation to climate change. By social aspects, I am referring to the different positions that various actors occupy relative to these sea defense systems (e.g. people who currently live by these sea defense systems versus those who don't versus those with responsibility for implementing these sea defense projects versus those who influence the policies that make these sea defense systems come to be). By social impacts, I am interested in what these sea defense systems mean for the livelihoods activities of people who particularly live within the vicinity of these sea defense systems, and the potential influence future sea defense systems might have on those who will find themselves living in the vicinity of a sea defense system.

Research Context

As described briefly above, the VRD exhibits some key characteristics of deltaic areas vulnerable to climate change. A significant number of studies characterize coastal erosion as the most significant problem affecting the VRD (Appeaning Addo et al., 2011; Boateng, 2009, 2010, 2012; Bollen et al., 2010; DARA & CVF, 2012; Kusimi & Dika, 2012; Nyamedor & Codjoe, 2013). Although coastal erosion is a natural process, it is expected to be exacerbated by sea-level rise and increased frequency and severity of storms as a result of climate change (Wong et al., 2014). Many studies attribute the increasing rate of erosion in the VRD to the construction of the Akosombo dam, which was completed in 1961(Anthony & Blivi, 1999; Appeaning Addo et al., 2011; Boateng, 2009, 2010, 2012; Boateng, Bray, & Hooke, 2012; Bollen et al., 2010; Gyau-Boakye, 2001). These studies suggest that the damming of the Volta River reduced the amount of sediment carried down into the delta - making the region more susceptible to the action of sea waves because there was no new sediment to replace soil lost to the sea. In the VRD, coastal erosion destroys homes, reduces coastal lands and their attendant biodiversity, and causes unemployment for those whose farmlands are affected (Kusimi & Dika, 2012). I confirmed the effects of home destruction and land loss from coastal erosion by the preliminary research I conducted in the Ada East district of the VRD during the summer of 2014, as illustrated in Figure 1.2.

Figure 1.2 Coastal erosion along the shoreline east of Ada Foah

These changes are happening at different rates in different parts of the VRD, and specifically in the areas in and surrounding Keta and Ada Foah, the capital towns of the Keta municipality and Ada East district respectively. This municipality and district[6] are the parts of the VRD where the GoG has implemented the construction of sea defense systems. For Keta, Appeaning Addo et al. (2011) estimated the average rate of coastal erosion after the sea defense system's construction at 2m/year with highs of 4m/year. Before the construction of the defense system, Nairn et al. (1998) estimated the range of the annual average rate of coastal erosion from 8-2m/year. For Ada Foah, Bollen et al. (2010) estimated the annual rate of erosion at 6m/year, referring to this rate as severe and necessitating the construction of the sea defense system. Ericson et al. (2006) conclude that human activities in deltas need to be studied in more detail to effectively increase the resilience of deltas and their populations to future changes. One such human activity is the construction of sea defense systems to deal with the phenomenon of coastal erosion.

[6] A municipality is simply a higher order district based on factors such as population size and regional centrality. Consider a district as you would a county in the United States.

This research examines the different positions that various actors occupy in relation to the AdSDS. These positions include: people who live beside the AdSDS; people who live in a community where they expected the AdSDS to be constructed but which the AdSDS never reached; relevant government officials who are responsible for governance, adaptation planning, and environmental management in the Ada East district and at the national level; academics who research or discuss SDS; and consultants, contractors, and funders who are responsible for the AdSDS's feasibility studies, design, and construction. This diverse array of actors highlights the multiplicity of meanings a single object can have to various people (Barnes, 2014; Barry, 2013; Carse, 2012). This multiplicity of meanings also lends itself to ideas about the ways in which objects such as a resource (Barnes, 2014) or infrastructure (Barry, 2013; Carse, 2012) are made or produced in a social sense. As Erich Zimmermann, a renowned economist, so famously quoted "resources are not, they become" (Zimmermann, 1951). In the same way, CCV and CCA can be thought of as constructed by the perceptions of different actors.

The research presented in this dissertation is informed by the results of preliminary research I conducted in the Ada Foah area[7] of the Ada East district in the VRD in the summer of 2014. The goals of this preliminary research were to explore CCV in the Ada Foah area by assessing the narratives of CCV of the government versus community residents; followed by an identification of some of the distinct and differentiated vulnerabilities that various groups of people in the VRD experience. According to Carr & Thompson (2014), *distinct vulnerability* is where different members of a population are exposed to different events and trends while *differentiated*

[7] The collective term I use to refer to the two communities I sampled from in the summer of 2014 because of their proximity to Ada Foah, the capital of the Ada East district

vulnerability is where different members of a population experience and/or respond to the same event or trend in different ways. In this research, I chose to focus on narratives of CCV because while we must understand the character of the environment, economy and society in which communities and individuals find themselves, people respond to the world as they perceive it (Carr, 2013) as these perceptions shape how people respond to and ultimately adapt to the impacts of climate change on their lives. I view narratives as one of the ways in which people express their perceptions of reality (actions being another way) and in an exploratory study that did not lend itself to extended fieldwork sessions that would facilitate ethnographic observations of actions and processes, a focus on narratives best served the goal of initial foray.

I also explored different vulnerabilities in this preliminary research because there is much literature on how climate change impacts affect different people in different ways (see Exhibit 2 in Carr, Owusu-Daaku, Damodaran, & Peers, 2015 for a review). Thus in order to ensure I was not repeating mistakes of the past by applying monolithic, one-size-fits-all framings to the issue of CCV, I decided to look out for cases of distinct and differentiated vulnerability in this particular research. This research found that the government characterizes the Ada Foah area as one most challenged by climate change impacts, while residents articulate economic concerns as their most significant challenges. This research also identified expressions of distinct and differentiated vulnerability to climate change impacts, particularly with regard to people's location in relation to the construction of the sea defense system in the Ada East district. I visited two specific communities in the Ada East district –which I refer to as the estuary and coastal communities (see Figure 1.3).

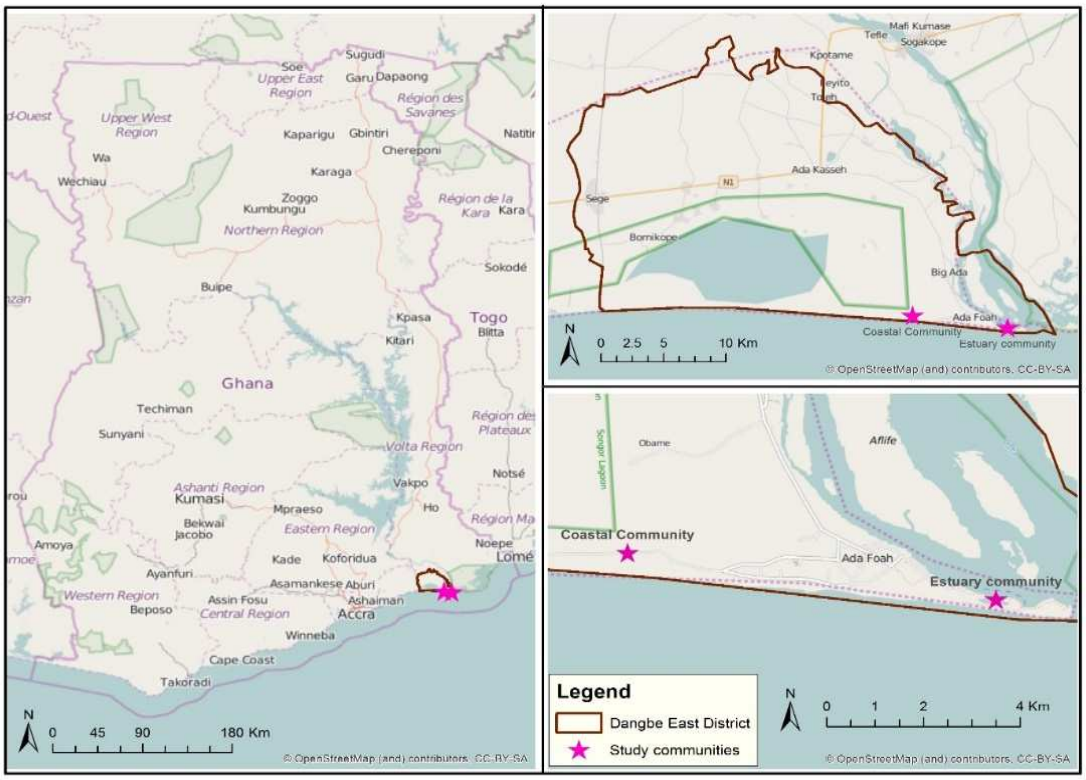

Figure 1.3 Location of communities visited in the Ada East District (formerly, the Dangme East District) in 2014. Source: (Owusu-Daaku & Diko, 2017, p. 34)

At the estuary community, the first phase of the sea defense system (which as of the time of my visit consisted mainly of groin built from riprap and a raised sand bar which serves as a wall - see Figure 1.4) had been initiated. As such, the estuary community was technically no longer prone to coastal erosion. However, residents of this community were still prone to flooding when the sea rose above the wall - as some of the respondents in that community articulated. The coastal community, however, was still vulnerable to both coastal erosion and flooding as the second phase of the defense system, which was supposed to protect the shore of their community, was yet to be constructed.

This preliminary study suggested that the analysis of government narratives of CCV needed to move beyond document analysis to include interviews with actual

Figure 1.4 Images of the completed aspects of the first phase of the Ada sea defense system

government officials/representatives. Also, since this current project is focused on the example of sea defense systems, I had to extend the actors I engaged beyond the government versus local members of communities to include other relevant individuals such as consultants, scientists and/or contractors who had different ideas about and carried out different activities in relation to the sea defense system in question. Finally, the preliminary research revealed that the distinct and differentiated vulnerabilities identified needed to be re-assessed more in-depth to better understand the effects of distinct and differentiated vulnerabilities to climate change impacts - specifically for people who live within the vicinity of the AdSDS. This dissertation takes up these questions and gaps as it seeks to better understand the mismatch between "expert" and local understandings of vulnerability, its sources, and its solutions and how and why this mismatch results in maladaptation - that is subsequently taken advantage of to further interests other than the stated goal of the adaptation project which is the construction of sea defense systems.

Research Questions

The study aims to further our understanding of how the identification of climate-related vulnerabilities, and the selection of interventions to address those vulnerabilities, can result in unintended outcomes that enhance, instead of ameliorate, vulnerabilities related to climate change. This study views the selected intervention of sea defense systems to address the climate-related vulnerabilities of coastal erosion and flooding as projects of rule – that is the ways in which people order their bio-physical and socio-immaterial environments. Viewing climate change adaptations as projects of rule lends the analysis in this study to the theoretical framework of governmentality and the production of "adaptation subjects" – individuals whose interests and desires are aligned with the dominant GoG justification for the implementation of sea defense systems as a CCA. I apply the theoretical framework of governmentality by examining the different positions of various actors relative to the sea defense systems in the Ada East district in order to understand how the perceptions of these groups construct the vulnerability of a particular place and its population to the impacts of climate change, identify sea defense systems as an adaptation to climate change, and understand, experience, and respond to the outcomes of that sea defense system – particularly outcomes one could consider as maladaptive. In effect, governmentality helps explain the reason for maladaptive and (mal)adaptation opportunistic outcomes of sea defense systems as CCA. The following questions seek to break down this seemingly complex goal into more manageable objectives:

1) What are the perceptions of actors such as residents, government officials, academics, consultants, and/or contractors of sea defense systems as an adaptation to climate change in the VRD?

2) In what ways do these perceptions of these various actors align (or not align) with the dominant GoG narrative on sea defense systems as CCA and in turn construct climate change vulnerability and adaptation as it is experienced by people living in the VRD?

3) What implications do the lessons learned from the use of sea defense systems as an adaptation to climate change in the VRD have for climate change vulnerability assessments and adaptation efforts in deltaic environments and beyond and for understanding they ways in which, and not simply why, maladaptation can occur?

By conducting a study of a sea defense system through the lens of governmentality, I sought to identify some specific perceptions that can influence CCV and CCA and invariably glean lessons to inform Ghana's National Adaptation Plan (NAP), mandated by the United Nations Framework Convention on Climate Change (UNFCCC), but is yet to be submitted to the UNFCCC. Governmentality explains the seemingly nonsensical ways in which decisions are made and actions are taken at various scales such as the reasons for which a climate change adaptation with an apparently obvious maladaptation such as intensified erosion elsewhere would be continually preferred by the GoG and desired even by individuals who have been affected by such intensified erosion. The theory demonstrates how actors may be influenced to take actions or believe in philosophies, without often being fully aware of exactly how such influence is taking place. As such governmentality is a useful lens for understanding how

disparate actors with disparate motivations are aligned toward a shared goal. Such understanding is essential in the light of the NAP process - which will require parties like Ghana to identify and develop medium to long-term adaptation priorities, policies and programs. NAPs influence CCA funding, and the framing of climate change and its impacts in particular parts of a country can greatly determine which places' and peoples' priorities a country focuses on. In other words, I am productively employing governmentality in hopes of assisting the production of a NAP that reflects shared goals that ideally relate to the actual vulnerabilities of people. Finally, this research can inform the design and implementation of sea defense systems as CCA in coastal and deltaic regions in Ghana – and by extension other similar areas of the world by preventing maladaptive outcomes through increased understanding of some of the ways in which these maladaptive outcomes occur.

This research also serves as a form of advocacy, on my part, for the plights of the individuals potentially disenfranchised by the CCA project of the AdSDS in the VRD because I am of the opinion that CCA (and development) more broadly cannot and should not be apolitical (Adger, Arnell, & Tompkins, 2005; Burton, Diringer, & Smith, 2006; Moore, 2012; Nagoda, 2015; Paavola, 2008; Paavola & Adger, 2006). Rather than apolitical, CCA should be pro-poor because climate change tends to have disproportionate impacts on the poor, as the poor generally have greater exposure, increased sensitivity, and lower adaptive capacity to climate change impacts (African Development Bank et al., 2003; Tanner & Mitchell, 2008). Also the stated objectives of sustainability and resilience of CCA and development cannot be achieved if these objectives are not pro-poor (Jerneck & Olsson, 2008; O'Brien, O'Keefe, Meena, Rose, &

Wilson, 2008). Lastly CCA cannot be equitably transformative if it does not address issues of poverty (Dodman & Mitlin, 2013).

Structure of the Document

I have divided this document into seven chapters. The first chapter, which is this introduction, provides the background to the research, and establishes the core questions this research seeks to answer. Chapter Two is a literature review of the core theoretical concepts that make up the governmentality framework and what it means for the concept of governmentality to be applied to CCA research particularly contributing to the politics[8] of CCA literature. Chapter Three discusses the research design, methodology, and methods and is explicit about researcher subjectivity, positionality, and research assistance. Chapter Four examines the views of national government officials, civil society actors, and international consultants, contractors, and funders on the AdSDS as a means of setting up the context within which further governmentality analysis will take place. Chapter Five applies the theoretical framework and methodology of governmentality employed in this dissertation to the AdSDS in the Ada East district. Chapter Six extends the methodological framework and literature on maladaptation to present a different, yet related, concept of (mal)adaptation opportunism: a situation where CCA projects are overrun by interests other than those of the projects' intended goal of enabling adaptation to climate change. The case Chapter Six describes demonstrates how, particularly with the complicated and non-linear process of governmentality, certain outcomes can be unexpected and result in maladaptation. Chapter Six also illustrates how

[8] I agree with Eriksen et al. (2015) in the use of politics in a broad sense to mean "the processes through which individuals and collectives cooperate and collude to order and govern everyday affairs" (p. 524).

governmentality helps answer the question of why proven maladaptive interventions would still be preferred by multiple stakeholders and subsequently implemented. Chapter Seven ties everything together by revisiting the research questions in an attempt to provide tentative answers, and outlines how in this particular study of the AdSDS in the VRD of Ghana, climate change adaptation presents itself as a complex process intervened by many interests; and results in a highly variegated, multi-scalar landscape of politics and change.

CHAPTER TWO

REVIEW OF RELEVANT LITERATURE

Introduction

This chapter reviews literature relevant to the application of governmentality to CCV and CCA and demonstrates how governmentality as an explanatory framework for maladaptation contributes to the literature on the politics of CCA. I begin the chapter by presenting a definition of governmentality and highlighting related notions of rationalities, power, knowledge, technologies, and security. I then apply these aspects of governmentality to understanding CCV and CCA as governmentality in three ways. First, I illustrate through a review of climate change-related infrastructure, the ways in which infrastructure serves as a technology to the rationalities of CCV and CCA. Second, I focus on the notions of identity, knowledge, and power to understand how particular framings of CCV become legitimate and enacted. My final discussion in this chapter considers how understanding maladaptation as a product of governmentality contributes to the politics of CCA literature and the implications of viewing CCV and CCA as governmentality for CCA decision-making and governance.

Governmentality: Rationalities, Power, Knowledge, Technologies, and Security

Governmentality is a concept introduced by Michel Foucault, in the 1970s.

Governmentality, according to Foucault, has a bit of a complicated origin. Foucault describes governmentality as

> "the ensemble formed by institutions, procedures, analyses and reflections, the calculations and tactics that allow the exercise of this very specific albeit complex form of power, which has as its target population, as its principal form of knowledge the political economy, and as its essential technical means apparatuses of security." (Burchell, Gordon, & Miller, 1991, p. 102)

This definition is very much in line with the definition of government provided by Dean (1999) as

> "any more or less calculated and rational activity, undertaken by a multiplicity of authorities and agencies, employing a variety of techniques and forms of knowledge, that seeks to shape conduct by working through our desires, aspirations, interests and beliefs, for definite and shifting ends and with a diverse set of relatively unpredictable consequences, effects and outcomes*"* (Dean, 1999, p. 11).

The diversity and unpredictable of the outcomes of government as defined by (Dean, 1999) speak directly to the unintended nature of many maladaptive outcomes and thus reinforce governmentality as a useful framework for explaining some of the ways in which maladaptation occurs. For the purposes of this review, the terms *rationalities*, *power*, *knowledge*, *technologies*, and *security* are critical. *Rationalities* are one key means by which things or objects are made governable. Foucault talks about the use of calculations and statistics in rationalizing the need for government intervention in a

population. Research that highlights this use of calculations and/or statistics in rationalizing governance of one form or another include Ferguson's *The Anti-Politics Machine,* which illustrates how development institutional framings of Lesotho cast the country as a subsistence economy of farmers, when in reality the majority of the local economy was supported by the wage-labor of men who worked in South African mines (Ferguson, 1994); Scott's *Seeing Like a State* which argues for the ways in which national governments use surveying and map-making to simplify complexity in order to manage populations (Scott, 1998); and Mitchell's *Rule of Experts* which demonstrates how even the economy as a taken-for-granted entity is a contrived concept which has been applied to Egypt to demonstrate shortages of food supply, caricature the peasantry, and explain ecological problems in simplistic, unitary ways (Mitchell, 2002). *Power*, according to Max Weber is "the probability that one actor within a social relationship will be in a position to carry out his own will despite resistance, regardless of the basis on which this probability rests" (Weber in Oels, 2005). Foucault expands on this notion of power, to highlight the productive forms of power in which individuals both exert power and have power exerted on them by others (Oels, 2005). According to Oels (2005), Foucault argues that "all power relations are based on a field of knowledge that sustains them and vice versa." (p. 186). Thus *knowledge* is defined as true belief, or true opinion combined with reason (Hilpinen, 1970). This definition gives rise to three concepts: acceptance/belief, justification/evidence, and truth (Hilpinen, 1970, p. 110). Truth in particular is a concept Foucault ties to knowledge because of the power that statements deemed as true yield for some in society (Foucault, 1980). Knowledge is also critical because relations of power are intimately bound up in what knowledge is seen as valid

and legitimate. *Technologies* are the means by which populations are ruled or governed. Technologies can be in the form of procedures, infrastructure, tools, programs or other physical and/or psychosocial objects that are the medium through which governing meets certain ends or exerts control. With regard to psychosocial technologies, identities and subjectivities (the identification of individuals as subjects of projects of rule) are particularly relevant. Rather than attempt to define identity, I rely on Weddon (2004)'s explanation of the relationship between identity and subjectivity to give meaning to these technologies of governmentality. According to Weddon (2004), identity is fluid and shifting and becomes momentarily stable with respect to a specific subjectivity. In this moment of identity formation, the individual often precludes (or is precluded by others from) any other subjectivities within the project of rule in question. This preclusion comes about through engagement with particular rationalities and forms of knowledge which travel through particular modes of power or relationships. The last term I would like to define is *security*, which is at the core of governmentality, where the alignment of interests is often framed around the need to protect or safeguard something from deterioration or harm (Foucault, 1995, 2003).

Climate Change Adaptation and Governmentality

The concept of governmentality as applied to climate change has been mainly to the issue of mitigation and the control of carbon, and not as much to the issue of adaptation (Lövbrand & Stripple, 2011; Lovell, Bulkeley, & Liverman, 2009; Paterson & Stripple, 2010; Rutland & Aylett, 2008; Schwanen, Banister, & Anable, 2011; Stripple & Bulkeley, 2014). I could find only one article that focused explicitly on climate change adaptation as governmentality. Keskitalo, Juhola, & Westerhoff (2012) analyze climate

change adaptation policy in the United Kingdom, Finland, and Sweden. The article does not focus on any actual example of planned and implemented adaptation but stays within the realm of adaptation policy. Another article I found by Vink, Dewulf, & Termeer (2013) discussed climate change adaptation governance in light of knowledge and power, but did not use the term governmentality. Other articles that discuss governmentality concepts (without an explicit reference to governmentality), such as subjectivities, in relation to climate change adaptation include Eriksen, Nightingale, & Eakin (2015) and Manuel-Navarrete & Pelling (2015). Eriksen et al., 2015 introduce a special issue on the political nature of CCA (to which Manuel-Navarrete & Pelling, 2015 contribute) which, in arguing for viewing CCA as a socio-political rather than techno-mangerial process, focuses on the concepts of subjectivity, knowledges, and authority (or power). I point out the use of governmentality concepts without explicit reference to the theory because of the challenge such applications create for a more comprehensive research agenda on the application of social theory concepts to everyday life. Referencing theories consistently ease the location of related research and promote the contribution to and extension or challenge of existing studies.

Mitigation might be seen as an easier aspect of climate change to apply the theoretical lens of governmentality to because the scale at which mitigation often is measured and implemented is national, thus lending itself to a consideration of governance within the notion of a sovereign state – which is an assumption climate change mitigation makes. The state is the object to which Foucault initially applied governmentality (Burchell et al., 1991; Foucault, 1980, 2003; Lemke 1992, 2007), but

this analysis has been applied to international systems of government as well (Death, 2011; Joseph, 2010).

With regard to climate change adaptation, the application of governmentality is complicated by the individualized scales on which climate change adaptation can occur. However, scholars realize that projects of rule do not only take place at the level of governments but also at the level of individuals (who are typically thought of as the governed, or subjects) and that governments, at the core of their institution, are made up of people (individuals). In fact, Foucault explains the verb 'government' as the/ "conduct of conduct" (Death, 2011; Oels, 2005, 2013; Okereke, Bulkeley, & Schroeder, 2009) and this conduct involves the governing of self, family, as well as the state (Dowling, 2010; Oels, 2013). Carr's work (Carr, 2013, 2014; Carr, Onzere, Kalala, Owusu-Daaku, & Rosko, 2015) in particular applies this notion of governmentality to the scales of the individual, household, and community. Further, while the concept of governmentality was developed through the study of liberal governments and economies prior to the 18th century (Burchell et al., 1991; Foucault, 1980, 2003; Lemke 1992, 2007), its utility is not limited to this context (Death, 2011; Joseph, 2010). For example, Death's (2011) work on climate change in Africa argues that scholars need to view governmentality as an analytical lens rather than a description of the state of political affairs with regard to climate change negotiations.

As I have stated earlier, rationalities constitute one important feature of governmentality. Calculations present one prime form of rationalities in governmentality. Calculations, definitions, and the attendant documents and statements within which they are contained could be referred to as discourses. Discourses can be described as ways of

thinking, doing or being. Thus discourse presents a more collective term to refer to the means of representing rationalities. In other fields, discourses are framed as means to the social construction of reality (Barrett, 1995; Gamson, Croteau, Hoynes, & Sasson, 1992; Phillips & Hardy, 2002; Potter, 1996). The discourses of climate change vulnerability, and the calculations, definitions, statements, and practices of which they are comprised, are critical means to the end of identifying what is to be governed in the context of climate change, and how it should best be governed.

There has been much literature on how vulnerability (particularly to climate change) is socially produced (Blaikie & Brookfield, 1987; Brookfield, 1999; Carr & Owusu-Daaku, 2016; Cutter, Boruff, & Shirley, 2003; Downing, 1991; Kelly & Adger, 2000; Adger, 1999; O'Brien et al., 2004). Most of this social production stems from actions that various individuals take in light of/or to address some identified form of vulnerability which either locks them into this socially produced definition or helps them break free. This social production is similar for CCA in that the ability to adapt usually stems from certain social arrangements or resource access (Adger, 2003; Adger et al., 2009; Berkes & Jolly, 2002; Pelling, High, Dearing, & Smith, 2008). In the following section, I will illustrate this process of social production with a review of how infrastructure, which is often thought of as purely technocratic and thus apolitical, is fraught with politics (Bijker, 2007). I choose such an illustration because infrastructure serves as one technology by which discourses can manifest, and therefore a lens onto the rationality of governmentality behind understandings of CCV.

The Social Construction of Climate Change Vulnerability and Adaptation through Infrastructure

I now review some literature on climate change-related infrastructure to illustrate the social construction and production of both climate change vulnerability and adaptation. I illustrate this social construction and production along the lines of three related themes. The first theme addresses the fact the utility of infrastructure does not merely stem from its existence, but that issues such as communication and social status influence how infrastructure benefits or disadvantages populations (Adger, 1999; Burch, 2010; Carr, Abrahams, de La Poterie, Suarez, & Koelle, 2015; Furlong, 2011; Heiskanen, Johnson, Robinson, Vadovics, & Saastamoinen, 2010; Kazmierczak & Carter, 2010) . For example, In a study citing the effectiveness of a storm protection system consisting of dykes in Vietnam, Adger (1999) postulated that communication surrounding the arrival of storms was key to preventing the loss of lives and property despite the presence of the dyke. A study of flooding in Zambia by Carr, Abrahams, de La Poterie, Suarez, & Koelle (2015) demonstrated how early warning systems would benefit different people due to their different livelihoods, with the wealthy needing different timings of warning than the poor. These studies illustrate how social actions such as communication, and not just the mere existence of infrastructure such as dykes or other flood protection, produce a process of effective adaptation.

The second theme is that infrastructure is political On the climate change-related infrastructure of dykes , Bijker (2007) argues that both dykes and dams are thick with politics. This framing of infrastructure as politics is based on two associated sub-themes. The first sub-theme is that infrastructure is often the focus and locus of politics (Bijker, 2007; Gosseye, 2012; Gursel, 2012; Kennedy et al., 2011; Puka & Szulecki, 2014; Von

Schnitzler, 2013; Winner, 1980). In this theme, the constitution and development of these infrastructures or technologies are not only surrounded and influenced by politics, but also exert political influence themselves by conditioning social relations and practices (Bijker, 2007). Bijker (2007) further argues that the types of technologies and infrastructure applied to different situations are a product of the culture of/toward technology that different societies hold (see also Winner, 1980). The second sub-theme is that the infrastructure itself, and not just the actors surrounding it, possess political qualities (Aradau, 2010; Hanseth & Monteiro, 1997; Schouten, 2013; Star, 1999; Winner, 1980). Winner (1980) discusses whether technology such as infrastructure has a political component or is able to express knowledge or power. Winner argues that technologies in and of themselves (and not just their social construction or context) have political properties, noting situations in which technology serves as the means to settle an issue within a particular community.

The third major theme is the mobilization of specific objects as infrastructure and how this mobilization occurs via politics (Carse, 2012; Larkin, 2013; Linton & Budds, 2014; Manzerolle, 2010; Simone, 2006). I illustrate this mobilization via the research of Carse (2012) on infrastructure in Panama. Carse (2012) explores the ways in which infrastructure can act as a political, ecological and social conditioning tool to different ends and for different actors. Building upon work in political ecology and science and technology studies (STS), Carse (2012) discusses how nature becomes infrastructure, i.e. how a resource deemed as natural can be reshaped, reconstituted or reimagined to serve an infrastructural or support purpose. The infrastructure in his article is the watershed of the Panama Canal, which supports the function of the Panama Canal by providing enough

water to enable seaborn transportation. He traces the historical progression of the creation of a watershed for the Canal and the decision to focus on agriculture as the activity that had to be regulated in watershed management amongst many competing uses of the watershed's land. Though he does not employ governmentality as an analytical lens, I can identify certain tenets of governmentality within his research. First, he articulates specific rationalities that state actors (both US and Panamanian) held regarding the Canal and the creation of its watershed, and the need to focus on swidden agriculture as the use of the watershed to be managed. Next, he identifies a particular technology of forest guards to enforce these rationalities. By his comprehensive analysis, he demonstrates how even infrastructure deemed as "natural" comes into being through various political and cultural acts and how (natural) infrastructure possesses different uses for different people.

Identity, Power, Knowledge, and Climate Change Vulnerability and Adaptation

In this section, I highlight the role of identity and how it intersects with other notions of governmentality such as knowledge and power to inform and influence understandings of CCV and CCA. I begin the discussion with how identity, framed through the lens of intersectionality, is critical for holistic understandings of CCV and CCA. Valentine (2007) defines intersectionality as the interrelationship between various axes of identity, such as age, gender, race, sexuality, socio-economic status. However intersectionality is not merely the relationship between axes of identity, but the unique and situational subjectivities that emerge as a function of these interrelationships. Such a view of intersectionality helps prevent the reification of simplified and immutable identity categorizations. This prevention is necessary because (as I have earlier discussed) identity under a project of rule attempts to prevent the co-existence of multiple

subjectivities. An intersectional view of identity (in light of subjectivities) helps maintain the fluid and shifting nature of identity (in relation to the subjectivity of a project of rule) and creates opportunities for the resistance of domination via identification, and different ways of seeing subjects and their power within projects of rule. I point out how intersectionality can often be viewed apolitically, and iterate the need for an explicit focus on power within discussions of intersectionality. I then conclude this section with a discussion of how this focus on power calls into question knowledge claims about the world, particularly claims that define specific problems and articulate their attendant solutions. This focus is in line with Eriksen et al. (2015), who call for a research agenda into the politics of CCA that outlines the mechanisms through which adaptation subjects are produced. This focus on the relationship between identity, power, and knowledge also further illustrates the themes of politics (which I discussed in the previous section) surrounding the social construction and production of infrastructure.

The question of identity in CCV and CCA requires some discussion of intersectionality within climate change research (Carr & Owusu-Daaku, 2016; Carr & Thompson, 2014; Kaijser & Kronsell, 2013; Sultana, 2013). Carr & Owusu-Daaku (2016) demonstrate how, in the delivery of climate information to farmers in Mali, it is gender's intersection with seniority[9] that produces identities associated with particular roles and responsibilities. These roles and responsibilities reveal and explain the differing needs of, for example, junior women who produce peanuts for market sale versus senior women who grow sorghum mainly as fodder for the animals they have the opportunity to

[9] Seniority is a social category and not a number. This makes seniority only partly about age. Seniority often does not have firm age cut-off but is also influenced by other factors that reflect status and accomplishment such as wealth and marital status.

raise and own because of their status as senior women. This particular example from Mali illustrates how junior women are likely to be more vulnerable to the market impacts of climate stresses than their more senior counterparts; and how a binary view of gender that assumed the condition of one grouping of women as representative of a majority of women in Mali would have missed this difference.

The issue of intersectionality brings to the fore how power relations and structures play a key role in the determination of CCV. For example, Carr & Owusu-Daaku (2016), in citing Becker (1990), point out that among the Bambara in Mali junior men occupy a subjugate position to senior men in questions of agricultural decisions and productivity - in that junior men can only cultivate their own plots after fulfilling obligations to the family farm which is controlled by an senior man. This example demonstrates how not just between but even within gender groupings unequal power relations exist. This focus on power relations can be viewed as a response to a call in feminist geography to pay closer attention to issues of power and inequality in the application of intersectionality (Valentine, 2007). CCV and CCA are also not only shaped by identity and power but also by the economy and politics. Works that approach climate change in such integrative ways include Carr (2014), Jeffers (2013), and O'Brien & Leichenko (2000).

Central to understanding power relations are questions of knowledge production. As I have earlier outlined, knowledge (and its production) is a key tenet of governmentality. Who gets to make particular claims about what constitutes valid knowledge in specific contexts is a critical manifestation of power, and is also productive of power. Pettenger (2013) argues that by asking when power and knowledge converge and diverge and the instances in which knowledge produces power (and I would add the

reverse - when power produces knowledge) we can begin to better understand the ways in which climate change (and by extension adaptation in the name of climate change) is socially constructed. The relationship between knowledge and power is illustrated more clearly through the study of the production, circulation and application of (scientific) knowledge in research that seeks to merge political ecology with STS in the explanation of the causes of and provision of solutions to environmental problems (Carse, 2012; Goldman, Nadasdy, & Turner, 2010). In fleshing out this application of political ecology and Science and Technology Studies (STS) to the production, circulation and application of knowledge, (Forsyth, 2010) highlights how explanations of environmental issues are highly politicized. He provides insights into how the sociology and philosophy of science can move political ecology beyond simply a focus on the social influences and interests of science towards the ways in which science frames and provides solutions to problems to make political ecology more relevant to policy enaction and practice. In further discussing the relationship between political ecology and STS, (Taylor, 2010) analyzes the concepts of agency, structure and knowledge production and their relationships with one another. Taylor concludes that it is never one factor or thing that is responsible for explaining processes or outcomes but a complex, multiple, intersecting of processes across various scales and over time (in other words "a geography") which makes a coupled political ecology and STS approach appropriate to geographical understandings of complex issues such as climate change. This geographically explicit approach is helpful in tracing the starting points for knowledge claims and the contexts within which these claims produce and are produced by power.

Adaptation Pathways, Governance, Decision-Making, and the Politics of Adaptation

In this section, I tie this literature review together by reviewing some implications of approaching climate change adaptation through the lens of governmentality for climate change adaptation decision-making and governance, and how this analysis contributes to the politics of adaptation literature. Some works identify climate change resilience as the logical next step after adapting to climate change, usually conceptualizing climate change resilience as a concept of "bouncing back" or "recovery" from some shock or stress of climate change (Bahadur, Ibrahim, & Tanner, 2010; Green, 2009; Tyler & Moench, 2012). Adger et al. (2011) caution that policy responses to climate change that seek to build resilience do not always address the underlying adaptive capacity of a socio-ecological system to respond to climate impacts. They argue that society must identify pathways that will build the adaptive capacity of the socio-ecological system as a whole through collaborative and decentralized decision-making (Adger et al., 2011). An example of research that has incorporated such a conceptualization of resilience into climate change adaptation decision making is Engle, Bremond, Malone, & Moss (2014). Engle et al. (2014) equate the concept of adaptive capacity with resilience despite many other definitions of resilience, and by doing so implicitly focus on adaptive capacity within their arguments. Engle et al. (2014) outline an indicator framework employing both quantitative and qualitative methods which spans multiple temporal and spatial scales in determining the resilience of specific actions in light of climate change. A call to seek pathways that build adaptive capacity is particularly important in light of the fact that certain pathways, particularly those that involve the development of infrastructure,

set path dependency and limit flexibility in adaptation (Barnett & O'Neill, 2010; Barnett et al., 2013).

However, adaptive capacity is constrained. Hill & Engle (2013) demonstrate tensions between adaptive capacity that are either reactionary or anticipatory on the one hand versus tensions between the various scales of governance at which adaptive capacity can be adequately developed relevant to the stressor at hand on the other. These tensions between reaction and anticipation and the lack of a multi-scalar analysis are some of the challenges of applying governmentality to climate change adaptation because governmentality traditionally has not lent itself to issues of scale (Rutherford, 2007) nor a consideration of social relations (O'Malley, Weir, & Shearing, 1997). However one such theorization that pays attention to scale and social relations within the context of governmentality is the Livelihoods as Intimate Government (LIG) approach (Carr, 2013) and its many applications (Carr et al., 2015; Carr, 2014; Carr, Fleming, & Kalala, 2016; Carr, Onzere, et al., 2015; Carr & Onzere, 2017; Carr & Owusu-Daaku, 2016; Onzere, Kalala, Owusu-Daaku, & Carr, 2015). LIG demonstrates how members of a social unit both constrain, and are constrained by, the actions of each other and wider societal expectations and discourses concerning how they should behave. LIG also makes livelihoods the lens for understanding the project of rule that is everyday life (attention to social relations) and illustrates how the economic, social, and material (different scales) are mobilized to achieve diverse, sometimes contradictory goals. LIG also tries to understand decision-making in light of the competing interests of the material, economic, and social as earlier outlined.

With regard to decision-making, de Boer, Wardekker, & van der Sluijs (2010) propose that decision-makers be cognizant of the type of frame of decision-making with which they are operating in order to facilitate the process of adaptation - making this process more comprehensive and reflexive - as a result of the consideration of multiple and sometimes contesting frames. This recognition of frames maps neatly to LIG's focus on perceptions and the ways in which perceptions of reality potentially influence action (Carr, 2013, 2014). Also, Mees, Driessen, & Runhaar (2012) recognize that the private sector or non-governmental actors also have a part to play in the decision-making process with regard to CCA and hence call for an analysis of responsibilities and capabilities of governmental and non-governmental (both for-profit and non-profit) actors in order to promote efficiency. This call for the involvement of non-governmental actors is another extension of the concept of governmentality beyond the state to understand how non-state actors contribute to projects of rule (Appadurai, 2001; Bryant, 2002; Sending & Neumann, 2006). However this notion of joint or shared responsibility is often not the case in Africa.

In many African countries, CCA acts as an idea that travels across multiple sites and through various networks, sometimes propelled by incentives of funding rather than out of direct need in response to a climate impact-whether current or projected (Weisser, Bollig, Doevenspeck, & Müller-mahn, 2014). As such, in the analysis of pathways and/or frames of decisions and their constitution across scales, it is critical that researchers pay attention to the interactions between governmental officials, and the influence of non-governmental actors such as multi or bilateral development agencies, and funded-research programs where applicable, to determine whether the "politics of a travelling

idea" (that is particular ways of governing or exercising control that seem to circulate within and between policy circles) with regard to CCA (Weisser et al., 2014) are at play within perceptions and whether these identified notions of governing or rule are a major driver for the articulation of these perceptions. This attention to "a travelling idea" reflects identifying particular "rationalities" of government (as defined by Foucault and other governmentality scholars) that condition particular "technologies" of climate change adaptation. Gebauer & Doevenspeck (2015) apply this travelling idea concept to a particular case of resettlement in the name of climate change in Rwanda, demonstrating how the notion (or rationality) of anthropogenic global climate change was translated into a local negative outcome of the national Rwandan government resettling farmers from their long-time homelands. The government used discourses of environmental degradation and the focusing event of floods in 2007 to necessitate resettling farmers from a "dangerous" place to subsequently conserve forest lands through the knowledges, expertise, and programmatic efforts of national elites. Gebauer & Doevenspeck (2015) conclude with how it was the interests of the national elites, above all others, that were served by the resettlement. This serving of the interests of the rich and powerful by a project in the name of climate change adaptation is a typical example of (mal)adaptation opportunism (see Chapter Six), where the elites benefitted from the adaptation and not the farmers who were resettled in the name of climate change.

The use of governmentality as an analytical frame to explain maladaptation and the furtherance of the notion of maladaptation with the concept of (mal)adaptation opportunism, follows Adger et al. (2005)'s criteria for evaluating the success of adaptations to climate change across spatial and temporal scales. These criteria are:

effectiveness, efficiency, equity, and legitimacy (Adger et al., 2005). Most determinations of maladaptation typically address the criteria of effectiveness and efficiency ignoring for the most part equity and legitimacy. Governmentality helps address this shortcoming by focusing explicitly on legitimacy and equity through the identification of the ways in which (mal)adaptation serves the interests of people (often economic) rather than fulfilling the stated goal of the adaptation project and not in pursuit of justice or poverty reduction.

Conclusion

It is clear that climate change adaptation can benefit greatly from framing through governmentality – particularly theorization of and empirically demonstrating the politics of climate change adaptation surrounding activities such as vulnerability assessments (identifying problems) and project design (proposing solutions). Also governmentality helps explicate the processes through which subjectification occurs within CCA and can illuminate the moments in which resistance to undesired outcomes can occur for a more transformative and liberating politics of CCA for CCA's intended beneficiaries (Eriksen et al., 2015). Finally, thinking on governmentality can benefit from an extension into issues and areas that research on climate change adaptation typically covers, such as scale and social relations. However, this mutual benefit is not without its challenges. There is a need for more explicit and step-wise implementation of governmentality, if the concept will be able to move from a typically abstract and sometimes difficult-to-understand theory to practical implementation. Already the LIG approach has begun to chart the course for this change; many more applications of this approach are needed to test its validity and encourage future growth.

CHAPTER THREE

RESEARCH DESIGN, METHODOLOGY, AND METHODS

Introduction

This chapter describes my situated knowledge and assumptions prior to beginning this research. I then follow with my approach to framing the research, the type of study this research is and the methodology I employed. I continue on with how I selected sites, identified participants, and decided on the information gathering methods to use (all with their justification). I then discuss my subjectivity and positionality to the research and how I addressed these factors, and the research assistance I received in conducting the research particularly the information gathering portions. I conclude with ethical considerations, limitations of the research, the composition of my sample, and the concepts, frameworks, and tools with which I analyzed the information I gathered.

I would like to make a note about the reflexive nature or stance I take to my writing in this document. This reflexive stance reflects a desire to adhere to calls for more reflexive CCA research (Preston, Rickards, Fünfgeld, & Keenan, 2015). By writing in the first person and highlighting my thoughts and opinions as I discuss themes and discuss findings, it is my hope that I can give transparency to my methods (Vogel & Henstra, 2015) and voice to the non-linear, messy process which was the writing of this

dissertation (Pryke, Rose, & Whartmore, 2003) in order to assist future research of this kind and ease the dissertation writing process for others.

Situated Knowledge and Related Assumptions

I became interested in CCV because of my PhD advisor and mentor. My broader research interests are in global/international development and national development planning. Climate change and development sits at the nexus of my advisor's current research interests and I have worked on a number of projects related to climate change and international development with him. I became interested in the particular topic of CCV in river deltas due to a larger five-year project I knew I was going to be working with my advisor on starting in the Fall of 2015 - the DEltas, vulnerability, and Climate Change: Migration and Adaptation (DECCMA[10].) project. DECCMA is a multi-country interdisciplinary and collaborative research project, examining the role of migration among other adaptations to climate change impacts such as sea-level rise, erosion and flooding in river deltas in Bangladesh, Ghana, and India. Since I am from Ghana and at the time DECCMA was beginning my wife was living and working in Ghana near the VRD, I jumped at the opportunity to work on a project and my dissertation that would give me opportunities to be home in Ghana and close to my wife.

Climate change is currently one of the issues that geographers, urban planners, and development planners are grappling with (I have academic training in these three disciplines). This is because these disciplines think of climate change as a stressor on many other development sectors and therefore climate change needs to be given critical

[10] Disclosure: As at the time of writing, I was a researcher with DECCMA and this affiliation influenced the geographic focus of this particular study

attention in the field of national and international development (For geography see Bailey 2008, Hulme 2008a, 2008b, Moser 2010, Wainwright 2010; for urban planning see Betsill & Bulkeley 2006, Blakely 2007, Davoudi & Porter 2012, Jabareen 2013, Wamsler, Brink, & Rivera 2013; for development planning see Adger et al. 2003, Klein et al. 2007, Schipper 2007, Smit et al. 2001, Wilby et al., 2009). My academic training caused me to frame the impacts of climate change as a matter of urgency. My review of existing literature on CCV and a seminar I took on global development in the first semester of my PhD program led me to focus on the perceptions of people surrounding climate change and not just observable physical impacts. I believe that objective truth exists in every given situation and at every point in time. However, my knowledge and understanding of that truth can only be partial (i.e. reflecting a post-positivist worldview) – which is also true of those who participate in the processes I study. I therefore chose to emphasize a focus on perceptions in this research because I believe that people respond to "reality" via their perceptions, and not in an unmitigated manner.

Framing the Research Approach

With regard to the social impacts of sea defense systems on the residents of the Ada East district who live and hoped to live within the vicinity of the AdSDS, I first needed to gain an in-depth understanding into exactly what livelihoods these residents undertook. This is because as far as adaptation to climate change goes, people have distinct and differentiated vulnerabilities (Carr & Thompson, 2014) and thus by inference will be exposed and respond differently respectively to climate change impacts in light of these differences. To reiterate, *distinct vulnerability* is where different members of a population are exposed to different events and trends while *differentiated vulnerability* is

where different members of a population experience and/or respond to the same event or trend in different ways (Carr & Thompson, 2014).

I already possessed some initial insight into what kinds of livelihood activities residents of the Ada East district undertake from the exploratory research I conducted in the summer of 2014. The two major livelihoods activities in the Ada Foah (the capital of the Ada East district) area are fishing (and/or the sale of fish) and farming, according to official government publications (Ada East District Assembly, 2012, 2013, 2015; Dangme East District Assembly, 2011; Ghana Statistical Service, 2014) and confirmed by my fieldwork in the summer of 2014 in the area. During fieldwork, other livelihoods activities residents articulated (and some I observed) included trading, carpentry, dressmaking, and operating motorcycle taxi services. I confirmed this preliminary assessment through subsequent fieldwork in the Ada East district between September, 2015 and February, 2016. Knowing the specific livelihood activities that individuals carry out is important because the biophysical and social factors that influence a person's vulnerability to climate change are the very factors that condition a person's ability to make a living (Gaillard, 2010). During my summer 2014 fieldwork in the Ada Foah area, I found expressions of both distinct and differentiated vulnerabilities (Carr & Thompson, 2014) via livelihoods. I engaged residents in two discrete sites which I will refer to as the estuary community (located in the area where the Volta River enters the sea) and the coastal community (located along the coast, east of the estuary) [See Figure 1.3]. No one in the estuary community is engaged in farming (a fact attested to by all participants engaged and confirmed by later fieldwork in the community during the period of September 2015 to February 2016) [see Figure 3.1]. As such, any climate change impacts

on farming will only be felt in the coastal community, where individuals engage in both fishing and farming (another hypothesis confirmed by September 2015-February 2016 fieldwork). It is almost self-evident that fisherfolk would be less sensitive than farmers to a phenomenon such as flooding from SLR. Fisherfolk (specifically the men who go out to fish), might only have to find more secure ways of anchoring their boats in anticipation of the flood. Farmers, on the other hand (depending on how far inland the sea floods), would have their crops affected. Even if the sea does not flood farmers' crops, they would still be prone to saline intrusion because of flooding or a storm surge. Fisherfolk (specifically the women who smoke and store the fish for sale) could be affected by flooding, but unlike farmers they can move most of their smoking equipment (with the exception of the earthen stove) and the fish to safer ground. Farmers on the other hand cannot move their fields or the crops still growing on them. All residents who live near the shoreline would be equally sensitive to flood impacts on their home but now this sensitivity would no longer be based on livelihoods but proximity to the sea. I confirmed all these hypotheses with the fieldwork I undertook between September 2015 and March 2016 in Ada East district.

Figure 3.1 Images of fishing boats from the estuary community and an onion farm in the coastal community in the summer of 2014

Secondary livelihood activities, such as carpentry, trading, hairdressing, and dressmaking would be more prone to economic shocks than climatic impacts because these livelihoods do not depend directly on the natural environment (with the exception of carpentry, but whose challenge of raw materials would be more an issue of tree loss than changes in the prevailing climate). The September 2015 to March 2016 fieldwork confirmed this assertion. To assume that all residents of the area would feel the impact of climate change on their lives in the same way would be erroneous at best. As such, an identification of the specific activities people undertake in particular places can better help us understand what their climate change vulnerability is and the impact of adaptation on their lives. Such a spatially contextual approach has also been demonstrated to be useful for a more nuanced understanding of livelihoods (King, 2011), and as I discuss in subsequent chapters, this is particularly true given the ways proximity to a sea defense system influences the climate-related vulnerabilities one experiences and by extension, one's ability to make a living within that vulnerability context.

Type of Study and Methodology

I conducted a multiple method study I define as a basic interpretive case study with a focus on perceptions. The study was a basic interpretive one because I wanted the information to guide the research and describe the phenomenon of sea defense systems as an adaptation. As Merriam (2002, p. 6) notes, in a basic interpretive study "the researcher is interested in understanding how participants make meaning of a situation or phenomenon (i.e. perceptions), this meaning is mediated through the researcher as instrument, the strategy is inductive and the outcome is descriptive". Also I gathered information through interviews, observations and document analyses and drew out broad

themes from the resulting information-which are all methods employed in a basic interpretive study (Merriam, 2002). I used these methods for drawing out themes because my goal was not to gather a representative sample of each group of actors but rather gather perceptions from each actor I engaged that speaks to their (non)alignment with the project of rule that is the AdSDS as CCA and the production (or not) of each of these actors as adaptation subjects. I use the expression adaptation subjects because subjectification, or the making of subjects, is a core tenant of governmentality. In analyzing the perceptions of various stakeholders on the AdSDS as a technology of governmentality, we can assess the extent to which the project of the AdSDS aligned the various stakeholders to the GoG rationalities on CCA (in other words produced adaptation subjects). This research is a case study because it relied on context-specific knowledge of a phenomenon (i.e. climate change) and seeks to inform theory about said phenomenon either through falsification of existing assumptions or as a grounded example of a hypothesis (Flyvbjerg, 2006; Ruddin, 2006). The assumptions I sought to falsify were those that climate change "experts" may have about sea defense systems as adaptation in these two communities and I desired to present the AdSDS as a grounded example of a CCA. I have the word *experts* in quotation marks because I believe one's title as an expert is a matter of perspective. Someone working at a national level on climate change cannot necessarily call themselves an expert on the expression of climate change in a particular community just because said person has extensive experience working on climate change issues. This is because, like many other phenomenon, climate change issues are highly contextual and dynamic. However, from my theoretical frame of governmentality, this falsification proved to be not as straightforward as I hypothesized

and I demonstrate this complexity in the subsequent chapters of this document. By focusing on perceptions within and around specific cases and allowing the information I found to guide my research, I achieved my study's focus of demonstrating how different subjects are aligned under the project of rule that is SDS as CCA.

The study's methodology generally followed the Livelihoods as Intimate Government (LIG) approach (Carr, 2013, 2014). The LIG approach was conceptualized as an analysis of livelihood decision-making and outcomes from actions that were taking place at the level of individuals within a household. The approach demonstrates how members of a social unit both constrain, and are constrained by, the actions of each other and wider societal expectations and discourses concerning how they should behave (Carr, 2013); hence the "intimate government" part of the approach's name. LIG also illustrates how livelihoods are a lens onto the project of rule (i.e. the governmentality) that is everyday life - how people's ordering of the economic, social, and material world are set on a path towards (sometimes contradictory) goals. Although this research is a project of "distant government"— government among various groups of actors without close personal relationships, LIG still presents a useful overall framework. This is because LIG seeks to understand decision-making in the light of competing goals and interests and is rooted in an understanding that livelihoods strategies (or decision-making) are influenced by individuals' framings of the world (Carr, 2013, 2014) – which relates directly to this study's reason for assessing perceptions. As such the LIG approach enables access to people's perceptions, and the ways in which those perceptions produce outcomes. LIG was also adopted because it allows a reseacher to enter a community to ascertain the issues pertinent to people, instead of imposing a problem on them with an a

priori research or assessment lens. See Figure 3.2 for graphical outline of the LIG approach.

The Vulnerability Context portion of the LIG approach seeks to establish what stressors are affecting livelihood activities or the context within which decision-making occurs (Carr, 2014). In the problematization stage of the LIG approach, the researcher identifies competing claims of different groups of people about a specific issue within the vulnerability context[11].

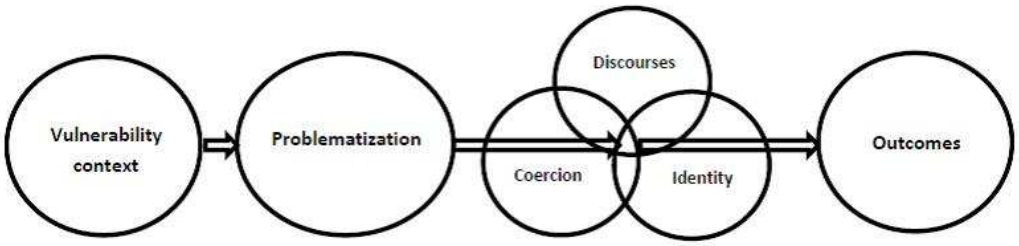

Figure 3.2: Conceptual Diagram of Livelihoods as Intimate Government (LIG) approach. Source: adapted from Carr, 2014

The third phase of the methodology explores three associated themes as an entry point into understanding decision-making or the problematization. These themes are *discourses*: the ways in which people think, and speak about, or act in reference to a phenomenon; *coercion*: practices or technologies by which behavior is influenced, and *identity*: the representations of self, constructed by individuals and society, to which people ascribe or must conform to that influence their discourses and tools of coercion. The final stage of the LIG approach analyzes the reasons for which people make certain

[11] In a Foucauldian sense, a problematization is both the object/idea around which the definition of a problem to be solved (e.g. climate change/sea level rise) is formed, and challenges to the "order of things" around which that definition emerge. Therefore in this research, sea defense system represent both the object around which the definition of the problem of sea level rise attributable to climate change is formed, and a means to understand how various actors contest or agree with sea defense systems as a solution to the problem of sea level rise.

decisions or take specific actions by linking outcomes to their production through discourses, coercion and/or identity.

Geographical Study Areas

Since the purpose of this study is to evaluate the AdSDS as an adaptation to climate change from the perspective of various actors, selecting the study areas was relatively straightforward. The communities along the coast of the Ada East district emerged as the geographical areas for the study. See Figure 3.3 for a locator map of only the AdSDS within the Ada East district.

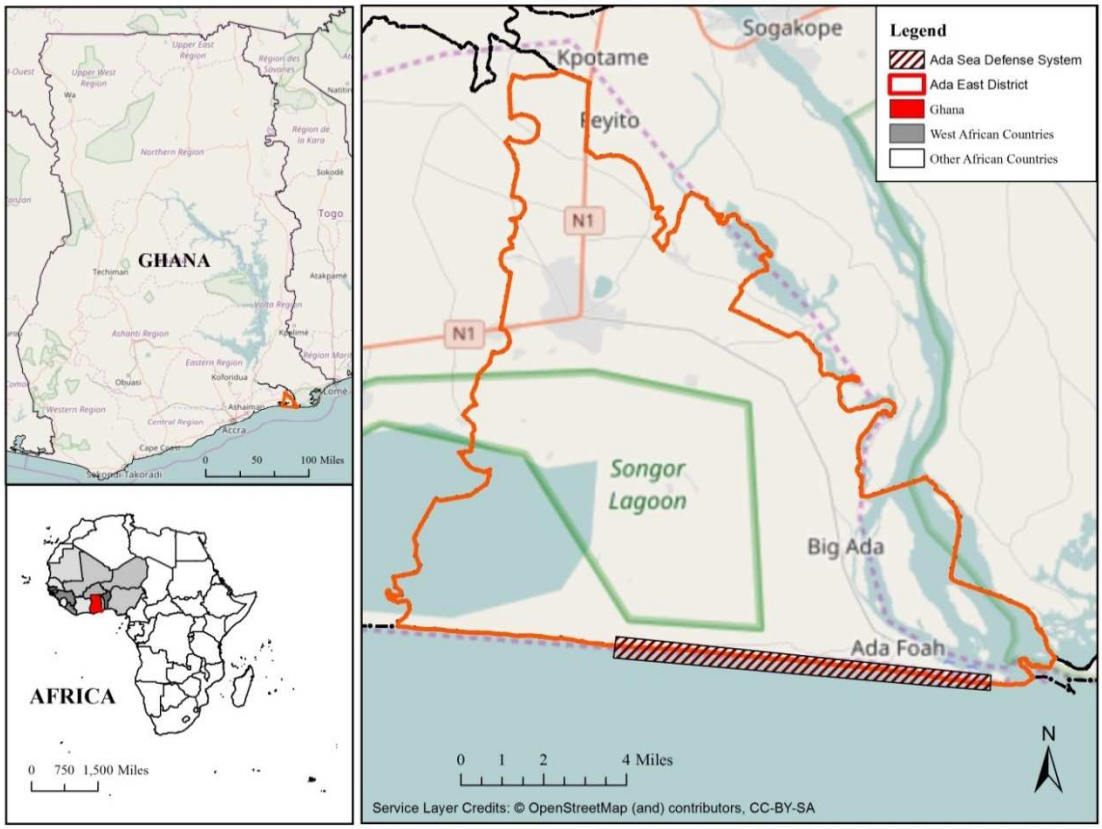

Figure 3.3: Map showing the AdSDS within the Ada East district. Map created by Stephen K. Diko

Participant identification, selection criteria, and justification

As I have earlier stated, the identification and understanding of the various roles and responsibilities individuals have with regard to their livelihood activities is important for understanding what actions they can take to respond to climate impacts (Carr & Owusu-Daaku, 2016), or in this case how efforts to adapt to climate impacts will affect their livelihoods. The lenses through which these roles and responsibilities should be identified and understood have to be contextual and not assessed on an a priori basis (Carr & Owusu-Daaku, 2016; Onzere, Kalala, Owusu-Daaku, & Carr, 2015; Owusu-Daaku & Onzere, in review). This is where the Livelihoods as Intimate Government (LIG) approach (Carr, 2013, 2014) served most usefully. LIG enabled me identify who does what particular activities and around what social cleavages or groupings people with these various responsibilities fell (Carr, 2014). In accordance with preliminary research conducted on livelihoods in the Ada Foah area (Ada East District Assembly, 2012, 2013, 2015; Dangme East District Assembly, 2011; Ghana Statistical Service, 2014), I first sampled across fisherfolk and farmers to capture a range of experiences then, following initial analysis of individual reported vulnerabilities using the LIG approach, I identified other subgroups defined by characteristics such as gender or other relevant livelihoods such as mangrove harvesting or trading that I needed to consider.

I mention gender in particular because it has been shown to be a significant (though not the only or most important) aspect of identity in determining people's capacities to adapt with regard to livelihood actions in particular (Carr, 2013; Jakimow, 2012; Kruijssen et al., 2013; Warner, Al-Hassan, & Kydd, 1997) and to climate change more broadly (Arora-Jonsson, 2011; Carr, 2014; Carr & Owusu-Daaku, 2016; Carr &

Thompson, 2013, 2014; Sultana, 2013). As I have emphasized, gender is not the only variable in influencing adaptive capacity and often finds it expression in the intersection of other aspects of identity such as ethnicity, age, religion, and class (Carr & Owusu-Daaku, 2016; Carr & Thompson 2013, 2014; Kaijser & Kronsell, 2013; Sultana, 2013). Gender proved to be a relevant axis of identity along which to sample residents particularly due to the gendered nature of fishing activities in the areas - only men go out on boats to fish and only women process fish for sale (Bortei-Doku Aryeetey, 1995; Odotei, 1992; Overa, 2003; Weeratunge, Snyder, & Sze, 2010).

To guide the sampling of these communities, I employed a *stratified purposeful sampling strategy* (Patton, 2002, p. 240). The strategy was purposeful because I strategically and intentionally sought out information-rich cases to illustrate the phenomenon of the SDS as CCA as projects of rule. The sampling strategy was stratified because I began with *maximum variation/heterogeneity sampling* in which I sought to identify different positionalities and different perceptions of the AdSDS and then recognize themes resulting from the differences (Patton, 2002, pp. 234–235). Upon initial sampling, I then further sampled to find *confirming and disconfirming cases* of emerging themes to otherwise deepen or modify the initial categorization according to themes (Patton, 2002, pp. 239–240). Examples of such disconfirming cases are the perceptions of academics on SDS as CCA. I transitioned from maximum variation sampling to confirming and disconfirming cases by conducting *snowball or chain sampling* to select the specific participants to be further engaged with. I used snowball or chain sampling because this sampling strategy was useful for obtaining information-rich key informants (Patton, 2002, pp. 237–238).

I also took location to sea defense systems into consideration when deciding who to sample. I first began with residents who lived beside the sea defense systems. In engaging residents near the AdSDS, I realized that I had to engage residents who did not live near the AdSDS at all – resulting in only one community – to strengthen my analysis of the perceptions and reasons for the perceptions of residents who did live near the AdSDS.

Another criteria I adhered to was that all engaged participants had to be 18 years or older. Ghana's age range for those considered the working age population is from 15-64 years but as per IRB[12] standards I did not engage any participants 18 years or younger in order not to have to seek parental approval. Also, most individuals under 18 years would not have much independent decision-making authority, so these youth would not be autonomously responding/adapting to climate change, although they would definitely be impacted by a changing climate. I included persons willing to participate above 65 years of age because individuals engaged in primary livelihoods such as fishing and farming usually keep on actively working until they are physically unable to do so.

To identify relevant actors other than residents of the communities near these sea defense systems, I conducted a content analysis of sources relevant to the sea defense systems in Ghana in general, and to the AdSDS in particular, to pinpoint any recurring persons as critical to speak to with regard to sea defense systems as CCA. The goal of this identification was to capture a range of perceptions within and outside the GoG in order to assess their (un)alignment with the project of rule of SDS as CCA. These sources included national communications, reports, research articles, and websites. My content

[12] IRB approval number for this research: Pro00047884 and date: 08/20/2015

analysis revealed the officials of the Ada East District assembly, officers in the Ministries of Water Resources, Works and Housing (MWRWH - the GoG ministry with the most direct responsibility for the development of the sea defense systems) and Environment, Science, Technology and Innovation (MESTI); consultants and contractors of the AdSDS, and scholars or academics conducting research related to the sea defense systems as the most relevant stakeholders to engage. One government ministry that emerged as relevant during fieldwork was the Ministry of Tourism, Culture, and Creative Arts (MOTCCA) because of recurring complaints that I heard of a real estate company allegedly forcing a fishing community off their land (my example of (mal)adaptation opportunism). As a result, I had to do additional research and MOTCCA emerged as a relevant governmental ministry to engage in an attempt to understand the issue better.

Information Gathering Methods

The methods with which I gathered information include:

1) a desk study of livelihoods, literature on the climate and environment, and studies of market trends and processes influencing livelihoods in the two areas– to understand the context within which CCV and CCA are taking shape (Carr, 2014) as established by the academic and grey literatures. This desk study was on-going throughout the duration of the research, from the development of the research proposal to the completion of the final dissertation document, but the desk study was completed in provisional form before the start of fieldwork to enable the LIG approach in the field

2) a content analysis of relevant information sources such as government communications, reports, websites, newspapers, radio, television programs, and

documentaries – to provide an initial insight into the perceptions of various actors relevant to the use of sea defense systems as an adaptation to climate change in Ghana. These sources were either entry points or proxies (in the absence of other means) to understand how the relevant stakeholders to SDS as CCA articulated their opinions, thoughts or desires concerning SDS and the other themes associated with these structures as CCA. To gain a deeper insight into perceptions however I employed:

3) semi-structured interviews and focus groups. Hearing from respondents first hand and analyzing what they told in the context of how they told me, helped me better approximate the meanings they ascribed to the topic under discussion (SDS as CCA). I conducted both interviews and focus groups with community residents, while I conducted only interviews with the other actors relevant to the AdSDS. This is because I was interested in a more in-depth analysis of the impact of the AdSDS on intra-community dynamics and the livelihoods of residents in the communities of the AdSDS than I was on the impact of the sea defense system on the other relevant actors related to the sea defense system such as government officials and consultants and/or contractors. I conducted all interviews and focus groups at the community level with the assistance of a translator and recorded proceedings with a voice recording device (wherever practical and whenever possible) to enable subsequent analysis of information. The ability to record and playback conversations was vital to capturing information as it was presented - especially where notes and memory were insufficient. Despite recording, I took copious notes of every interview I conducted and this note-taking was particularly useful as I could not record every interview. Group interviews also proved a prominent feature of my interviewing at the community level. I distinguish here between group interviews and

focus groups as group interviews being composed of two interviewees and focus groups being composed of three or more participants. Many, if not all, of these group interviews were unplanned. They often occurred as a result of coming upon research participants engaged with others in activities. Since my interviews at the community level were such that I did not have the time to set them up in advance, I often had to interview more than one person at a time. This unplanned feature was the same for all focus groups I conducted.

4) site and participant observations - These provided further insight into the lived experiences of residents and provide a more personal understanding of the experiences they relay in interviews and focus groups. This method of information gathering is also in line with the LIG approach (Carr, 2014). I documented my observations of physical processes and structures and activities of participants in the form of field notes and photographs. I used these observations to fact-check the information I gleaned from the desk study, interviews and focus groups; to challenge any information from these sources with information I gained from the observations (all this is in line with LIG's tenet of problematization to facilitate understanding of the livelihood phenomenon under study - Carr 2013; 2014); or to serve as illustrations of phenomenon or concepts I observed in the field. I recorded field notes for as many activities as I could that I observed when gathering information and I took photographs of many community structures, and participants and their activities, where possible (or where I was not being intrusive or offensive and with permission as often as I could).

Role of the Researcher: Statements on Subjectivity and Positionality

Subjectivity

For my subjectivity, I identified two subjective-'I's (Peshkin, 1988) relevant to this research: my Postpositivist-I which as I earlier stated, believes that some form of objective truth exists, yet my knowledge of said truth will always be partial; and my Perfectionist-I which obsesses over minute details of projects I care about. On one hand, my Postpositivist-I was a strength in the sense that it made me dissatisfied with the very first answer I received and helped me seek to probe further in search of the ever elusive "objective" truth I technically never found-because even my definition of objectivity is subjective to someone else's. My Postpositivist-I caused me to go to great lengths to be as rigorous as possible in my research. On the other hand, my Postpositivist-I sometimes struggled with knowing when to stop or accept a finding as valid because, as a result of my view of my knowledge as partial, I was often seeking to gain as much knowledge from my participants during the information gathering process. This persistent line of question and asking of the same question in different ways sometimes irritated my participants.

My Perfectionist-I was a strength because it pushed me to do as rigorous research as possible. However, my tendencies for perfectionism sometimes limited my ability to realistically achieve my goals in a timely manner. One major activity that my Perfectionist-I affected was the analysis and writing up of this dissertation document.

Positionality

I discuss positionality in terms of insider and outsider status. Outsider status was mainly a challenge but in some instances, as I demonstrate with community residents, outsider status served as an opportunity to gain better understanding. My insider statuses (which I specifically delineate in the following sections) greatly assisted my information gathering and subsequent analysis, as I had a baseline understanding of many contextual issues.

To community residents: To the community level participants I was an outsider based on my ethnicity and educational background to all of the community residents I interviewed. I was also an outsider based on my age and gender to some of the community residents I interviewed (basically women, middle-aged, and older people). My status as a member of another ethnic group and my inability to speak the local languages made it difficult for me to comprehend first-hand what was going on with my community-level participants. I however tempered my outsider status based on my ethnicity by, quickly adding after answering where I was from, that I currently lived in Akuse (one of the main inland settlements of the Dangme people-the majority ethnic group of the Ada East district). My saying I lived in Akuse assisted my acceptance, because people in Ada East would often follow my statement with "so you can speak Dangme?" I had to always shyly answer no and then offer up the one or two Dangme greetings I had learned. Greeting and saying thank you in the local language always helped end interviews on a warm note. My age might have also affected how seriously some of the participants took me and my questions. I was afraid that my community-level participants would also think I felt I was superior to them due to my educational

background, or that they may be intimidated or overly impressed by my educational background and in an attempt to "help my research" tell me only what they think I wanted or needed to hear. As a result of this fear, I always told participants that I was affiliated with the University of Ghana (indirectly through the DECCMA project) and never that I was a PhD candidate in the United States. Also as a result of generous research funding, my family background, connections, and obligations, I showed up at my research sites driving a vehicle – either a 2014 Hyundai Accent or a 2007 Nissan Navara. These vehicles likely influenced some community residents' perception of me and most likely reinforced my outsider status. At the community level, I also encountered sentiments of research fatigue and instances of answers that seemed rehearsed. These answers may have been as a result of my identification with a research project (i.e. DECCMA) and the fact that I made week-long trips to the communities and did not reside within all the communities I visited. My outsider status, however, freed me from community-level politics and this freedom helped me gain insight into some of the inner workings of the community that participants were more comfortable telling an outsider about. At the same time, because I was an outsider, I was only privy to the framings and politics that community members chose to make me aware of. On the other hand, my insider status, to my community level participants was my nationality and identity as a Ghanaian.

To government officials: I was an outsider to all the government officials I interviewed because I was not a GoG employee. I hypothesized that my educational background as PhD student in the United States would make some government officials I interacted with perceive me as "one who thinks he knows/understands more" than they

do, which would not auger well for my interactions with them. However, my educational status did not affect me quite as much as I thought it would. There was only one instance in which I felt like a national government official was refusing to give me audience because this officer perceived my project as "simply another graduate student research project." I felt this way because this official asked me a lot about what, where, and how I was studying my PhD before he declined to grant me an interview (even though I was standing right in front of this official, who had agreed to my request that I come see him in his office). The one piece of information that possibly negates my view on this issue is that multiple researchers on the DECCMA project had told me how difficult it was to get in touch with this official, especially by phone (which I confirmed by my own experience in trying to reach him prior to meeting him in person). My stating that I was affiliated with the DECCMA project and the University of Ghana helped me gain access to government officials – particularly at the national level. My insider status to government officials was my nationality and identity as a Ghanaian and specifically to the governmental officials who were climate change "experts"- my interest in climate change and/or environmental issues. I was also an insider to some of the Keta municipality officials because of my affiliation with DECCMA, as the project had undertaken some activities with municipality officials prior to the start of my fieldwork.

Other DECCMA researchers: I was also an insider to other DECCMA researchers because of my affiliation to DECCMA and this status helped me gain some of the civil society actor views I discuss in Chapter Four.

Other actors (consultants and contractors): To these individuals, my insider status was my interest in climate change and/or environmental issues. My outsider status to

them was the fact that I was not an employee of their respective firms or a consultant or contractor.

Measures to address my subjectivity and positionality

Reflection was the first way I was aware of and continuously addressed my subjectivity and positionality. By reflecting on my experience and thoughts throughout the research, I was able to track how my opinions of myself and my participants changed and such knowledge proved useful during analysis.

To address my Perfectionist-I, I made use of my Time-Money-and-Planned-scope-for-the-topic (TMP) threshold. This threshold helped me not to waste time on minute details and kept my larger goal and objectives in view. Referring back to my proposed timeline and field notes helped keep me on track.

For my Postpositivist-I, I did my best to ensure that I member-checked every information I received and recorded. Triangulation and/or crystallization of information also helped me be satisfied with the information I gathered from my study after undertaking a member-checking exercise.

My positionality as an outsider was reduced by the interest I showed in the language (as I have earlier outlined), culture and lives of my participants. Learning how to greet and say thank you in the local language (for community residents) or about the everyday struggles in their work (for community residents and "experts') boosted my acceptance by participants. Also, allowing participants to ask me questions about my life and research helped open me up to participants and make me seem less of an outsider.

Research Assistance

Both my subjectivity and positionality were influenced by the assistance I received in undertaking my research, in the form of research assistants in community-level field work and networking via the DECCMA project. I want to devote some space to discussing my research assistance because the assistance I received impacted my ability to collect and understand my data, and also because there have been calls for researchers to be more explicit about the individuals who assist in ethnographic research (Middleton and Cons, 2014).

In terms of community acceptance and building rapport: my affiliation with the DECCMA project, my preliminary research in the Ada East district, and my research assistant helped immensely. My research assistant primarily assisted with translation and gaining a general lay of the land during fieldwork in the communities. I paid my assistant a daily rate for each day he assisted me with research. My research assistant was a man for two reasons. The first reason is because of the relationship and rapport I wanted to build with my research assistant over time. Community fieldwork involved some potentially intimate moments such as sitting in close quarters while conducting an interview or riding in a vehicle side by side for extended periods of time. Engaging in such activities with a woman might have been culturally inappropriate in these communities, and for me. While having a woman research assistant to assist in my interviews with women might have enhanced the research, the aforementioned reason of appropriateness superseded this enhancement. The second reason for a research assistant who was a man is that I did not possess the budgetary allowance to fund both women and men research assistants for two study areas. If this was a larger research project I was

undertaking, women researchers would work primarily with women research assistants and engage primarily women while men researchers would work primarily with men research assistants and engage primarily men. Though there is something to be said about the benefits of outsider status in woman to man or man to woman research engagements, and the fact that gender is not simply biological sex or that gender is not the only commonality a researcher should have in common with a research participant, since it would be impossible to fulfill all these conditions all at once in a single research project, I ended up working with my arrangement of only a man as a research assistant.

Research assistants bring to the fore the role of interpersonal dynamics, prior experience, and subjectivity in contributing to the overall experience of information gathering. Prior research experience, both on my part and the part of my research assistant, played a big role in the smoothness of our working relationship. I had conducted preliminary research in the district prior to beginning fieldwork for my dissertation, so I was very familiar with the both the physical and social landscape of the area in which I wanted to work and I already had contact with a research assistant I had worked with during my preliminary research. This research assistant was the one who recommended the assistant I employed during my main dissertation fieldwork. The discussion of working dynamics and prior experience highlights the need to devote time to relationship building, especially when working with research assistants.

For DECCMA, the project was particularly instrumental in helping me gain audience and receive assistance from government officials at both the national and municipal/district levels as well as with the key scholar I interviewed. When speaking to government officials, often all I had to do was present them with a DECCMA project

brochure or say I was affiliated with the University of Ghana to gain an audience. The project brochure seemed to serve in lieu of an official letter that they might have requested to substantiate my legitimate affiliation to the project and the University of Ghana. Also some of these government officials had already met or worked with other DECCMA researchers, so this prior experience of the officials with DECCMA assisted me in gaining their time. Lastly the key scholar or civil society actor I interviewed was a DECCMA researcher so I had no difficulty in accessing this researcher for an interview.

Ethical Considerations: Respect, Justice and Risk

I took into account the IRB human subjects' research concept of *respect for persons* - which for my study suggests that I needed to ensure that people with diminished authority were entitled to protection and that research subjects were treated as free and autonomous agents (Hemmings, 2006). Respect for persons also means that informed consent must be obtained from all research participants, and participants should, in most (if not all) cases, be guaranteed privacy, confidentiality and anonymity (Hemmings, 2006). I viewed my community-level participants as those with "diminished authority" in comparison to the other research participants such as government officials and scholars who have more political authority and agency at a national scale than the community-level participants. As such, I took measures to protect my community-level participants from reasonable risk. However I applied the concept of respect for persons to all my research participants.

This notion of respect *for persons* led me to consider issues of *justice*, another IRB concept, which contemplates who receives the benefits and who bears the costs of the research (Hemmings, 2006). I bore all non-monetary costs related to the research

(monetary costs were borne by the grants that funded my research, the Norman E. Borlaug Leadership Enhancement in Agriculture Program [Borlaug LEAP], the University of South Carolina Walker Institute for International and Area Studies, and the University of South Carolina's Office of the Vice President for Research). As at the time of writing, I have received no monetary or recognition benefits from this research. The benefits that I have received so far are personal – an expanded knowledge base and skillset. I am still grappling with whether and/or in what ways the participants who provided me with information should receive any monetary or recognition benefits that may accrue from the findings of this research. I will however acknowledge the participants of this research in any publication or presentation of my findings.

I also had to consider not only IRB ethics but the ethics of the communities and contexts within which I worked. For example, as a man interviewing women participants at the community level, some of whom may be married, I needed to consider culturally-appropriate ways and settings within which to interview these women e.g. out in the open (see my discussion of my man research assistants for further discussion on cultural appropriateness).

Limitations

My inability to speak the local languages of the communities I worked in prevented me from acquiring or fully understanding the intricacies of issues that the community-level participants relayed to me. This reduced understanding stems from the considerable amount of information that can be lost during translation. I also could not interpret off-handed comments or discussions that occurred in the local languages. Though I often asked my research assistant for a translation of such occurrences, I was

limited to what they told me. Even though, after working with my assistant for a while, I was able to discern an incorrectly translated question (often based on the translated answer I received), I still had to heavily rely on the translations of my research assistant.

Another limitation is the length of time I was able to conduct this study. I would have preferred to spend at least one continuous year collecting and initially analyzing information while in the field to get a more in-depth and contextual amount of information. However as a United States international student, I could not be outside the US for longer than a semester (not counting the summer semester) and still maintain my student status. This meant that the maximum amount of time I could continuously spend in Ghana was eight months and even that was assuming I was able to leave immediately as spring semester ended and return exactly at the start of a subsequent spring semester. Also, coupled with the funding stipulations of the Borlaug LEAP grant which funded the bulk of my fieldwork, I had to be back in the US by the end of March, 2016. All these factors combined, I ended up spending a total of eight months in Ghana (i.e. from July 2015 to March 2016 with a short 10-day trip to the US in January to keep my student status active).

Sample Composition

The amount of time I estimated for active information gathering/fieldwork was six months (I was in Ghana for a total of eight months from the middle of July 2015 to the third week of March 2016). Based on this estimate, I intended to devote three months to each study area (the initial research design focused on two community level research sites – the coastal stretches of the Keta municipality and Ada East district respectively with SDS). Three months in one site was actually longer than previous implementations

of the LIG approach had employed to gather information in other settings (Carr, Abrahams, de La Poterie, Suarez, & Koelle, 2015; Carr, Fleming, & Kalala, 2016; Carr, Onzere, Kalala, Owusu-Daaku, & Rosko, 2015; Carr & Owusu-Daaku, 2016) so this estimate was a sufficient amount of time to gather adequate information. In reality, I spent a total of five months doing active gathering of information/fieldwork (from September, 2015 to February, 2016). The remaining months of my time in Ghana were spent prepping for fieldwork, wrapping up fieldwork and conducting further desk research into the issues I was discovering in the field. Because of the emergence of (mal)adaptation opportunism as a critical theme in this research, I only present community level information for the Ada East district and AdSDS, which is illustrative of this concept[13]. At the community-level in the Ada East district, I conducted from engagement in five communities: 37 semi-structured interviews and 13 focus groups with a total of 52 participants.

I was able to interview a total of six government officials. At the local government level, I was able to interview two government officials. For the ministry or national government officials, I was able to interview four officials. Two of them were within MESTI and two of them were within MOTCCA. There was a key officer within the MWRWH with whom, after repeated attempts to obtain an interview, I finally gained an audience. However, this individual refused to grant me an interview on the spot and insisted that I email them my interview questions to which they would respond. They never responded to my email.

[13] I conducted research in the Keta municipality which is also illustrative of maladaptation and resettlement related to climate change but will employ that information in future explorations of this research.

For the funders, consultants and contractors of the AdSDS, I was only able to successfully map who they are, so I had to settle for proxy documents such as Environmental Impact Assessments (EIAs) which some of them submitted to MESTI. There are a total of ten consultants, contractors, and funders for the three sea defense systems combined but only four of these ten are associated with the AdSDS.

For the academics conducting research related to sea defense systems in Ghana, one name emerged as the most relevant to engage and I was able to interview this scholar, particularly due to my affiliation with this scholar as a researcher on DECCMA. One other scholar later emerged as prominent after I had left Ghana. However, I obtained this scholar's views on sea defense systems also by proxy through a documentary on climate change and coastal erosion in some of the communities I studied. The use of information from such a source is legitimate because a publicly accessible interview recording becomes akin to a content analysis of a document – one can deduce themes and discourses from words and how they are used. Also this particular interview was exactly about the use of the SDS in the Volta Delta to combat flooding and coastal erosion. For all intents and purposes, I could have been the one conducting the interview. The difference arises in positionality of the interviewer. My positionality to the academic in question might have produced a different result, but that does not mean the analysis of this interview is without merit.

Interpretive Framework

As I have earlier outlined, governmentality serves as the conceptual and theoretical framework for this research. As such governmentality, by way of the LIG

approach, is the lens through which I interpreted all information I gathered for this research. Upon a close study of the LIG theory (Carr, 2013) and application (Carr, 2014), I am of the opinion that the sea defense system better represents a problematization –the definition of a problem and its attendant solution and the disagreement revolving around this (see Figure 3.2). What the sea defense system is problematizating in this case is a response to coastal erosion as a result of SLR attributable to climate change. The sea defense system as a problematization gave me an entry into the conceptualization of and actions concerning CCV and CCA and coastal infrastructure as a CCA. The problematization also allowed for an identification of who the relevant actors with regard to the livelihood/issue at hand were (though this realization was somewhat retroactive when the problematization was framed as the sea defense system because then the relevant actors on a broad scale with regard to livelihoods are simply those who have already been or will/desire to be impacted by the sea defense system-something I had already identified). The overall framework of LIG works for my project. The identification of the Vulnerability Context, followed by the Problematization as a point of entry for Strategy Formation (Discourses, Coercion, Mobilization of Identity), and ultimately ending in an analysis of Outcomes (Carr, 2013) is indeed a useful framework for analysis when thinking of maladaptation. In summary, I am taking the concept of governmentality and attempting to apply the methodological framework of LIG to examine how the sea defense system, as a form of government engaging various actors with different positions relative to the system, produces both material outcomes (by way of vulnerabilities and (mal)adaptations to climate change) and a shared sense of what

must be done to address the problem of coastal erosion in the VRD attributable to climate change.

Analysis of Information

With regard to the mechanics of analyzing information, Bogdan & Bilken (2003) suggest that analysis and interpretation of information occur both during and after information is gathered. I typed up summaries of my field notes into relevant categories to facilitate analysis. Bogdan & Bilken (2003) also suggest many useful categories for coding information after transcription. The codes I used followed the LIG approach's categorizations of concerns, activities, roles and responsibilities, identity, tools of coercion and outcomes. Some of the specific codes I used were major challenge, access to alternative employment, gender, occupation, thoughts on sea defense, and location.

CHAPTER FOUR

SEA DEFENSE SYSTEMS AS AN ADAPTATION: PERCEPTIONS OF NATIONAL, INTERNATIONAL, AND ACADEMIC ACTORS

Introduction

In this chapter, I begin my analysis of sea defense systems as an adaptation to climate change from the perspectives of national government officials, international actors such as consultants (and contractors), and academics. I found it more difficult arranging and/or securing interviews with actors at these levels. As such, the analysis of their perspectives rests heavily on a mixture of documents and in-person interviews, where in-person interviews supplement the documents in most cases. The disadvantage of a dearth of in-person interviews is the lack of contextual first-hand experience that such sources could have provided. However as this research seeks to determine the GoG rationalities informing SDS as CCA, and the definition of government I use includes policies, programs, as well as people (Dean, 1999), this prevalence of documents over individual voices is reflective of the nature of governing in Ghana (Baruah, 2017). In this chapter, the approach I take is to first trace how the national government linked coastal erosion in the VRD to climate change (i.e. the rationalities and the problematization. Second, I then demonstrate how the national government identified sea defense systems as an appropriate strategy to address coastal erosion in the delta. Third, I assess what

international actors relevant to the AdSDS have to say about the project and whether these actors share (or do not share) rhetoric similar to the national government. Finally, I discuss what some academics have to say about sea defense systems in general. This chapter extends governmentality to the national and international spheres, illustrating how interests, discourses, or rhetoric shaped and enacted beyond an actor's scalar purview influence their views and actions in the world.

National-level Discourses of Climate Change in Ghana[14]

The Progression of the Policy Discourse on Climate Change

There are five national development policy frameworks that outline Ghana's national development agenda. They are the Ghana Vision 2020: First Step, 1996-2000 (National Development Planning Commission, 1995); the Ghana Poverty Reduction Strategy (GPRS I) 2003-2005 (National Development Planning Commission, 2003); the Growth and Poverty Reduction Strategy (GPRS II) 2006-2009 (National Development Planning Commission, 2005); the Ghana Shared Growth and Development Agenda I (GSGDA I) 2010-2013 (National Development Planning Commission, 2010); and the Ghana Shared Growth and Development Agenda II (GSGDA II) 2014-2017 (National Development Planning Commission, 2014). These policy frameworks are the result of long deliberations and consultations with community, district, regional, and national stakeholders. The term "climate change" first emerged in these frameworks in the GPRS II (National Development Planning Commission, 2005). In earlier frameworks, climate change-related issues such as deforestation, land degradation, and loss of ecosystem

[14] The following section has been reproduced with significant modification from Owusu-Daaku & Diko (2017)

resources (including loss of coastal ecosystems) were considered under the notion of "Environment" and "Environmental and Natural Resource Management." The timing of this first explicit mention is linked, at least in part, to the Netherlands Climate Assistance Programme (NCAP) which was implemented between 2004 and 2007 with €180,000 funding from the Dutch Foreign Ministry. ETC International (a Netherlands based non-profit) in partnership with the National Development Planning Commission (NDPC) and the Ghanaian EPA (EPA) were the main implementers of the NCAP (Würtenberger, Bunzeck, & Van Tilburg, 2011). The purpose of the NCAP was to prepare climate change policies that were consistent with GPRS I (Würtenberger et al., 2011) and thus by the time GPRS II came around, there was already an established framework to incorporate climate change issues into national planning documents.

GPRS II thus marked the beginning of an articulated national discourse on climate change issues in Ghana. The policy framework made connections between climate change and poverty issues such as "vulnerability and exclusion," and one policy statement within the framework focused explicitly on climate change, articulating a desire to "deal with the effect of climate change especially drought and desertification" (National Development Planning Commission, 2005, p. 115). Additionally, in GPRS II climate change impacts were explicitly stated as a challenge, as "adverse environmental factors such as climate variability and land/soil degradation" which, from the perspective of the drafters of this document, "continue to be challenges posed to the growth potential of the agricultural sector" (National Development Planning Commission, 2005, p. 15). Clearly, the framing of climate change as a challenge to national development can be traced to the objective of the NCAP, which emphasized adaptation and highlighted the

influences of climate change impacts on poverty and their effects on livelihoods particularly in poor communities.

While climate change is currently an accepted fact in Ghana, the influence of the NCAP on climate change integration into national development planning in Ghana shows that climate change, as with many other development concerns such as sustainability, conservation, biodiversity, equity, and inclusion, to name a few, is really a discourse that the government (and I would argue civil society and possibly private sectors) buys into at a specific point in time based on the funding associated with such a discourse. I noted this sentiment during my interview with an officer responsible for climate change at the MESTI. This officer mentioned all the right terms associated with climate change adaptation, but I felt as if the officer was trying to mobilize these terms not because the officer believed or used such terms, but to make me believe what the officer was saying. I felt this way because first, this officer learned I was a researcher on a large climate change related consortium and second, I was introduced to this officer by their boss (the boss literally called this officer into the boss's office and told the officer in front of me to make sure they provided me with whatever information I needed). This assessment of the interview with the MESTI official is in line with Weisser et al. (2014)'s observation that in other African countries, climate change adaptation has proven to be an idea that different actors respond to mainly for funding purposes, rather than a response to a changing climate or the impacts of climate change.

The intensity of interest in climate change issues in Ghana surged in 2009, probably due to the reconstitution of the Ministry of Environment, Science and Technology (MEST), which later became the Ministry of Environment, Science,

Technology and Innovation (MESTI) in 2013 (Ministry of Environment Science Technology and Innovation, 2013b). The reconstitution of MEST in 2009 augmented government's effort to expand the climate change discourse in Ghana. The MEST was subsequently "endowed with greater responsibility for coordinating climate change activities across Ministries, Departments and Agencies (MDAs)," and the National Climate Change Committee was formed and strengthened to advise MEST on climate change-related issues in Ghana (Würtenberger et al., 2011, p. 9). Since the 1990s, Ghana has implemented several climate change-related projects (Würtenberger et al., 2011). However, it was through MEST that Ghana led its own efforts towards climate change issues. MEST and Ghana's Environmental Protection Agency (EPA) commissioned several national climate change vulnerability and adaptation assessments (EPA, 2008). From these assessments, the government realized that there was a "substantial impact of climate change on the national economy, with clear evidence that many of our key economic assets— the coastal zone, agriculture and water resources— are affected, as well as our social development in terms of poverty reduction, health and women's livelihoods" (Ministry of Environment Science and Technology, 2010, p. 18). In effect, the government was concerned about climate change because of its impacts on the national economy and needed to act swiftly and concisely. The framing of climate change as an economic threat can obscure the ways in which climate change also poses challenges to justice and equity, as sectors that tend to be highly visible receive greater attention and investment to the detriment of others, such as the focus on tourism in the Ada East district to the detriment of the agricultural sector which I describe in Chapter 5).

The integration of climate change issues was stronger in the GSGDA I than in the GPRS II. The entire policy framework envisaged "protecting the environment and minimizing the impacts of climate change" (National Development Planning Commission, 2010, p. 4). In this document, climate change was identified as a complex issue with multifaceted impacts on Ghana's development. GSGDA I also articulated the importance of paying attention to "environmental sustainability as well as [to] determine the impact pathways of climate change and the areas of national vulnerability for appropriate policy interventions" (National Development Planning Commission, 2010, p. 5). This focus continued in GSGDA II.

So far, the rise of climate change in planning in Ghana has resulted in four national documents on climate change— the National Climate Change Policy Framework (NCCPF) and the National Climate Change Adaptation Strategy (NCCAS), which were prepared in 2010; the Ghana National Climate Change Policy (NCCP) published in 2013 (Ministry of Environment Science Technology and Innovation, 2013a) and the National Climate Change Policy Action Programme for Implementation (NCCPAPI) published in 2015 (Ministry of Environment Science Technology and Innovation, 2015).

In all of these documents, there was a clear recognition by the GoG that Ghana remains vulnerable to climate change. Although the NCCPF provided a broad direction on how climate change issues would be handled, the NCCAS, NCCP and NCCPAPI provided clear-cut approaches to confront current and anticipated climate change impacts in Ghana. The vision of the NCCP, for instance, is to "ensure a climate-resilient and climate-compatible economy while achieving sustainable development through equitable low-carbon economic growth for Ghana" (Ministry of Environment Science Technology

and Innovation, 2013a, p. 21) by focusing on adaptation, social development and mitigation. Again, the GoG is explicit about the priority it gives to framings of impact in terms of the economy. Though it mentions sustainable development as a simultaneous focus and then again mentions low-carbon development, these are mentioned only as such development relates to economic growth. This is the first rationality of the Government of Ghana related to climate change: *climate change is a threat to the national economy*.

The Policy Discourse on Coastal Erosion

In Vision 2020, the GoG presented coastal erosion as the result of "natural causes but exacerbated by such practices as sand winning[15]" (National Development Planning Commission, 1995, p. Vi). "Natural causes" is an adequately ambiguous term that can cater to any number of sources such as sea-level rise, subsidence, over-topping, or flooding (though whether any one of these sources are purely "natural" is itself in question). References to "sand winning" (a human activity) are also found in non-governmental sources (Anim, Nkrumah, & David, 2013; Appeaning Addo, 2015b; Gyampoh & Asante, 2011; Kusimi & Dika, 2012; Mensah, 2014; Stanturf et al., 2011). I will explain the relevance of this association of the human activity of sand winning to the cause of coastal erosion in my discussion of the policy discourse on sea defense systems. Communities such as Accra, Tema, Ada Foah, Keta, Elmina and Sekondi-Takoradi were identified as areas predisposed to coastal erosion. The Vision 2020 policy framework also

[15] Sand winning is the local term for sand mining – the extraction of sand from beaches and dunes usually by open pits and often used in construction

drew attention to a need to invest in sea defense systems to prevent coastal erosion. In GPRS I and II there was no explicit mention of managing coastal erosion.

The issue of coastal erosion was explicit in GSGDA I but was not an issue identified in GSGDA II. Coastal erosion may not have been mentioned in GSGDA II because by the time GSGDA II was published in 2014 (and at the latest drafted in 2013), many of the projects addressing coastal erosion which were identified in GSGDA I already had been moved forward to implementation. In GSGDA I, the NDPC identified coastal erosion as a key issue under the development focus Marine and Coastal Ecosystems Management. The objective was to "improve investment in control structures and technologies", such as the Keta Sea defence system (KSDS), "gabions and boulder revetments to arrest erosion," and "mangrove replanting and planting of other vegetative cover to delay erosion, e.g., at Winneba" (National Development Planning Commission, 2010, p. 154).

The NCCPF, NCCAS, and NCCP also emphasized coastal erosion as a challenge. In these documents, sea level rise and coastal erosion and their effects on settlements were identified as a major climate change impact in Ghana. In effect, coastal erosion became part of the climate change discourse in Ghana and policymakers identified coastal erosion as needing attention. This attention reveals the second rationality of the GoG: *coastal erosion is a serious climate change impact that needs attention*. I find it very interesting that the GoG links coastal erosion mainly to climate change, even in areas such as Keta. In areas of the VRD such as Keta and the estuary in the Ada East district, the major historical cause of coastal erosion is the damming of the Volta River by the Akosombo dam. Many studies attribute the increasing rate of erosion in the VRD to

the completion of the Akosombo dam in 1961 (Anthony & Blivi, 1999; Appeaning Addo, Jayson-Quashigah, & Kufogbe, 2011; Boateng, 2009, 2010, 2012; Boateng, Bray, & Hooke, 2012; Bollen et al., 2010; Gyau-Boakye, 2001). These studies indicate that the damming of the Volta River reduced the amount of sediment being carried down into the delta - making the region more susceptible to the action of sea waves. Boateng et al. (2012) demonstrate that the total sediment carried into the coast reduced from about 71×10^6 m^3/a (pre-Akosombo dam) to about 7×10^6 m^3/a (post-Akosombo dam).

The coast of the VRD experienced erosion highs of 4m/year before the Akosombo dam construction and highs of 8m/year after the dam's construction (Appeaning Addo et al., 2011). Boateng (2009) suggests that the Akosombo dam did indeed contribute to increased erosion and settlement destruction in Keta between 1965 and 2002. This pattern of coastal erosion has been no different at the estuary of the VRD in the Ada East district, where the annual rate of erosion was estimated at 6m/year (Bollen et al., 2010). Thus the GoG attributed the contribution of sediment loss to coastal erosion as resulting from the construction of the Akosombo dam (at least in the VRD) under the wider discourse of climate-change induced coastal erosion. The ignoring of the substantial body of research linking increased erosion within the VRD to the construction of the Akosombo dam is telling of the GoG's refusal to acknowledge the nation's complicity in contributing to increased erosion in the VRD.

The Policy Discourse on Sea Defense Systems

Sea defense systems, one key focus in promoting environmental sustainability in Ghana's *Vision 2020* policy framework, were missing in GPRS I, GPRS II and GSGDA

II. Although there was an interest to "promote and facilitate private sector participation in flood control systems and coastal protection" (National Development Planning Commission, 2005, p. 53) in GPRS II and management of flooding in GSGDA II, sea defense systems were not identified as a strategic option. This changing emphasis in adaptation options is likely linked to national electoral politics. At the time of the drafting of Vision 2020, the ruling party was the National Democratic Congress (NDC). The president of Ghana under the NDC during Vision 2020 was His Excellency Jerry John Rawlings. Rawlings was particularly aggressive about coastal erosion and coastal erosion for the Anlo-Ewe (the majority ethnic group) of the Keta area because the Anlo-Ewe had articulated a sense of being side-lined by successive governments since Ghana's independence and also because President Rawlings' mother was an Anlo-Ewe and her family home in the Keta area had already succumbed to the ravages of the sea (Akyeampong, 2001, pp. 208–214). Construction of the Keta sea defense started in 2001, but talks about the provision of the defense by the ruling GoG party at the time, the Provisional National Defence Council (Akyeampong, 2001), which later became the NDC (Akyeampong, 2001), started before the publication of Vision 2020 in 1995. On the other hand, the GPRS I and GPRS II were formulated by the New Patriotic Party (NPP), and the electoral districts located in the VRD have traditionally voted in favor of the NDC. So while the NPP may not have consciously decided to avoid infrastructural investments in the VRD, the NPP certainly did not exert energy (as far as sea defense systems are concerned) into electoral areas the party knew it could not gain a substantial number of new votes. One challenge of highly localized structures such as sea defense systems as political investments is that they send an almost unequivocal message to the

rest of the country that the area which received such a specialized and localized investment is preferred to others because unlike a road, citizens who live in other areas cannot insist they will also "use a sea defense system". Although this investment in the Keta municipality is a cumulative response to a history of marginalization, particularly where coastal protection is concerned, beginning with colonial administrations (Akyeampong, 2001), the investment can still evoke sentiments around the preferential treatment between groups and regions in the country. The NPP's only mention of coastal protection was geared towards the investment of the private sector, suggesting that under the NPP, the GoG did not on its own want to exert considerable effort into coastal protection or sea defense systems.

The NCCPF and NCCAS also did not capture sea defense systems, because these documents focused on explaining the challenges, ramifications, and broad strategies for climate change action for Ghana as a whole. Also, both documents focused on priority policy and program areas without detailed recommendations for the type of investment projects on which the government needed to concentrate. Nonetheless, in the NCCP sea defense systems were clearly emphasized. This emphasis was captured under the Disaster Preparedness and Response, Focus Area 2: Build Climate-resilient Infrastructure policy (Ministry of Environment Science Technology and Innovation, 2013a, p. Sec. 4:4-5). In the NCCP, the government articulated the need for developing and improving "protective infrastructure, such as sea defence walls" (Ministry of Environment Science Technology and Innovation, 2013a, p. Sec. 2:2-5). The priority given to sea defense systems illustrates the government's understanding of, attitude toward, and belief in climate-resilient infrastructure and how such systems can contribute to reducing vulnerability to

coastal erosion and sea-level rise in Ghana (Ministry of Environment Science Technology and Innovation, 2013a).

This focus on sea defenses presents the third rationality of government: *coastal erosion must be addressed through hard engineering infrastructure such as sea defense systems.* This particular rationality becomes especially clear when contrasted with earlier GoG statements on the role of sand winning as the cause of coastal erosion. Ironically, aside from the mention of sand winning in Vision 2020 in 1995, many of the other mentions are from non-governmental sources (Anim et al., 2013; Appeaning Addo, 2015b; Gyampoh & Asante, 2011; Kusimi & Dika, 2012; Mensah, 2014; Stanturf et al., 2011). There are a few mentions of sand winning at the district level of the districts referenced in this study (Keta and Ada East). Those mentions focused mainly on sanctions against or education about sand winning (Ada East District Assembly, 2012; Dangme East District Assembly, 2011; Keta Municipal Assembly, 2011, 2012). I could identify no initiatives developed by either the GoG or civil society to address this sand winning-related cause of coastal erosion. Yet sand winning has been pitted against natural causes of coastal erosion – and these natural causes have been addressed through sea defense systems. Just like in the ignoring of the impacts of the Akosombo dam, the GoG presentation of sand-winning ignores addressing a human cause of coastal erosion in favour of addressing a "natural" one.

Perceptions of National Level Officials on Sea Defense Systems as Adaptation to Climate Change

Inasmuch as policy documents and briefs serve as official statements and proxies

of government viewpoints, it is important to remember that governments (and international agencies) are complex entities made up of individuals with views and perspectives of their own (Mathews, 2005; Robbins, 2000; Carr's contribution in Simon, Sidaway, Yeboah, O'Reilly, & Carr, 2011). I therefore found it necessary to assess how national-level government officials view sea defense systems in the context of adaptation to climate change. The other reason for the insufficiency of a document analysis alone is the existence of *decalage*— a concept that refers to a gap between stated policy and actual practice (Max, 2009). I interviewed two national-level government officials about their thoughts on sea defense systems as an adaptation to climate change. One official's work related to project impact assessment and the other to climate-change-related issues.

The climate change officer unsurprisingly talked only about climate change and the implementation of climate change responses from the national through to the district level. This is the officer I referenced earlier in this chapter who spoke extensively about the reality and non-deniability of climate change as a result of the evidence of climate-attributable impacts. This officer, in their statement on climate change impacts, mentioned the Akosombo dam as a recipient of climate related impacts (through reduced reservoir levels as a result of increased temperatures) but not as a cause of the climate-attributable impact of coastal erosion.

The climate change officer also reflected the GoG rationality that *climate change is a threat to the national economy*. In response to my question about whether this officer was of the opinion that this notion of sea defense systems as a CCA originated from MESTI (the officer's Ministry), the officer replied that the notion was not necessarily a MESTI creation or promulgation. However the officer did state that one role of MESTI

with regard to climate change in the country is that MESTI "makes other sectors realize that it [addressing coastal erosion] is not just a development issue [in terms of poverty reduction or wealth creation through the preservation of live(lihood)s and property] but also a climate issue." One way that MESTI goes about promoting buy-in of the rationality of climate change as a threat to the national economy is through the convening of the National Climate Change Committee (NCCC). The NCCC constitutes representatives from various governmental agencies with a role in promoting a national response to climate change in Ghana. According to the climate change officer, through the NCCC, MESTI is able to "get [climate change] information to flow from sector to sector." One key organization on the NCCC is the NDPC. Through collaboration with the NDPC, MESTI was able to ensure that addressing the impacts of climate change became a priority for districts. According to the climate change officer:

> "…when the NDPC is developing guidelines [for district development planning], we [MESTI] make submissions. We [MESTI] got them [NDPC] to put it [addressing climate change issues] in the guidelines. They [NDPC] put it [addressing climate change issues] in the GSSDA. [Other government] Sectors and districts are now mandated to put addressing climate change issues on their priority list…Another way we create buy-in is through the Functional Organizational Assessment Tool - FOAT. FOAT is an evaluation process that tracks how well district assemblies are adhering to national planning guidelines. The incentive for compliance is that districts can then access additional funding from the District Development Facility – a fund for district assemblies to carry out their development projects. Through our collaboration with NDPC, climate

> change is now a key indicator in the FOAT evaluation process…We go out with NDPC to conduct orientations and trainings on how to evaluate climate change issues under FOAT. "

However, this buy-in is not without resistance. The climate change officer stated that they (MESTI) sometimes faced some skepticism from district-level officials with regard to addressing climate change issues. According to the climate change officer:

> "The skepticism is not because they [the district officials] don't believe it [climate change] is true. It is about whether we can do something about it. They [the district officials] often ask "can we really do something about it [climate change]?" I have only experienced this skepticism from a few districts though…"

This skepticism the climate change officer is referencing is as a result of the other competing demands that district officers need to address (such as education, health, job creation etc.) with climate change. One can argue that climate change (will) impact(s) all these other sectors and addressing climate change is akin to addressing all these issues at once. However district officials do not necessarily view climate change in this way – an issue I will expound more on in the next chapter.

This officer was also aligned with the second GoG rationality: coastal erosion is a serious climate change impact that needs attention. The officer demonstrated their alignment through the articulation of the focus area of the NCCP document that directly addresses coastal erosion and flooding issues – Focus Area 2: Build Climate-resilient infrastructure under the policy theme of Disaster Preparedness and Response. The climate change officer prefaced this reference and their discussion of the NCCP in general (which

constituted about half of the interview) by stating that with regard to climate change "Ghana has recognized there is a problem to be solved; if not it (Ghana) would not have come out with a policy document." The officer also further emphasized the need to protect coastal resources by referencing Focus Area 5 of the NCCP: Improve Management and Resilience of Terrestrial, Aquatic and Marine Ecosystems.

With regard to what this officer thought specifically of sea defense systems as a CCA, the climate change officer deflected directly answering the question by stating that "the MWRWH deals with the construction of sea defense systems. Others have to translate policies onto the ground. Here at MESTI we look mainly at policy coordination." This statement is insufficient to demonstrate alignment or otherwise with the third rationality: *coastal erosion must be addressed through hard engineering infrastructure such as sea defense systems*. To summarize my interview with the climate change officer, this officer was clearly aligned with the first two GoG rationalities on the project rule of SDS as CCA. The verdict however on the third rationality is inconclusive, because the officer did not speak in favor or against SDS.

The project impact assessment officer reflected all three GoG rationalities referencing the impact of climate change on coastal, and by extension, national resources and the fact that sea defense systems adequately addressed the coastal erosion problem of Ghana. According to this officer "a problem of coastal erosion was identified, a solution of sea defense systems were proposed, and the sea defense systems have been constructed – cased closed." Even though this officer was concerned with project impact assessment, as far as sea defense systems were concerned, this officer's assessment of impact only implied completion of construction. I asked this officer about whether their unit in

MESTI returned to sites for which EIAs has been submitted a few years after the fact to monitor impacts and call for remediation, if necessary. The officer told me that they only monitoring the unit did was with respect to the measures to mitigate negative impacts as outlined in the EIA. The monitoring was mainly done during and sometimes immediately post-construction (before contractors disengage from the site). There was no long term monitoring in the case of sea defense systems in the VRD. In summary, by reflecting all three rationalities on SDS as CCA, the project impact assessment officer appeared more aligned than the climate change officer.

These instances in which these officials aligned with the three-step GoG rationality could be due to both the physical and administrative proximity of these officials to the central government and their physical and administrative distance from the implemented systems. For these officials, coastal erosion and flooding was identified as a problem to be solved by the construction of sea defense systems in order to protect live(lihood)s and property in the VRD, reflecting the three-step rationality of the GoG on sea defense systems as a CCA (i.e. 1) climate change is a threat to the economy; 2) coastal erosion is a serious climate change impact that needs immediate attention; and 3) coastal erosion must be addressed through hard engineering infrastructure).

Another case in point of at least the third and second step of this GoG rationality playing out at the national level is a statement made by the then Minster of the MWRWH Dr. Kwaku Agyemang Mensah[16] upon visiting a community in the Keta Municipality

[16] I explicitly identify the Minister because Ministers are high-level government officials who are unlikely to suffer repercussions for statements they make on behalf of the GoG unless they are in direct opposition to an official government stance. Also, I am of the view that public officials, and politicians for that matter (not simply public servants) at such a national level should be held accountable to the statements that they make.

which was receiving national attention because the community had recently experienced flooding in April, 2016:

> "The NDC government, through the Ministry of Water Resources, Works and Housing, is implementing a lot of coastal protection works. You can talk about Ada Sea Defense, you can talk about Adjoa, you can talk about Nkontompo, you can talk about New Takoradi. And in the Volta region, we've just completed the Atorkor-Anyanui-Dzita sea defense project at a cost of $60 million. At the moment, we are implementing the Blekusu sea defense project at a cost of $41 million. Now, the President is concerned about what happened two (2) days ago here, and he has instructed that we should take this project as…on emergency basis. That is, extend the Atorkor-Anyanui-Dzita project to cover this area. So we've started engaging the contractor. We are also talking to the Ministry of Finance because this one is an emergency and it is Presidential Directive. So we are going to do something for these communities." (Gakpo, 2016a)

This statement lays out how the GoG is addressing coastal erosion through the hard engineering infrastructure of sea defense systems across the coastline of Ghana. The Minister also articulates how the flooding as a result of sea-level rise requires immediate or, as he put it, "emergency" attention. What the Minister's statement is doing in this situation is projecting "the idea of a paternal state that cares and acts immediately and with force when the safety of its people is at stake" (D'Alisa & Kallis, 2016, p. 237). The promise of engaging the contractor to continue an already completed project is not realistic as there is a public procurement process to which every project is subject, which the Minster more than anyone else would know. Thus, the Minster's claim that the

Ministry of Finance had been contacted and that this action was a Presidential Directive serves to imply that the order must be obeyed at all cost and with no questions asked, which does not reflect administrative reality in the GoG. While administratively irregular actions do take place, in Ghana such actions are usually carried out under the cover of secrecy and not out in the open in response to such a public statement.

Why is the GoG so keen on the apparatus/technology of infrastructure in implementing its rationalities? Perhaps this is a case where, as shown in other research, infrastructure tends to buy votes and get persons in government re-elected (D'Alisa & Kallis, 2016, p. 230). Such reasoning is due to the fact that infrastructural projects are highly visible and can be pointed to as concrete examples of something the government has done. A social protection program or a loan that someone has spent to expand their business and thus increase their productivity is more difficult to trace or take sole responsibility for.

Discourses of Consultants and Contractors

Sea defense systems are technical projects – they involve specialized knowledge and considerable experience in their design, construction, and monitoring and evaluation. This technical knowledge or expertise is often provided by consultants who are often foreign to the country of the project's implementation. Generally, this sourcing of foreign expertise is justified by claims that the country conducting the work does not have the required capacity to carry out such projects on their own. In this section I trace the alignment of consultants, contractors, and funders involved in the AdSDS project with the three-part GoG rationality on sea defense systems as CCA. In instances where I was

able to contact some of these individuals in person, I do not identify who they are in particular though I provide their institutional affiliations.

AdSDS

The AdSDS was carried out in two (2) phases. The MWRWH estimated the cost of the first phase of the AdSDS at €60 million[17] (Ministry of Water Resources Works and Housing, 2013, p. 7). Another official GoG source stated the second phase as costing €183.4 million (Information Services Department, 2017). Together these two phases total €244.3 million. Thus, the overall cost of the AdSDS has been cited as approximately €240 million (Andoh, 2016; Open Governance, 2017). International Marine and Dredging Consultants (IMDC), Belgium were responsible for the detailed design and engineering of the system (IMDC, 2011). Ecorem – an environmental services company with its headquarters in Belgium was responsible for the environmental impact assessment (EIA) and the environmental management plan (EMP) (Ecorem, 2009). Ecorem contracted a local Ghanaian non-profit, International Centre for Enterprise and Sustainable Development (ICED), to assist with mainly the fieldwork portions of the EIA and EMP (ICED, 2016). The contractors for the AdSDS were Dredging International Services Cyprus Ltd. (DEME, 2014) a subsidiary of Dredging, Environmental, and Marine Engineering (DEME) Group- a Belgian company (Dredging International Services, n.d.). The common factor for all of these companies is that they are all Belgian, and this commonality is interesting as the funding for the AdSDS (at least the €60 million portion of it) came from BNP Paribas Fortis (Ministry of Water Resources Works and

[17] €1 = $1.07 as at January 30, 2017.

Housing, 2010, p. 22) – an international bank based in Belgium (BNP Paribas Fortis, 2017).

IMDC, Ecorem and Dredging International all link the cause of coastal erosion in the Ada East district to the construction of the Akosombo dam (Bollen et al., 2010; DEME, 2014; Ecorem, 2009, p. 9; IMDC, 2011). Granted, Ecorem states that it is both the dynamics of the Volta River estuary *and* (emphasis mine) the construction of the Akosombo dam that have led to the rate of coastal erosion in the area (Ecorem, 2009, p. 9). What this dual causality does is that it creates space for stakeholders of the VRD to challenge sea defense systems as the be-all-end-all solution for addressing coastal erosion in the delta, as the complicity of sediment starvation from the Akosombo dam is made explicit in conjunction with sea level rise. These consultants and contractors are not as aligned as governmental officials with the GoG rationality, and rightly so because the consultants and contractor do not owe any allegiance to national rhetoric or articulations on the effect of coastal erosion as a climate change impact and the necessary measures to deal with said effects.

Discourses of Academics

I was able to garner information from two academics on their perceptions of sea defense systems as an adaptation to climate change in Ghana. I conducted an interview with one of the academics, and gathered information from the other via statements this individual made in a documentary. Again, to preserve confidentially and protect the identity of these individuals, I do not explicitly mention who they are but use the general term academic. These academics also (unofficially) possess some immunity from

government harm as a result of statements they might make that are contrary to the government's views. The statements of these academics, which were often in opposition to the dominant government discourse in favor of sea defense systems as an adaptation to climate change, demonstrate both the political and intellectual freedom of academics in Ghana. This freedom is especially true when many academics in Ghana are involved with government committees and programs and/or projects. I will refer to these individuals as Academic 1 and Academic 2.

Academic 1

Academic 1 is a Ghanaian senior scholar at a tertiary institution in Ghana. Academic 1 stated that it usually takes anywhere between 5-10 years to determine whether sea defense systems are functioning as they should or not. This means that the AdSDS has a few more years to go before it is ripe for assessment since construction was completed in 2015. Academic 1 was not aware of any comprehensive monitoring scheme that assesses the functioning of sea defense systems over time. The absence of such a monitoring scheme was confirmed through an interview with the governmental official in charge of project impact assessment. This official stated that monitoring with regard to sea defense systems was only done in the short-run to see whether the contractors had followed the Environmental Management Plan (EMP) for the project, and not in the long-run to assess whether there were any adverse impacts of the system or whether the system was working as designed and constructed. The Ministry of Finance, in its Medium Term Expenditure Framework for the MWRWH, mentions an impact assessment of the Keta sea defense project under Operations. However, the document included no further details on the impact assessment (Ministry of Finance, 2015, p. 17).

Academic 1 was of the opinion that sea defense systems or hard engineering structures are not sustainable and that the GoG should move away from the culture of fighting against nature to one of working with nature because sea defense systems simply transfer the problem (coastal erosion) from one place to another (see also Angnuureng, n.d.; Angnuureng, Appeaning Addo, & Wiafe, 2013; Appeaning Addo, 2015). Academic 1 argued for a more holistic approach to addressing coastal erosion rather than knee-jerk reactions-such as those of the Minister. Such a holistic approach would take a broader view of coastal erosion management instead of focusing on localized solutions (as the problem of coastal erosion is never one that manifests purely locally). Acadcemic 1 suggested approaches such as beach nourishment due to their view of the high volume of sand in the area. Indeed, Academic 1 advocated for spending all the money that has been pumped into sea defense systems on beach nourishment all along the coastline which, over time, would help develop new features along the coast. Academic1 argued that if engineering structures are not well-designed and should fail, the impact of such failure would be very great. Academic 1 concluded that

"We must learn to live with the sea. Man can never win the war [against nature]."

In summary, Academic 1 is calling for nature-based engineered solutions for dealing with coastal erosion (Beck, 2014; Temmerman et al., 2013; Temmerman & Kirwan, 2015).

Academic 2

Academic 2 is also a Ghanaian senior scholar at a tertiary institution in Ghana. Academic 2, when asked in an interview about choosing between relocation and building sea defense systems as options to deal with sea-level rise, had the following to say:

> "It's a natural phenomenon. Government cannot control the tide. It cannot control the level of the sea. If it is going to overrun, it will overrun. As I pointed out sea defense is not cheap. It's not something that happens overnight. So, you can die with your pride. And NADMO[18] will come in and save those who did not perish. And if you want to stay there again, there will be another flood, and more people will die. Until we will ask 'who are we saving left' It's…you cannot beat nature. It's not possible. We cannot do it" (Gakpo, 2016a)

Academic 2, like Academic 1, believed strongly that humans cannot work against nature. Academic 2 was more fatalistic in their assertions of the struggle between humans and nature, evoking a sense of powerlessness against the raging sea. Academic 2 was very concerned with the costs of sea defense systems, as they are not cheap structures.

> "There is nothing wrong with a seawall, properly designed in such a way that the ecosystem functions of the area are maintained, but-and there's a big BUT there…it costs money. Now let me put that into perspective. There's some seawalls which have been built around…or sea defense, I should say it properly, sea defense. The one at Sakumono is 1.2 km. It's a GH₵[19]100 million per km. There's one in that same area between Atorkor and Anyanui, 2.5km: $34 million for 2.5km. So if you're going to protect the shoreline with sea defense of the Keta area – 60km - you're talking about $1 billion[20]. Again, if you look at the Keta district projection for 2016 budget, the entire budget for the whole district for all the activities is around GH₵8 million i.e. $2 million approximately. That $2

[18] National Disaster Management Organization
[19] 1 GH₵ = $0.23 as at February 1st, 2017.
[20] $816 million approximately based on CSO 2's figures

> million can do 150m of sea defense – about a football field…in proportion, yeah. And you're thinking about education in the district, health in the district, road infrastructure, farmer extension services – all of those things will be consumed in the 100 million. So you have to put things into priority."

Academic 2 clearly laid out why it is not economically expedient to invest in sea defense systems. While I agree with Academic 2's assessment of the economic value of sea defense systems, I must point out that Academic 2's reading of the way in which sea defense systems are funded in Ghana is incorrect. District and municipality funds do not fund large-scale infrastructure. Funding for sea defense systems in Ghana is always channelled through the MWRWH and is usually funded by international organizations or funds (Ministry of Water Resources Works and Housing, 2013). Therefore Academic 2's argument of opportunity cost at the district/municipality level does not hold for sea defense systems but is relevant for discussions of investments at the national level. Academic 2's mention of "a seawall, properly designed in such a way that the ecosystem functions of the area are maintained" agrees with Academic 1's advocacy for nature-based coastal protection infrastructure.

Academic 2 is, however, not all doom and gloom and offers some suggestions in lieu of sea defense systems, since Academic 2 is of the opinion that sea defense systems are not worth the money they cost, whether nature-based or not:

> "What we need is early warning system, which will tell people that you are likely to be flooded tonight. So we don't wait for people to die, before we then throw our hands up. And we can also tell people that 'this land that you are building on

> because of its elevation…because of its positioning, it is likely to be flooded four times in a year. Are you sure you want to build here?' And let people have the information for them to make their choices. So again we have to look at this long-term, holistically, and with priorities based on objective, scientific criteria. But if we go into this emotionally, we will spend, and spend, and spend…to the detriment of other areas of development"

Academic 2, like Academic 1, advocates for a holistic and long term approach to dealing with coastal erosion and sea-level rise. Unlike Academic 1, Academic 2 overtly based this conclusion on what was deemed objective, scientific criteria in which Academic 2 discounts emotion and affect by warning that the debate about whether to build sea defense systems or not should not be entered into "emotionally." As others have demonstrated (Goldman et al., 2010), this framing obscures the ways in which science is still a subjective lens within which to view the world, particularly nature. What measurements are valid, and indeed what gets measured, are subject to politics both within an intellectual field (accepted practices) and from without (national politics, donor politics). I also do not agree with Academic 2's discounting of emotion and affect in dealing with environmental challenges, particularly visceral ones such as flooding and erosion due to sea-level rise. Research demonstrates that emotion and affect need to be engaged in moving people towards any new positions different than their own, particularly in regard to environmental and climate change issues (Adger, Barnett, Chapin III, & Ellemor, 2011; Donner & Webber, 2014; Graham et al., 2013; Haywood 2014, 2016; Walker-Springett, Butler, & Adger, 2017)

Conclusion

From, my analysis in this chapter, it is evident that the discourse of the GoG and national level government officials concerning the Akosombo dam and coastal erosion in the VRD are, as best as I can tell, aligned. The nature of this alignment confirms how representatives of government (or international agencies by extension) are not mindless adherents to the dominant government narrative or discourse but have opinions and viewpoints of their own (Mathews, 2005; Robbins, 2000; Carr's contribution in Simon, Sidaway, Yeboah, O'Reilly, & Carr, 2011). Ignoring the Akosombo dam in the causal equation of erosion in the VRD confirms research by Mathews (2005) that governments use not only knowledge, but ignorance as well, as a tool to condition or control discourses. By ignoring the Akosombo dam, the GoG can give further credence to its rationality that coastal erosion is fully attributable to climate change and therefore we need to take steps to protect ourselves from the impacts of this external force. The non-alignment of the academics I spoke with, however, confirms the phenomenon that researchers such as Academic 1 and 2 tend to use knowledge, science, or expertise as a tool to make claims (Goldman et al., 2010). This use of knowledge or expertise is evident in the discourses of both Academics. Both Academics argue based on science and the research literature, Academic 2 more explicitly than Academic 1, but neither Academic framed science as another perspective that is not necessarily more legitimate than economic or electoral interests. Academic 2, in their hailing of science, outright dismisses other factors relevant to decision-making that we do not often deem as scientific, such as emotion. The objective of this problematization of SDS in the VRD is to protect the

physical environment or at least maintain a balance between nature and society. To these individuals, SDS were unequally or unfairly impacting the physical environment.

The issue of what is seen as valid knowledge, and valid framings of the challenges in the VRD, highlight the ways in which ignorance/knowledge are linked to power (Mathews, 2005). In the case of the government, ignorance of the impacts of the Akosombo dam on coastal erosion is the tool to justify the need for sea defense systems to address coastal erosion while in the case of the Academics, expertise or an abundance of knowledge is the tool to advocate against sea defense systems as a solution to coastal erosion. In either case, knowledge of the same issue (coastal erosion and flooding) is clearly linked to power, which leads different actors to mobilize different framings of the challenge, and different evidence for that challenge, which they use for different ends and purposes. A project of rule is clearly at work in these/the effect of these discourses.

The analysis in this chapter shows that the GoG mobilized the interests of the international agencies involved in the funding and implementing of the sea defense systems as an adaptation to climate change in the VRD to neatly align the GoG discourse with the discourses of these actors. However, the academics, with regard to sea defense systems in Ghana, maintained discourses in direct opposition to the GoG discourse. These academics are clearly not aligned to the project of rule that is sea defense systems as CCA even though these academics in particular are very engaged in national level CCA planning and policy formulation. However, these academics' adherence to the notion of science as an objective criterion for decision making causes them to stand outside the GoG rationalities embodied in the project of rule of sea defense systems as CCA because academics, unlike government officials, are not obliged to adhere to any

political rhetoric. The question now remains of what the nature of the discourse on sea defense systems in the VRD are in the Ada East district and what all these discourses on vulnerability and adaptation mean for climate change planning for Ghana in the long term.

CHAPTER FIVE

SEA DEFENSE SYSTEMS AS ADAPTATION IN THE ADA EAST DISTRICT

Introduction

This chapter looks at the Ada Sea Defense System (AdSDS) as an adaptation to climate change through the perceptions of district government officials and community residents. The outline of the chapter is as follows. I begin with an overview of the district. Then I discuss the vulnerability context (the first stage of the LIG approach) of the Ada East district to climate and other impacts. After these, I discuss the AdSDS as a problematization (the second stage of the LIG approach) by examining the perceptions of district government officials and community residents about the benefits or challenges associated with the AdSDS. In the discussion of the problematization (the challenge of climate change-related flooding and coastal erosion as a dominant need of the VRD and how different stakeholders of the VRD disagree on this designation), I depart slightly from the order of the step-wise methodology of the LIG approach by examining the entry points for explaining the problematization (third stage of the LIG approach) concurrently with the problematization. I do this for ease of discussion and to also demonstrate how the two entry points I explore –discourses and identity (a clear and demonstrable tool of coercion did not emerge from my analysis) potentially produce the problematization of

the AdSDS. Also such a structure enables me to assess the manner in, and extent to which, district officials and community residents are (un)aligned with the GoG rationalities regarding SDS as a CCA. Specifically, I examine the extent to which they are aligned with 1) the framing of climate change as an economic threat, 2) the argument that flooding and coastal erosion are serious (climate change related) impacts that needs attention, and 3) the claim that sea defense systems are the means to address this impact. By focusing on major occupational concerns or challenges associated with making a living and/or living in a place, it is possible to identify the (un)alignment of different actors with the GoG rationality of climate change as an economic threat. At the same time, perceptions of the AdSDS provide an entry point into different actors' views of the GoG rationalities regarding flooding and coastal erosion as serious concerns and SDS as the means to address these concerns. Throughout all these illustrations I pay particular attention to identity to understand the relationship between roles and responsibilities and perceptions on the AdSDS that produce (or otherwise) these district officials and community residents as adaptation subjects. Since an objective of governmentality is security, I whenever possible demonstrate in discussion how the analysis illustrates the achievement of the GoG objective of preserving live(lihood)s and property through sea defense systems. I discuss a further entry point for understanding perceptions of sea defense systems, the effect that the AdSDS itself has on mobilizing desires and aligning interests. I then conclude by commenting on the uneven manner in which residents of the Ada East district are (un)aligned with the GoG objective of the protection of live(lihood)s and property via the AdSDS.

District Profile

The Ada East district (formerly, known as the Dangme East District) is located in the south-eastern part of Ghana along the coast, (see Figure 3.3) along the border of the Greater Accra and Volta regions. The district has a total land area of 289.78 km^2. The district is generally a low plain with maximum heights above sea level of 60 m (Ghana Statistical Service, 2014). The geographical focus of my research in the Ada East district is the 19 km coastal stretch of this plain (Ada East District Assembly, 2015). The Songor Lagoon - an international RAMSAR site[21] and home to endangered species of turtle and migratory birds among other animals - is also located in the Ada East district (Ada East District Assembly, 2015).

The district records an annual rainfall of about 30 inches and in the dry season there is little to no rain in Ada East. The Ada East district is also located in the south-eastern coastal plains of Ghana - one of the hottest regions of the country. Temperatures range between 73°F and 82°F across the year but can rise to as high as 91°F. The vegetation of the district is mainly coastal savannah, which features predominantly savannah grass, short trees, and shrubs. Closer to the coast, there are a few strands of mangrove trees that can be found mainly along the tributaries of the Volta River that flow through the district, and many stretches and groves of coconut trees along the coast (Ghana Statistical Service, 2014).

[21] A RAMSAR site is a protected wetland designated under The Convention on Wetlands of International Importance, called the Ramsar Convention. The Ramsar Convention is an intergovernmental treaty that provides a framework for the conservation and wise use of wetlands and their resources. The Convention was adopted in the Iranian city of Ramsar in 1971 hence the name of the convention and its designated sites.

According to Ghana's 2010 Population and Housing Census, Ada East's total population was about 71,671, with 52.54% being female and 47.46% being male (Ada East District Assembly, 2015). The predominant livelihoods of the district are fishing, crop and vegetable farming, and salt mining (Ghana Statistical Service, 2014). The district offers no percentages for these major livelihoods, but the livelihoods reported by those in the research sample reflect similar livelihoods activities as seen in the district at large (see Figures 5.1 and 5.2 for the breakdowns of the interview and focus group sample respectively by livelihood activities).

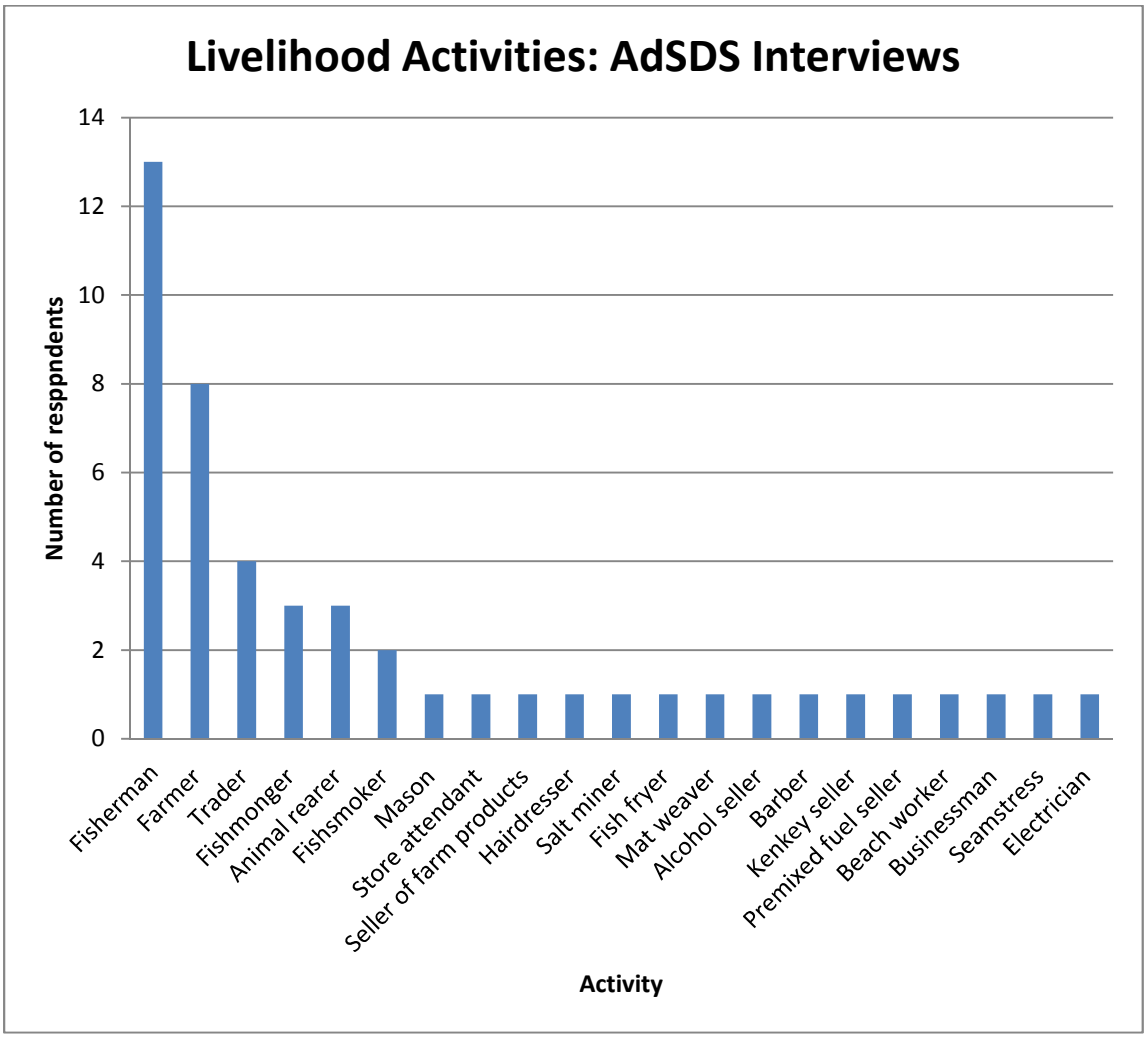

Figure 5.1 Livelihood activities of Ada East district community-level interview respondents

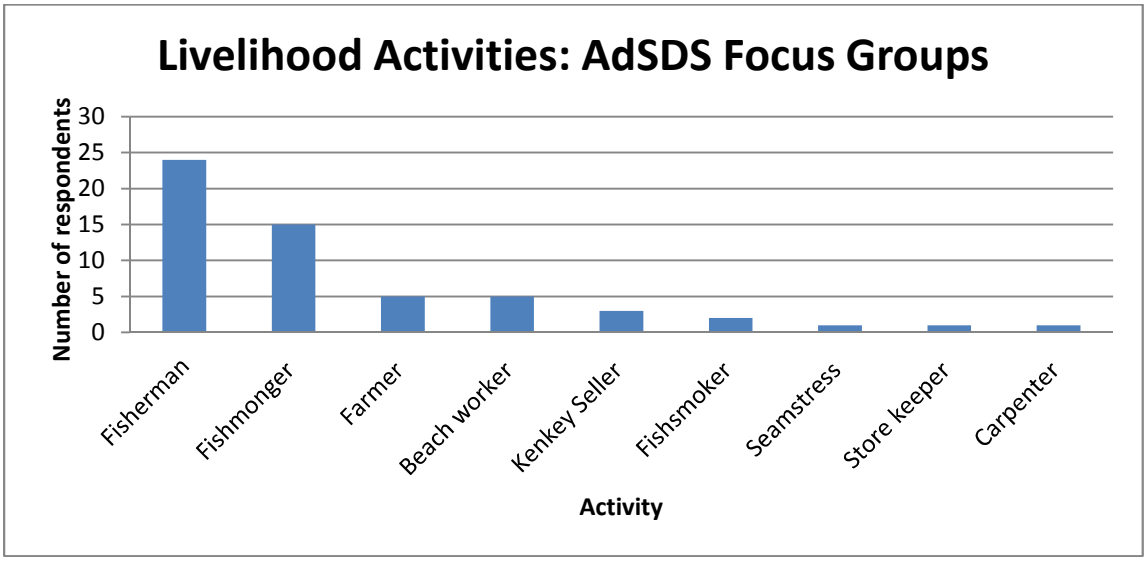

Figure 5.2 Livelihood assemblages of Ada East district community-level focus group participants

The Vulnerability Context

To summarize the vulnerability context, the residents in the coastal strip of the Ada East district are faced with low rainfall, unreliable irrigation infrastructure, high temperatures, rising sea levels and coastal erosion, and the impacts of a sea defense system; all within the context of inadequate agricultural extension, and the potential for tourism development to supersede the needs of the local population.

I reviewed other research in addition to earlier mentioned information on the climate, and climate change impact-related studies of the Ada East district to establish a context within which to consider the vulnerability of the coast of this district (and its inhabitants) to climate change. A key document from which to begin this discussion of the vulnerability context of the district is its composite budget. The most recent budget document for the Ada East district, as at the time of writing, was the budget for 2016. This budget highlighted the following as the major issues of concern for the district: more

unmotorable or third class roads than motorable roads; some basic education schools without requisite facilities; a troubling incidence of HIV; challenges in environmental conservation and management and the development of an eco-tourism industry; problems with waste management, sanitation, and public health; a recurring cost of replacing street lighting due to the corrosive effect of the sea breeze on the light poles; an unstable irrigation infrastructure; and difficulties with adequately monitoring fisheries (Ada East District Assembly, 2015).

The Ada East district focuses significantly on tourism and the potential of this industry to contribute to both the local and national economy (Ada East District Assembly, 2015; Ghana Statistical Service, 2014). This focus on tourism is due to the geographic location of the Ada East district. The estuary of the Volta River which is a popular relaxation, boating, and swimming site in the country, is located in the district, making the district a highly attractive tourism destination. Further, the designation of the Songor Lagoon as a RAMSAR site gives the district increased international visibility. The district is also a habitat for endangered species. Finally, the district is close to Accra and therefore more accessible than many other areas with environmental amenities. As a result of this tourism focus, the Ada East district often casts all environmental challenges as a potential threat to the growth of tourism in the district and tends to portray people as the progenitors of these problems (Ada East District Assembly, 2015).

Fishing is a common activity among the Dangme (Haakonsen & Diaw, 1991). Migration is also a common practice among the Dangme (Haakonsen & Diaw, 1991). The commonness of migration among the Dangme, though, is primarily a result of the migratory nature of fishing due to the need for fishermen to follow schools of fish (Abobi

& Alhassan, 2015; Haakonsen & Diaw, 1991), though there are some records of historical migration among the Dangme (Kuwornu-Adjaottor, 2015). The duolocal nature of residence patterns among the Dangme, in which women lived in households independent of their husbands with other women, enabled women to pursue their own economic interests (Overa, 2003) as opposed to primarily their husband's interests or those of the household. The access to resources that duolocal residence patterns give women is similar to those of the Ga (an ethnic group related to the Dangme who, together with the Dangme, form the larger ethnic group Ga-Adangme), particularly in domestic urban water supply and provision (Mensah & Fitzgibbon, 2013a). This gendered character of fishing and historical residence patterns in the Ada East district highlighted gender as a relevant axis of identity for me to consider when selecting a sample of residents to interview.

Farming is also a dominant activity among the Dangme, and within the district at large, with farmers growing crops such as cassava, shallots, maize, tomatoes, and carrots (Ada East District Assembly, 2015; Ghana Statistical Service, 2014). Though a majority of the respondents I interviewed were fisherfolk based on my focus on sea defense systems and the fact that most fisherfolk live closer to the coast than farmers, the status of farming in the municipality made it important to investigate this activity in my research on community resident livelihoods. Based on the livelihood activities of my sample (see Figures 5.1 and 5.2), I realized that livelihoods were a significant social marker through which to understand the views, discourses, and actions of the community residents (E. R. Carr, 2008, 2011; Codjoe, Atidoh, & Burkett, 2012; Molua, 2011; J. Ø. Nielsen & Reenberg, 2010).

Within this vulnerability context of inadequate support for agriculture and a hyper governmental focus on tourism - of which climate related changes such as sea-level rise and the efforts to deal with these changes such as sea defense systems are my current focus, it is possible to subdivide the population into groups by their experience of this context. These groups are those living in communities located directly behind the sea defense system *(with the AdSDS)*, and those living in the one community that is not protected by the sea defense system *(without the AdSDS)*. These groupings present a case of distinct vulnerability to climate change impacts – a situation in which members of the same population experience different climate change impacts or trends (Carr & Thompson, 2014). Residents protected by the AdSDS should no longer (technically) experience coastal erosion and flooding while residents without the AdSDS still would.

The community without the SDS, called Totope, is in a more precarious environment than most other communities along the district's shoreline because Totope is hemmed in by the sea on one side and the Songor lagoon on the other (see Figure 5.3). I specifically name this community because the community leaders and some members I interacted with asked that I explicitly identify Totope in my research-in the hopes that someone would hear their plight of not being covered by the AdSDS, and come to their aid. The general sentiment from this community was that, in not being protected by the AdSDS, they had been sidelined by both the district and national government. The residents of Totope could not understand why the sea defense system ended less than a half mile short (approximately 0.465 miles) of their community, especially since Kablevu, the next community beyond Totope that is anywhere near the shoreline, is almost 5 miles away (see Figure 5.4).

Figure 5.3 Location of Totope between the Sea and the Songor Lagoon

As a result of this disenfranchisement, one of the community leaders of Totope has been very vocal on behalf of the community's plight – speaking to the media and even featuring in a documentary by a journalist on coastal erosion in Ghana (Gakpo, 2016a). This visibility, coupled with residents expressing that they wanted their plight spread far and near, led me to explicitly identify this community in this dissertation. Another reason why I identify Totope is that it is the only community in the district not protected by the AdSDS. Therefore mentioning the vulnerability grouping of *without AdSDS* presents only one possible option.

The Problematization and Its Associated Identities and Discourses

The Ada sea defense system served as the problematization around which the aforementioned vulnerability context and relevant social cleavages (i.e. livelihoods and gender) cohered and I analyzed the perceptions of district government officials and community residents with regard to the problematization of the AdSDS. To reference an earlier footnote, the problematization emerges in the debate regarding the definition of

Figure 5.4 Totope in context of Last Groin and Kablevu

the problem at hand and the disagreements surrounding how to address that problem. As such, to begin the analysis of the AdSDS, I start with an assessment of major occupational and life challenges faced by the residents before moving to the specific perceptions that district officials and community residents have of the AdSDS. This is in order to establish how these actors define the problem at hand along the coast of the Ada East district and whether their framing of the problem aligns with their perception of the solution the national government provided. Because there are three GoG rationalities under consideration, it is possible for individuals to be aligned with the GoG project of rule in some ways, while in disagreement with them in others. By illustrating the (un)alignment of individuals with none or one or more of these different rationalities, we

can see the different ways in which actors become adaptation subjects via the project of rule which is SDS as CCA in the VRD.

I categorized the analysis of the perceptions of the AdSDS according to the aspects of functionality (ability to reclaim land or reduce erosion and /or flooding), design, and (experience of) construction. Based on these aspects, I summarized the perceptions of district officials and community residents with respect to the AdSDS under the categories of appreciative of functionality (respondents generally thought the sea defense was good and had helped curb the problem of coastal erosion and flooding or reclaimed land), critical of functionality (the sea defense was not doing what it was supposed to by causing more problems such as erosion in some instances or not reclaiming land fast enough), critical of design (groins should have extended further or been placed closer together), critical of construction (citing disturbances from trucks, cracks in buildings, and dust) and multiple (any combination of the aforementioned including an expression of uncertainty regarding making an evaluation of the AdSDS).

I begin this overall examination of the AdSDS with district government officials following the overall structure of this dissertation and its theoretical framework – where in employing governmentality as an analytical lens I begin with a national government framing of a problem and its attendant solution and then examine how this framing trickles down (or not) through the governance structure to demonstrate how various actors are (un)aligned as subjects of the project of rule at hand.

District Officials

I interviewed two district government officials: a District Planning Officer (DPO) and a Natural Resources Management Officer (NRMO) regarding their role in the implementation of the AdSDS. In describing their major occupational concerns, the DPO talked more about project management and planning while the NRMO talked more about environmental conservation and protection. The DPO had intimate knowledge of the implementation of the AdSDS within the district. According to the DPO:

> "The District's role [in the project] was community mobilization and sensitization. We scheduled venues for meetings and took care of all radio announcements…We were the liaison between the Ministry, contractors, and other agencies involved such as the EPA for the EIA…It was the Assembly who wrote to the EPA to do the EIA…Whenever the contractors or consultants needed any local information, we provided that information for them."

When I asked the DPO their thoughts on the AdSDS, the perception of the DPO was a mixture of appreciation for the functionality of the AdSDS and a critique of the implementation process. With regard to the work which the consultants and contractors conducted on the AdSDS, the DPO had the following to say:

> "I enjoyed working with them [the consultants and contractors] – especially during the first phase [of the project]. It was very interactive…I would give them an overall A+ for the work done. There has been a remarkable improvement [in the reduction of flooding and coastal erosion]…in the past sea waves used to splash in front of the [Assembly] building...There used to be a lot of coconut trees

> and other buildings before the [road that passes in front of the] Assembly – all those structures have been washed away...Other key facilities such as the district police station and the Kongenstein fort were taken away. The AdSDS has assisted in the protection of the coastline…the sea used to be where that heap of sand now is…the reclamation is gradual…"

The DPO appreciated the functioning of the AdSDS, stating that there had been "remarkable improvement" in the reduction of flooding and coastal erosion. The DPO's citing of past incidents of flooding and the loss of trees and key security (police station) and tourism (Kongenstein fort) infrastructure demonstrate their alignment with the GoG rationalities of climate change as an economic threat, and flooding and coastal erosion as serious climate-related impacts that require attention. The DPO's acknowledgement of the assistance of the AdSDS in protecting the coastline aligns with the GoG rationality of addressing flooding and erosion through SDS and in so doing securing live(lihood)s and property. Thus, the DPO is greatly aligned with the project of rule of SDS as CCA. While the DPO points out that the reclamation of land by the AdSDS is gradual, this comment was more so to explain the absence of a wide beach to justify the DPO's claims of protection at the time of the interview[22]. It is only in the process of provision of the AdSDS that the DPO indicates any lack of alignment with the project of rule. In response to my question of whether the officer felt anything could have been done differently with regard to the AdSDS project (the implementation process), the DPO said the following:

> "With regard to administrative procedures…there were certain instances that emergency works needed to be done, and the equipment of the contractors could have easily been used. Yet they [the contractors] always insisted that we had to go

[22] Interview was conducted in September 2015 and AdSDS had been completed earlier that year.

through the MWRWH for permission. And these were for emergency works. For example, a storm pushed sea sand onto the road and blocked one of the communities along the coast – this happened overnight. We made an SOS call to the MWRWH but the contractors could not release their equipment [to help with the removal of the sand]. We received a lot of pressure from the people because this road blockage happened around a market day…"

The DPO was not satisfied with all the stipulations that governed the project and thus was critical of the implementation process because to the DPO these stipulations did not take into account local level needs and realities and made the DPO feel somewhat slighted after all the help the process required the Assembly to provide to the consultants and contractors. Despite this critique of the AdSDS implementation process, I it is clear the DPO is, overall, significantly aligned with the GoG project of rule of SDS as CCA.

With regard to environmental conservation and protection as it relates to the AdSDS, the NRMO felt the planning of the AdSDS had gone well (appreciation of implementation process) since the NRMO's unit had been able to influence the design of the AdSDS to its current technology of groins to facilitate the annual nesting of turtles along the beach:

"We helped redesign the initial design of the sea defense system from land reclamation through beach nourishment [using deep sea sand] to the groin system for turtles to have access to the beach. They (the contractors) brought a dredger and deposited deep sea sand – which is very hard and will prevent erosion - onto the coast. However the turtles could not dig to nest in this sand and the turtles now had to travel some ten to fifteen meters inland to lay eggs. So the design was

> changed to that of the groins - using natural sand along the beach which the waves would re-distribute."

The NRMO's comment above on groin redesign shows their appreciation of the final design of the AdSDS, but only insofar as this design assisted the nesting of turtles. The NRMO's concern for turtles to be able to nest in the sand and not have to travel further inland stems from the mental imprint that turtles have of the sand in which they hatch to which they return to nest when they are fully grown (Sea Turtle Conservancy, 2015). As a result, the NRMO stated that redistributing existing sand through groin technology would auger better for turtle nesting than dumping "new" sand from the sea bed. As far as the discourse of the NRMO was concerned, it was one of preserving the sea turtles. As I queried this official about their role in the AdSDS, they began to talk to me about turtles:

> "This area is an important site for nesting turtles…Ada up to Ningo receives more turtles along the entire Ghanaian coast. Restoration works needed to be done such that the turtles could still lay their eggs…"

It is clear that this official was only concerned about the AdSDS as far as it facilitated his professional objective of protecting these turtles, which could be potentially endangered by warming oceans and sea level rise that would take away the nesting grounds of these creatures (Sea Turtle Conservancy, 2015). The officer then proceeded to tell me about the specific species of turtles that nest on the coast of the Ada East District, such as the olive ridley, the loggerhead, the hawksbill, and the green sea turtle. Protecting and conserving sea turtles was most certainly this official's primary objective as far as the AdSDS was

concerned. Therefore, it does not appear that this officer was mobilized by the GoG framing of climate change as an economic threat. As far as this officer is concerned, environmental conservation and particularly the conservation of turtles is the problem that needs greater attention.

When I asked this officer for their perceptions of the AdSDS itself however, this officer felt that some of the groins were disintegrating (critique of construction) and was not sure how well those groins would hold up after a number of years. The officer also stated that it would take anywhere between three and six years before any conclusive statements could be made on the benefits or otherwise of the AdSDS as far as land reclamation (and benefit to turtle species) were concerned:

> "It is very early to determine the impact [of the AdSDS] on turtles… we are conducting continuous monitoring. During the last nesting season we had taskforce members along the coast. After restoration [of the beach through land reclamation], it will take anywhere from three to six years to see how wide the natural deposits will be. We have done a lot of baseline studies in order to be able to carry out before, during, and after studies."

Again turtles emerged as the subject of the evaluation, showing a stance outside of the GoG's project of rule regarding SDS as CCA which secures (human) live(lihood)s and property. Also, this notion of "waiting to see" reflects the discourse of the time that needs to pass before evaluating a SDS espoused by Academic 1 (Chapter Four). This issue of timescales introduces some uncertainty or caution in evaluation and thus further positions

the NRMO as an actor not as aligned as the DPO to the project of rule associated with the AdSDS.

I find the statements of the NRMO on the AdSDS inconclusive because the officer failed to directly address whether they were appreciative or not of the functioning of the sea defense system itself. The officer assessed the process as far as it concerned the officer's job by taking about their ability to influence the design process, and they intimated how long they thought the sea defense system might last by talking about disintegration of the groins. By not clearly providing either an appreciative or critical review of the functioning of the AdSDS, this officer side-stepped the objective of the question, "what are your thoughts on the AdSDS?" The framing of the question might have led to the inconclusiveness of the NRMO perception with regard to the functioning of the AdSDS. However the NRMO's inconclusiveness regarding functionality is again telling of the extent of their alignment with GOG rationalities concerning sea defense systems, particularly when contrasted with the DPO's appreciation of functionality because both these officers were involved in the planning process of the AdSDS, though from the DPO's account, the DPO was more involved than the NRMO.

Community Residents

I asked community residents what their challenges were in making a living and/or living in a particular place to gain a better understanding of what their definitions of the pressing challenges of the residents of the coast of the Ada East district (and by extension the VRD) were. This questioning was also to assess the extent to which an individual aligned with the GoG rationality that framed climate change as an economic threat.

Afterwards, I asked residents what their thoughts were on the AdSDS to assess whether their initial framing of a livelihood activity or living situation challenge aligned with the GoG framing of flooding and coastal erosion as the most important challenge to be addressed in the VRD via SDS and to demonstrate the extent and manner of alignment with the GoG rationalities based on a given answer.

To the first question "what are your challenges in making a living and/or living in this place?", I received a variety of responses such as flooding and coastal erosion, saline intrusion, pests and diseases, capital and inputs[23], revenue, occupational hazards, financial assistance, potable water, sanitation, and bad roads which I chart in Figure 5.5. In the discussion of answers to these questions and their associated themes, I begin with an individual, describe who they are with respect to their gender and livelihood, and include any associated roles and responsibilities they might have that would help explain their answers. I present this analysis under the vulnerability groupings of *with the AdSDS* and *without the AdSDS*.

With the AdSDS

I begin with an old woman who rears animals such as goats, chickens, and ducks. We[24] met her sitting under a coconut tree with a younger lady sitting beside her. This old woman told us she used to smoke fish and sell for a living but now she was too old to keep up with the stress of buying fish from the fishermen, standing for long hours in a cloud of smoke, and then travelling sometimes for miles to various markets to make a

[23] I present capital and inputs as a single theme based on the colloquial definition of capital as "money invested in business" or startup needs argued for by Hodgson (2014). Many at times, the inputs needed in everyday livelihood activities can be a part of capital needs. Revenue generated from these everyday livelihood activities are then often in turn used to purchase necessary inputs to continue making a living.
[24] My research assistant and I

decent sale of smoked fish. She said she was originally from Totope but came to stay with her aunt in the community in which we were currently when she was a little girl. When I asked her what her major challenges were in rearing animals my research assistant translated that[25]:

> S: …Finding feed for animals because she say she is not having money. She say she sometimes have to buy feed on credit and maybe two weeks later pay back when she is able to sell the animal…I ask her if there are times that people buy animals on credit and they don't pay but she said that usually she sells to known people so she can collect her money or the animals, even after a long time.

This woman's challenge expressed a desire for feed for her animals (capital and inputs) but bemoaned the lack of money (revenue) to do so. I then went on to ask her "what are some of her obligations to, or roles you play in your household and society". Her translated answer was that:

> S: She cooks for her grandchildren. The parents of some of her grandchildren are not here. She gives money to those grandchildren whose parents are not here-their parents send money for that purpose…Their parents are in Accra. They are doing petty trading in Accra.
>
> K: How often do the parents return?
>
> S: …Once in a year but parents send food items and money…

[25] In the excerpt and all others to follow, S stands for my research assistant/translator, K for myself and R for Respondent (if I engaged with them directly implying that we could speak a common language). I, for the most part, present excerpts from the interviews as a conversation between me and my translator (unless I engaged directly with the Respondent) because those are the only parts of the interview in English.

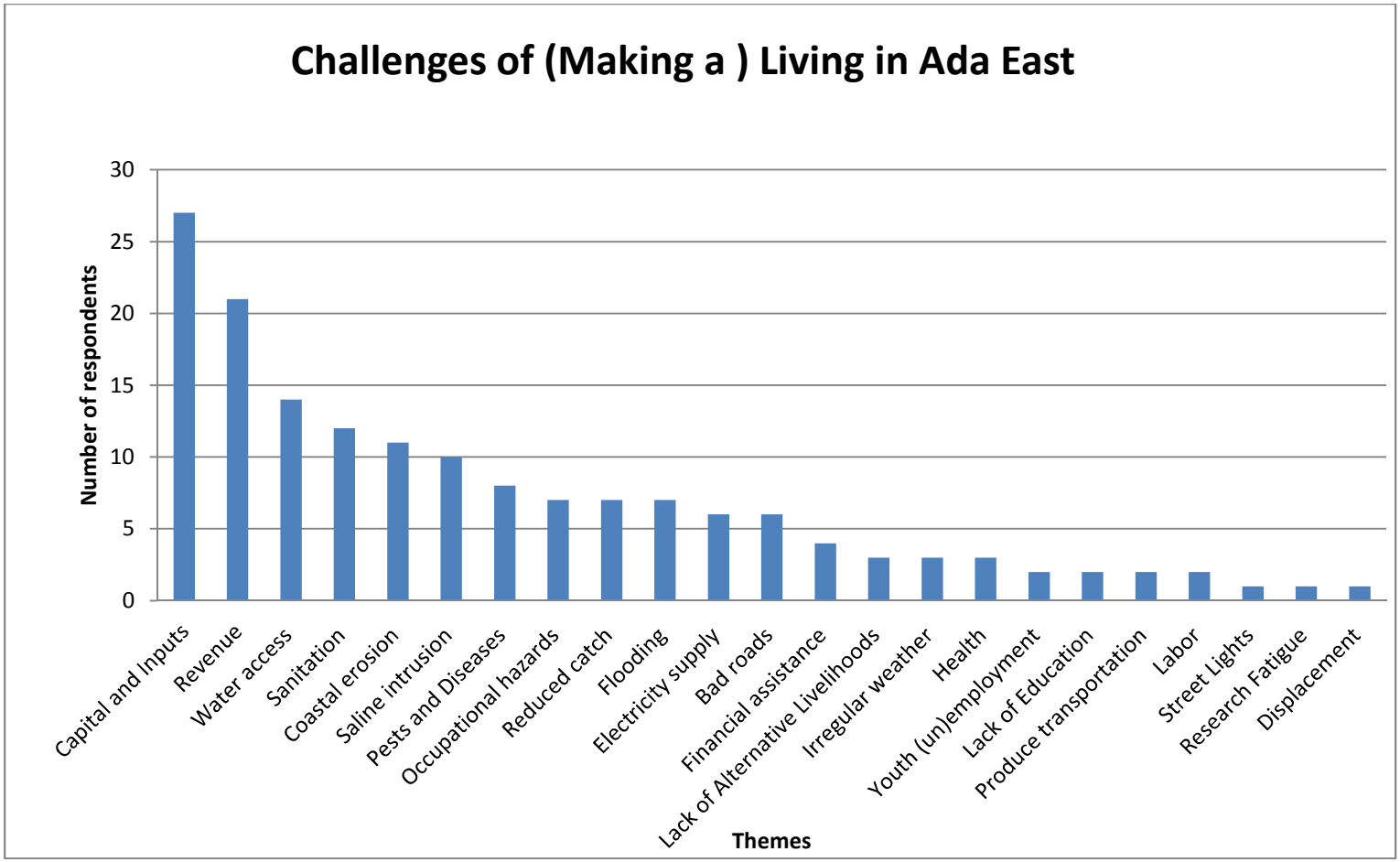

Figure 5.5 Themes associated with challenges to making a living/living along the Ada East District coast

This old woman had responsibility for not only herself but also for her grandchildren. She was responsible for cooking for all her grandchildren and taking care of the ones whose parents had migrated out of the community to Accra (the capital of Ghana) for employment. Such a migration arrangement is fairly common in the VRD, where women often stay behind to look after children and elderly family members (Atiglo & Codjoe, 2015). In this case, it is the elderly family member who stayed behind, but she was still tasked with the responsibility of caring for the children who could not migrate with their parents. The conversation then continued as follows:

> K: What are her thoughts on the AdSDS?
>
> S: …She thinks it's good because previously when the sea was rough it comes into the town. But since completion of defense, it seems they are free from such a problem.

This woman commended the ability of the AdSDS to reduce the amount of flooding that occurs in the community during high tide. Harkening back to her roles as caregiver to her grandchildren under the arrangement of migrated parents, this sea defense system enables her and her grandchildren to stay put so that she can continue to help their parents by caring for the grandchildren. If the parents could have migrated with their children they would have in the first instance or if they were now in a good financial place to care for them, it is most likely they would have come to collect the children by now. All the factors combined, it is not surprising then that this old woman would appreciate the ability of the AdSDS to reduce flooding during high tide in the community and allow her to care for her grandchildren in peace. This woman's appreciation for reduced flooding

from the AdSDS also illustrates her alignment with the GoG rationality on coastal erosion and flooding as a serious climate change impact that should be addressed with sea defense systems. Because she may not necessarily be aligned with the first GoG rationality framing climate change as an economic issue, her alignment with the remaining two rationalities and her appreciation for the functioning of the AdSDS is an example of one alignment with the larger project of rule, and therefore the production of one type of adaptation subject within the project of rule that is SDS as CCA.

The next person I discuss is a young fisherman. When we met him he was sitting on about four pieces of plywood stacked on top of each other and laid across two tree stumps. The conversation with him beginning with his livelihood challenges progressed as follows:

> K: OK so what are some of the major challenges he faces in his livelihood?
>
> S: He says like it is seasonal work so basically they do the major fishing for three months and so they spend most times at home – like on land than doing the work. So that doesn't – like the work is not going on well. The market, didn't get market for the fish so the fish is not expensive for them to even get money to send their kids to school. Like getting assistance in times of need; assuming the canoe or the net, outboard motor or something spoiled, the assistance to buy it is very difficult. He even say that they didn't get support.

This fisherman expresses concerns associated with revenue generation (not getting good prices or "market" for fish), occupational hazards (the seasonality of his profession) and accessing financial assistance for his capital and input needs such as repairing fishing

nets, canoes, or outboard motors. This fisherman was not aligned with the GoG rationality framing climate change as an economic threat because in his articulation of challenges he did not cite anything such as flooding and coastal erosion. Even in his articulation of "challenges living in this place" he mentioned not having electricity and bad roads, not flooding or other sea-level related issues. Building on this concern for his ability to make a living, he mentioned not being able to send children to school as an effect of not getting enough money from the sale of the fish they catch and this is not surprising based on the discussion we had concerning his roles and responsibilities:

> K: What are some of your obligations?
>
> S: …He takes care of children's school fees… His children sometimes assist him in his work when they come back from school. He also provides food for the house…
>
> K: What about his wife? What does she do?
>
> S: …Petty trading. She sells items such as sugar and groundnuts…She sells kenkey[26] as well.
>
> K: Do you keep joint or separate accounts?
>
> S: …He say separate. That the women will not let you keep their money but if they get yours they will spend it. And they will often demand that you give them yours.

[26] Similar to sourdough dumplings, but made from fermented maize, and steamed in dried maize husks

Given this man's financial obligations, it makes sense that he was critical of the AdSDS in its functionality of obstructing him from conducting fishing with dragnets and thus earning an income:

> K: What are his thoughts on the sea defense?
>
> S: … He said, how they thought the land would go back. The sea would go back, it doesn't go back like that. And because of the groin that they did, they couldn't do the fishing proper-the one that they drag [dragnet fishing] ...so that one is a challenge to them, or is problem too...He said during the dry season, he realize it [the sea] go back a bit. But when the rain start, then it come back-it come to its place. So for now they can't say much about it [the AdSDS].
>
> K: Can you explain why, how the groins-exactly how the groins affect dragnet fishing? I just want to understand.
>
> S: ...He said like if they are dragging, and the water is going to a direction in particular, and they are like not many, and they were not able to drag early, the net will go against - attach to the ... [K: groin] the groin and the net will tear.

This fisherman's critique of functionality is because in his reported experience, the groins of the AdSDS hamper him and other fishermen from dragging their nets smoothly to shore. Also the fisherman, like the NRMO, began to touch on this issue of timescales with regard to evaluation or waiting for a period of time before making an evaluation. By the translation "…So for now they can't say much about it", the fisherman is inferring that if more time had passed he might have been more confident in making an assertion of the AdSDS's functionality. Considering his critique of the functionality of the AdSDS,

this fisherman is not aligned with the GoG rationality framing sea defense systems as protecting livelihoods, though he does align with the rationality that views flooding and coastal erosion as processes that need attention based on his sentiment of wishing that the AdSDS had reclaimed more land than it had. This fisherman, however, leaves open the possibility that he could become more or less aligned with these GoG discourses over time. From this point in time analysis however, this fisherman is only aligned with one GoG rationality. This is a different sort of alignment with the project of rule surrounding the AdSDS, and therefore this man represents a different sort of adaptation subject than the senior woman discussed above.

Another critical view of SDS functionality which also addresses this notion of timescales, but then critiques the experience of the construction process of the AdSDS, comes from another fisherman. This fisherman is actually the Chief Fisherman of the community we were working in. As such our conversation revolved around capital and inputs that one needed to enter into the fishing trade in the community, the different types of fishing such as deep sea versus dragnet fishing, and the roles of women and men in the fishing trade. The conversation about roles then shifted to his roles as a husband and father:

> K: What are *your* roles and responsibilities?
>
> S: …He said he pay school fees and provide food. He say when you don't have the woman can help…because the women have more money.

Like the younger fisherman who was concerned about the ability to pay his children's school fees, the Chief Fisherman was also responsible for paying his children's school

fees and feeding his family. Unlike the younger fisherman, though, he could get support from his wife. This phenomenon of married couples keeping separate accounts is not uncommon among the Dangme (Overa, 2003), and this sentiment of women possessing more money than men was shared by many of the men I engaged with. The Chief Fisherman's major challenges of making a living and living in the community are also similar to that of the young fisherman:

> K: What are some of your biggest challenges in making a living and living in this place?
>
> S: …Inputs are expensive…many of the canoes are broken…It is also difficult to get young people involved in fishing…There is not much future in fishing-if there is an accident, you have to start from scratch.

The Chief Fisherman painted a bleak picture of the fishing trade in his community. He bemoaned expensive (capital and) inputs and the inability to repair inputs because of limited revenue and the challenge of getting youth involved in fishing. The Chief Fisherman did not align with the GoG rationality of climate change as an economic threat, because of his concerns for capital and inputs and revenue were not shaped by impacts of coastal erosion and sea level rise. If his livelihood of fishing is as volatile as he claims and he has to provide school fees and food for his family, then his critique of the AdSDS's functioning is not too surprising:

> K: What are his general thoughts and opinions on the sea defense?

S: He say, it is better than nothing. Erosion it still takes place going downwards [of location of interview]. We are not 100% safe. We can only wait and see. Maybe will see the full impact after four years. We cannot do anything. …

K: Did the construction affect you in anyway?

S: The construction really affected them. The construction cracked buildings, and because of noises at night, they couldn't sleep.

The Chief Fisherman's comments suggest some alignment with the GoG rationalities on flooding and coastal erosion as a serious impact that needs attention, and the need to employ a SDS as a means to address this impact. The Chief Fisherman notes that he was not expecting erosion to continue to take place after the AdSDS's construction. However this accretion is to be expected as around a groin there will always be buildup of sand on one side of the groin (updrift accretion) at the expense of the other side (downdrift erosion) as a result of longshore drift (Bruun, 1995). Regardless, the Chief Fisherman said the community residents could only "wait and see" if the situation will improve. The phrase "wait and see" denotes the theme of timescales, and in this reference to time the fisherman gives a specific figure - four years - which is one year short of the minimum time frame Academic 1 estimated should pass before evaluating a sea defense system (five years). The Chief Fisherman is not aligned with the first GoG rationality of climate change as an economic threat (because none of his major livelihoods challenges reflected environmental issues) but is aligned with the GoG rationalities framing flooding and erosion as best addressed via SDS (because of his appreciation for the AdSDS, though he is critical of its functioning and construction). The Chief Fisherman is similarly aligned to

the project of rule as the younger fisherman, but they both express their alignment in different ways. The younger fisherman critiqued the functionality of the AdSDS for the way it affected his livelihood activities. The Chief Fisherman critiqued the AdSDS because erosion still occurred post-construction and the period of construction was hazardous. They share a critique of the SDS functionality, but express that critique in different ways.

The fourth person I present is a young woman who smokes fish and weaves mats. She said she smoked fish in partnership with her mother. When I asked her about her challenges we translated the following for her:

> S: …The smoking-it gets to a time, they don't get fish. So they spend all their money. When they spend their money and they started getting fish, money to buy the fish again is a problem.
>
> K: What about the weaving of the mat? Is there any challenge?
>
> S: That thing they use to for the mat; what is the name?
>
> K: The raffia?
>
> S: She says it is expensive and as they sell it too, the price for it in the house, like selling for the people in the community is different from at the market. Like those in the communities, their price is less. And at time they will send it to the market they will not get the price, like the price that they want, so they have to bring everything back.

This fish smoker's challenges are related to her livelihoods activities and problems with revenue generation. There are seasons when the fishermen's catch is reduced. During those periods, the fish smokers will obviously have less fish to smoke. When that happens, the fish smokers have to depend on their savings to meet their living needs and obligations. By the time fishermen start finding fish again, the fish smokers are all out of money to buy fish from the men when they bring the catch ashore. With regard to her mat weaving, her inputs of raffia are often too expensive and because she often cannot make a profit on the prices she has to sell mats for in the community or on the market. As a result, she ends up not generating enough revenue to buy more raffia to continue her trade. In this articulation of major challenges in (making a) living, she makes no reference to flooding and/or erosion. In order to understand the nature of some of the obligations on which she spends her savings during the lean fishing season, I asked her:

K: Are you married?

S: …She said yes.

K: As a woman in your household, what are some of your roles and responsibilities?

S: …She assist her husband when he don't have money…The man has gone fishing so she is the one who provide.

K: Do you have complete control over your money or can your husband influence what you do?

S: …She said the money is hers…She even has some of her husband's money.

Therefore, during the lean season this woman assists her husband who is a fisherman (and at the time of the interview had travelled to undertake deep sea fishing-which takes weeks and sometimes months and is the reason why she would be the one providing for their family in his absence) so that they can take care of the family. She corroborated what the first two fishermen said about women keeping separate accounts from their husbands and their ability to support their husbands provide for the household. Her challenges with revenue generation and acquiring inputs do not align with the GOG rationality framing climate change an economic threat. Her perceptions of the AdSDS are influenced by this lack of alignment and her obligation to support her husband in providing for their family. This is what she had to say when I asked about her thoughts on the AdSDS:

> S: It [the AdSDS] is not good – compared to what has been done at Keta. The manner in which the sand has been heaped [in the AdSDS] is not good for visibility. Children beyond the sand mound may not be seen until it is too late…"

This perception is critical of the design of the AdSDS. Her critique of the raised sand mound of the AdSDS's design (see Figure 1.4) was in comparison to the design of another SDS in the VRD but in another district. In her opinion, this raised sand mound, which cut off visibility of the beach from the community behind it, was a potential safety hazard - particularly for children playing on the beach.

This woman fish smoker and mat weaver is also not aligned with the *manner in which* the GoG executed its rationality on sea defense systems – even though she may be aligned with the rationality of addressing flooding and coastal erosion through SDS itself.

During the interview we conducted with her, she did not say anything in support of or against this notion of alignment with the sea defense rationality. Unlike the first two men who were also not aligned with the rationality of climate change as an economic threat, this woman is not a well-produced (for lack of better terminology) adaptation subject because her alignment with the rationality of addressing flooding and coastal erosion via SDS is different than theirs because of child safety concerns. This woman is clearly aligned with only one GoG rationality – that of flooding and coastal erosion as processes that require attention. Thus, she represents yet another form of adaptation subject produced by the AdSDS.

The fifth and sixth people I present are and an uncle and his niece. We came upon the niece sitting in front of their house eating tapioca. After a few minutes of interviewing her, her uncle returned home and more or less hijacked the interview, so we went ahead and interviewed him. When we were done with him, we picked up the interview with her where we had left off. She was however present during the entire duration of her uncle's interview and sometimes offered answers to questions when we directly asked her. The uncle is a self-proclaimed businessman. He is an electrical technician, store manager, and motorcycle taxi rider who sometimes does fishing on the side. The following is an excerpt from his view of the problematization via major challenges:

K: So what are their major challenges?

S: …For the work?

K: Mmhm

S: …Mention money, like to expand the business. Some people that they work with, they are not faithful. That's another problem. He's mentioned the road work, the road system is also a challenge for them. He say like the work here because they are in the fishing area it is seasonal work. So even for the electrician it will get to a time they will be getting the job, it will get to a time too. Selling too.

K: What about living in this place?

S: He said the major challenge being here to him is work. They don't have besides the fishing, they don't have other job. And the fishing work is seasonal so when it is off season, like then almost everybody is at home. The don't have money to run… even paying fees, paying for hospital bills and others who are supposed to continue, further their education because they don't get money. Then they are at home.

His major challenges covered themes such as the dishonest character of the workers (labor) he oversaw as manager, revenue, and the seasonal nature of work in a fishing community (even for an electrician-the seasonal nature of the fishing trade affected people's purchasing power during the off season and so all people's livelihoods suffered, particularly those who depended on other people's business). He also had concerns such as the absence of opportunities for anything other than fishing in a fishing community, and the overall difficulty of making a living during the off season. Like the others before him, this businessman does not have any environment-related concerns and so is not aligned to the GoG framing of climate change impacts as an economic threat. One could argue that I have only been assuming that the individuals I have discussed so far do not

see flooding and coastal erosion as major challenges only because they do not offer it up without provocation. To demonstrate that these individuals are aware of challenges such as flooding and coastal erosion but do not consider them major, let us examine the conversation that led up to the businessman expressing his perception of the AdSDS:

> K: So what does he think about the sea? Is the sea a challenge to their living in this place?
>
> S:…He's talking about the sea defense…He say for now, the sea defense , for now that, although it's done but they can't say specifically that for now it's good or un- unless they will give some time to measure it, after time to measure it like four years time to see before. To see whether it's, they can say it's good or it's not good. But it's better than before...
>
> K: When you say it's better than before what...the erosion or the...what is better than before?
>
> S: ...Ok, so he give...he say, formerly when the sea is rough, it come-it get into the community ... but now, although they don't see anything like that. But as he said, we will give some timeline to measure it.
>
> K: Ok, so let me ask another question. So if he was to rank. Umm …what he just said about them needing assistance for other jobs and the sea defense, If they [the GoG] were to give a choice, between [S: these] yeah, which one would he [S: which one would he like to be the first] yes.

S: …ok...what, simply what he said, because, for the sea defense it's for the whole community. But for the assistance that one is individual. So, if he should put it, then he will take the sea defense to be the first...because if the sea, assume the sea is rough and is entering the community, you will not have the peace of mind to go and look for something else to do. And you have the job, you have your job, you have good food, you have everything you need-water and the sea is still not good, the erosion is entering the community, you will not have that piece of mind. So...and if the, now that, assuming the sea defense too is good. The land, the sea is not eroding the land. You have, you don't have good water, good food, place to live-that one too is challenging...He, he look at the tw...both sides before he choose one. Because he said, for the sea defense it's for whole community but for...these ones are individual things.

The businessman's discourse in the excerpt above illuminates some interesting themes. The first is that for this individual, he is willing to address flooding and coastal erosion over his other challenges such as labor and the lack of access to alternative livelihoods, even though these latter challenges were his major challenges. This is because the businessman argues that what is most beneficial for a greater portion of the community should be pursued over what is most beneficial to him as an individual. Some scholars demonstrate that a sense of community over the individual is a prominent feature of Dangme society (Kuwornu-Adjaottor, 2015; Sawyerr, 2012). This sense of community over the individual also results in the alignment of his perception of the AdSDS with the GoG rationality framing SDS as an appropriate means to address flooding and coastal erosion. He also agrees with the GoG rationality that flooding and coastal erosion require

attention because the residents of the community cannot have the peace of mind to carry out their livelihood activities. In short, the businessman is fully aligned with the project of rule of SDS as CCA. This is yet another example of the creation of an adaptation subject via the SDS – this time based on a sense of devotion to community over the individual.

To demonstrate that this businessman's view of the communal good as greater than that of the individual is not a chance coincidence with the findings of some scholars on Dangme society, let us analyze his niece's articulation of major challenges and her subsequent perceptions of the AdSDS. This niece is a net puller/dragger. What this means is that when the fisherman cast their nets out to sea in dragnet fishing, she assists the men and other women like her to pull the net back on to shore. For major challenges, she complained about how hazardous spending hours out in the sun is to her health and echoed her Uncle's sentiments on the difficulty of establishing a livelihood alternative to fishing-related work in their community:

> K: So what are her challenges … in her work that she does?
>
> S: She said for her when she goes to the beach and the sun is coming up then her head, like headache, she will be feeling headache so she goes early in the morning when the sun is coming up then she come back. So she is thinking that when she gets some business at home that she can do she will stop going to the beach.

Her major challenges express health and financial assistance concerns. Also when asked what she thought the community needed the most she responded with a toilet facility. Even at a communal level, she was not expressing flooding and coastal erosion as the

community's most pressing need. By this articulation of major challenges she is not aligned with the GoG rationality that views climate change as an economic threat because she does not raise any environment related concerns such as flooding and coastal erosion.

However, a Dangme sense of community ultimately influences this individual's perceptions of the AdSDS as meeting a communal need:

> K: Err does she think that the sea, living here has been a problem to them, has been disturbing them?
>
> S: …She say formerly it have been disturbing them-the sea. But now that they did the defense, they didn't face any challenge-for now they didn't face any challenge.
>
> K: How was it disturbing them?
>
> S: ...formerly when the sea is rough it enters the community.
>
> K: Umm, so between the sea...or ok. What does she think about the sea defense?
> S: …She said for her she thinks it's good. Because it's better. It's far better than before.
>
> K: Ok...so between, yes again - the sea defense and...now this one is a hypothetical situation because the sea defense is already there. So supposing the sea defense was not there and [S: somebody wants to give them] yes-assistance. [S: sea defense or toilet facility, which one will she?] yes, yes, which one will she take? Toilet facility and even like assistance in business and stuff.

S: ...She said she will choose the sea defense first. Because if you don't have peace of mind, you can't work.

It is evident from the excerpt above that this woman would forgo the provision of a toilet facility (which *she* thought was the most pressing communal need) and financial assistance to set up a business (which was one of her pressing personal needs) for a sea defense (which she thought was a more pressing communal need for others). One could argue that her choice of the SDS over a toilet facility or financial assistance to her, is not really out of a sense to community but self-serving because like she said "…if you don't have peace of mind [afforded by a SDS]…you can't work." However, even if she were self-serving by preferring the tackling of a more communal challenge such as flooding and coastal erosion, she is choosing to self-serve in a way that would be beneficial to others as well. One could also argue that she was only echoing her Uncle's sentiment but even if so, this echoing was not under duress because the Uncle was not present when she made this statement and she would have no fear that we might meet him later and tell him what she said because we were not resident in the community nor friends of her Uncle. Again the Dangme sense of obligation to communal over individual needs (or individually-defined communal needs) appears to play an important factor in creating an appreciation of the functionality of the AdSDS (removing the challenge of flooding) for this community resident. As an adaptation subject, this woman is aligned to the GoG rationalities of addressing flooding and coastal erosion (because it hinders the "peace of mind" to live one's life in the community) and the use of SDS as the means to address flooding and coastal erosion. The fact that her major challenges were not flooding and coastal erosion and yet she was appreciative of the functioning of the AdSDS produce her

as an adaptation subject very similar to that seen in her uncle, despite their different identities, roles, and responsibilities.

The seventh and last person I discuss among those *with the AdSDS* is a woman farmer of crops such as okro (okra), tomato, onions, and carrots. She used to raise animals such as chickens and pigs but she stopped because the feed was expensive, and the animals later died because they contracted a disease and she couldn't afford to treat them. Regardless, she is an advocate for mixed farming. The following is the excerpt from the conversation about her major challenges:

> K: What are some of the major challenges she faces?
>
> S: She said usually when they plant the crops they are infected with some diseases that they didn't get chemical to treat.
>
> K: Any other challenge?
>
> S: The farm inputs are expensive. So now they want to get, like store food items so that they will go on strike. She says sometimes they will bring some like they are reducing the price but they didn't – it is for a few people. She said sometime they will bring it that they are selling it but you will never see. You will not even know who is selling it.
>
> K: What about living in this place?
>
> S: She says they don't have toilet facility. They don't have good water.

This woman farmer mentions challenges such as (pests and) diseases and the challenges associated with a lack of revenue necessary to purchase the chemicals needed to treat the

diseases. She found the (capital and) inputs needed to farm expensive and difficult to access. She also expressed sanitation and water needs in not having a toilet facility and potable water. Though she expresses the challenge of crop disease as a significant concern, it is not clear that the theme of pests and diseases relates to the GoG rationality of climate change as an economic threat because the direct linkage between pests and diseases and a changing climate is difficult to establish from her comments alone. However when I asked her directly about whether the sea was affecting her in anyway, the linkage to a changing climate became clearer:

> K: Has the sea been affecting your life in any way?
>
> S: …The sea is eroding the land. You realize the water is now salt-it's hard. It's becoming hard. So the…some of them they will have their farm-getting to the beach. But they will connect the pipe from this side [location-inland] to that place [the beach]. [Indecipherable]. So it all leads to money. If the money is there you buy the pipe. If you don't have the means to buy then you can't farm.

This woman farmer first complained about coastal erosion. Then went on to describe saline intrusion into the groundwater-particularly on the farms close to the beach. She raised an important point about how such farmers needed to irrigate their fields and needed the money to do so. Her statements establish her alignment with the GoG rationality on climate change as an economic threat since she discusses the ways in which saline intrusion (attributable to climate change through sea level rise) affects her ability to grow her crops. She establishes climate change related impacts as an economic threat more clearly with her statements on how farmers closer to the coast have to irrigate their

fields with water from inland sources because of saline intrusion into the groundwater. After she explained her major challenges, I then asked her what she thought about the AdSDS:

> K: So what does she think about the sea defense?
>
> S: ... She said, they are saying-those at the beach they are saying the sea is eroding some parts, some places...is still eroding. But to her, it [the AdSDS], it's ok. That's their main-the challenge and they've construct the defense so it's ok. But people are complaining that it's still eroding the land.

This woman farmer was personally appreciative of the functionality of the AdSDS. She referred to their main challenge [erosion] which the AdSDS had been constructed for, so in her opinion things were good ["it's ok"]. Her perception aligns her with the GoG rationality of flooding and coastal erosion as central challenges to be addressed through SDS. Even though this farmer is appreciative of the AdSDS, she points out that others in the community (particularly those living near the coast) are critical of its functioning because of the continued erosion that they see. However, I would argue that this woman farmer is not fully aligned with the GoG rationality of flooding and coastal erosion as needing immediate attention because of the focus of her livelihood concerns. The AdSDS is able to reduce community-wide challenges of flooding and coastal erosion. However when it comes to the specifics of livelihood challenges, the AdSDS is not very effective in addressing these particular needs. For example, farmers whose ground water has been affected by saline intrusion still need to irrigate their fields from non-intruded inland water sources even after the construction of the AdSDS. All the above produce this

woman farmer as yet another kind of adaptation subject who is mobilized not so much as a result of her material needs or personal priorities but more by an abstract appreciation for reduced flooding via the AdSDS in general.

Without the AdSDS: Totope

The first individual I discuss is a young woman who was a fish smoker. When we met her, she was roasting crabs in fire in a coal pot. Her baby daughter was on the ground beside her, playing in the sand - a few feet away from the fire. She had been smoking fish for ten years with her mother. She currently lived with her parents. Her parents owned animal such as pigs, goats, and chickens and she helped take care of these animals for her parents. In our conversation she made no mention of a husband or the father of her children and I did not ask any question to that effect. She told us she also sold the fish she smoked, often travelling to the big market at Kasseh or sometimes as far as the neighboring country Togo. When we asked her about her major challenges, she expressed the following:

K: What are some of the biggest challenges in her line of work?

S: …Like some people using the fish [indecipherable] like buy it on credit and others will not even come at all with the money. Especially like you go to Togo and you don't know the person. You also need customers [indecipherable]

K: Are there any others?

S: That's all.

K: So what does she think could be done about it?

S: They fry fish too. Like now they will not sell the fish on credit again. Stop selling on credit

Her biggest challenge seemed to be with her lack of ability to make a steady stream of revenue because of customers buying fish on credit. When I asked about her major challenge living in Totope, she said that she wanted the government to come and provide them with more access points for pipe-borne water. Currently the access points were too few and the water flowed too slowly. In her articulation of major challenges, she did not make any allusions flooding or coastal erosion but rather revenue and potable water. She is therefore not aligned with the first GoG rationality on climate change as an economic threat. We then moved to discuss her roles and responsibilities in her parents' household:

K: What contribution do you make to your parents' household?

S: …She cooks, helps with fish smoking…and supports in eating [all laugh]

K: Is the baby her only child?

S: …No. She has two children … a boy as well.

K: Is she responsible for taking care of them?

S: …She is responsible but her mother support her as well

K: Are you free to do whatever you want with the money you make?

S: … Her money most of the time is with her mother. She lives with them…she doesn't make much…anything on her own.

This woman appears to be somewhat of a dependent in her parents' household. Even though she has two children of her own, she said she doesn't make enough to support herself and her children without her parents' help. Besides, most of the earnings she makes from smoking fish with her mother are in her mother's safekeeping. We then moved on to ask what she thought about the AdSDS:

> K: Ok, so she should tell me, what does she think about the sea defense project?
>
> S: … she say like they end the project before the get to the community, so if the sea is rough, it will flood the community. So they should come and continue, or finish [indecipherable] for them.

The fish smoker complained about flooding "when the sea is rough" aligning herself with the GoG rationality which views flooding and coastal erosion as a concern. This alignment is interesting because the manner in which she references flooding does not particularly demonstrate that she views it as a serious concern. She then expressed desire to be covered by the AdSDS or a SDS in order to address this flooding, thus aligning her perceptions of the AdSDS with the GoG rationality that views coastal erosion as a challenge to be addressed through SDS. This woman represents a different kind of adaptation subject than seen among those with the AdSDS, because although she does not have the AdSDS, and is aware that the GoG could have covered her (community) by it but did not, she still yearns for it. It appears that for this fish smoker, it was the fact that other communities had a SDS, and to a lesser extent the challenge of flooding in her own community, and not any role or responsibility of hers in the community or sense of obligation to a Dangme sense of community, that made her desire for a SDS.

Others in Totope, however, are not as gracious as this fish smoker in their feelings regarding their lack of coverage by the AdSDS. One such critical individual was a young man who was a lagoon fisher. This young man was a unit committee member – a member of the local community administration committee whose chair is the community's representative to the District Assembly. We met with him in the compound of the Chief Fisherman's house. He told us he had been fishing in the Songor lagoon beside Totope for about nine years. The following is an excerpt from our conversation about major challenges:

> K: What are err, what do you think err some of your biggest challenges or problems are in making a living for yourself?
>
> R: Our challenge here is that apart from fishing we don't have anything doing. And even that, until you travel from here to Togo, Cameroon and other places before you can get something better doing. Apart from that, being in this village there is nothing - or in this town - there is nothing you will do that you will get something to - which will satisfy your needs.
>
> K: But what about you? For the lagoon fishing or whatever you do what is the major challenge that you face?
>
> R: The major challenge we face is that there is a certain grass that grows in the lagoon. At times it comes with fish. If you put your net there you catch a lot of fish. But if the wind is blowing like how it is blowing now at times you go you won't catch fish the grass will be uprooting and this thing, …I don't know… cover the eyes of the net so that the fish will not get the chance to enter there so in the morning if you go to drag, it will give you tough time to … especially if you

go alone - because people will go alone, this one it doesn't require plenty number of people, just one or two. But if you go alone and the grass come to cover the net like that you find it very difficult to deal with it.

K: So what do you think could be done about these challenges you mentioned. The first one where fishing is seems to be the only activity you can do so you are limited? What do you think can be done?

R: Now the best, er, solution to all these grass matter and those things is that they need to dig the lagoon. Cos now it has been blocked by rubbishes and dust. In time of the dry season you see that the grass will turn to dust so it will choke the river it will make the river not be deep again. Now if you enter, the highest you make it – the deepest will be around here [points to his waist]. So at first when we were small it was deeper than this one. So coming to our time, it is becoming shallow every…every blessed year it will be shallow than the previous…

This lagoon fisher began his answer to a question with the word "yourself" with "our." Even after I explicitly asked him to articulate a challenge that was specific to him and what he did (lagoon fishing), he still began with the word "our." By the manner in which he began his responses, he seemed very much in tune with the Dangme sense of community. He articulated challenges such as the difficulty in gaining access to any other type of work that was not fishing-related. His challenge that directly affected his ability to make a living (the presence of aquatic weeds in the lagoon) was very much environment-related - as was the continuing silting up of the Songor lagoon. He also mentioned other challenges (not reflected in the excerpt) such as irregular temperature (an intensified dry season) and precipitation (unpredictable rainfall-the past rainy season

was surprisingly dry). His articulation of major challenges include clear climate-related linkages and their impact on ability to make a living (such as irregular temperatures and precipitation), thus representing a particular, somewhat indirect, alignment with the GoG rationality on climate change as an economic threat. This lagoon fisher/unit committee member is similar to the woman farmer with the AdSDS, who articulated challenges that had linkages to a changing climate and impacted some of her livelihood activities. This similarity demonstrates how alignment with the GoG rationality of climate change as an economic threat is able to produce subjects with similar articulations of the problematization of the project of rule of SDS as CCA regardless of whether these subjects are protected by a SDS or not. However the distinction remains that both these subjects (the woman farmer and young fisher/unit committee member) have different perceptions of the AdSDS. The following is an excerpt from the conversation about his roles and responsibilities:

K: Er so I want to ask, are you uh married? Do you have children?

R: Uh uh [no]. I'm single. I just completed [senior high/secondary school] this year.

K: Ok. You completed SS [secondary school]…[R: (in affirmation) SS] this year [R: SS (in affirmation)]

K: So where did you go to SS?

R: At Ada Senior High Technical School - ASTEC

K:…So, erm what responsibilities do you have as a young person? Are you still living with your parents? Or you are…you have your own place?

R: No…uh…I'm still living with my brother…My senior brother.

K: So what responsibilities do you have being a member of that household? What do you have to do? Or contribute to the household?

R: Ok, at times, uhh…m…like when, when I completed JHS [Junior High School], my sister was at SS. So I have to, I have to work…and provide with my brother to gather some money to be paying her school fees so that when she complete I will also go to school. So I stayed in the house for a year doing that. So when she was about to complete, I also jumped in-into school. So my younger brother also completed JHS and they were also supporting me. So now that I have finished I have to also support him to go too. So that's err the main thing reason why I'm at [indecipherable. K saying something at the same time]

Although this young man is single and has no children, he still has to work to help support his younger brother through school, as his older brother and younger brother whom he is now supporting did for him. Another responsibility that was not explored because of the nature of my line of questioning is his responsibility to the community as a member of the local unit committee. This responsibility comes up a bit more in his perception of not being protected by a SDS:

K: My last question is about the sea defense. What, what, thoughts on that? What thoughts do you have about the sea defense?

R: uhh…it's a work given to some people to do. We are not specialists in it. They've done their best. What they think is the best for them. They've done it. We are also imagining things by our own knowledge. Thinking they should have done something better than this one. But since the work was not given to us but was given to them, they've also done err what they think is their best. But to us, the

project is supposed to pass Totope...to the other side before they stop. Then the next time they come, they will come and continue. But they came, they came, as they are about to reach Totope, and they stop at [indecipherable] this thing-at the entrance, before you enter the place [community], they stop there. So we were all demanding for the this thing, err, the DCE [District Chief Executive] and the MPs [Members of Parliament] to come and check for it but they didn't come. So we were wondering why, because we know the project is supposed to pass Totope but the project didn't pass Totope. The project stopped at the end of Pute [the town before Totope], before the people [the contractors] left. So due to that, a lot of people...nearly everybody on the...err...at this place are saying that if, if time for election comes, none of them will vote. Yeah. None of them will vote...that's what they are saying. So we are even trying to bring the MP to this place so that-as the executive members of the party, we are trying to bring the MP to this place so that-she will explain the reason why maybe, maybe the time they were calling her she didn't come. Maybe she knows what we don't know about it [not receiving the AdSDS]. Before, maybe we are assuming that we were calling her and she didn't come. Maybe she was playing some underground err this thing, err roles that we don't know-so that she will come and explain to us. [K: Yes] Mmm [in agreement] So for now, we are not satisfied with the sea defense that they have done, unless something change.

As a unit committee member, when the residents of Totope realized they would not be protected by the AdSDS, he was obligated to help to try and find answers to their protests. He mentioned himself as an “executive member of the party.” The party he is

referring to is a local chapter of the NDC political party, which was ruling Ghana at the time. Since unit committee members are elected to the committee based on political party affiliation, and the MP and DCE he referenced are all members of the NDC, he felt obligated to try and save face for these officials by getting them to come and speak to the community members themselves. He even expresses the possibility of hidden best intentions on the part of the MP ("Maybe she knows what we don't know about it… Maybe she was playing some underground err this thing, err roles that we don't know…"). These obligations of his – to family and community, help explain why he is critical of not being covered by the AdSDS. Also his not being critical of the lack of Totope's coverage by the AdSDS would make him look irresponsible as a unit committee member and more on the side of the political party than the community. His perception, which is critical of the AdSDS's coverage, also raises two associated themes. The first is the use of elections to leverage action from political actors. He referenced that residents of Totope were saying that they would not vote in the upcoming presidential and parliamentary elections in December 2016 (interview took place in September 2015). The second theme his perception raises is a challenge to the notion that specialist knowledge is necessary for project evaluation. This unit committee member is of the opinion that even though the specialists possess technical knowledge, the residents of Totope also possess their "own knowledge" with which they can assess whether a project was done well or not – not necessarily based on technical standards. His sentiment is expressed in the following excerpt from his discourse: "We are not specialists in it. They've done their best. What they think is the best for them. They've done it. We are also imagining things by our own knowledge. Thinking they should have done something

better than this one". This young man, through his critique of the AdSDS not covering Totope – presents a unique way of aligning his interests with the GoG rationalities on flooding and coastal erosion as requiring attention and SDS as solutions to flooding and coastal erosion. His critique of the lack of coverage by the AdSDS is in effect an expression of desire for the AdSDS, and less a clear statement that flooding and erosion are major challenges in the community. This young lagoon fisher is a different sort of adaptation subject from the others discussed so far. He is a more political subject than a subject who needs to be protected from flooding and erosion.

The third individual I present is a much older (than the lagoon fisher) fisherman-who fishes in the sea and occasionally in the lagoon during the rainy season when the level of water in the lagoon is higher. He has been fishing for most of his life (50+ years). This is how he articulated his major challenges:

> K: What are some of the biggest problems facing fishing here?
>
> S: …He is saying like accident on the sea. Some time you are going and the boat capsize. The machine everything can collapse. And you know there are rocks in the sea. So sometime the net will go against or the net will be stuck with the like the rocks. With that you will not get sometime you will not even get the net or you will get small part of it. So that is what he said the challenges that they face.
>
> K: What does he think can be done about the challenges?
>
> S: He said is your own affair - like the owner. Because so far as you are going to start the business and didn't inform the chief fisherman so this one too you have to take care of it yourself. It will be personal something. And it's not under the government [indecipherable] so you will [indecipherable] for any insurance.

K: He mentioned the insurance. Does he think that that is a possibility in this type of business? That maybe if there was insurance for fishermen that people would use it and that it would work?

S: He said like if they were to be paying tax or insurance to the government that one he think it would be good. Like when any accident occur the government can support or the insurance company in charge can support. And they like, he think they are initiating like that. Sometime ago the government gave them instruction that they should give the canoes numbers and they did that but they didn't hear anything from them again.

This older fisherman expressed concerns that revolved around the themes of occupational hazards and financial assistance. He did not articulate any specific concerns that had clear climate linkages. Based on his statements alone, this older fisherman is not aligned with the GoG rationality on climate change as an economic threat. Let us next examine this fisherman's roles and responsibilities:

K: What are your roles and responsibilities?

S: …He say that every week he give chop (housekeeping) money to his wife. He also give pocket money to his children for school. If they [his family members] are sick he will send them to hospital and such.

K: Does his wife assist with these things in any way or are they his sole responsibility?

S: …He say his wife also assist…support him. She does well.

This fisherman, with the support of his wife, is responsible for providing for the day-to-day needs of his household. As such it makes sense that he would be critical of the fact that the AdSDS did not cover them:

> K: Erm, so what are his thoughts on the sea defense project?
>
> S:…err, like to them, or to him, they [the GoG] didn't do anything for them. Because, it will get to a time that there will be flooding-the sea. And he think they, it is erm rather that erosion, the sea erosion is affecting most but they don't do anything. The dredges [groins] that they [the contractors] do, they didn't do even one in front of them to support them. That's simply what he's saying
>
> [K: Mm (in recognition)]
>
> S: Because most of the time when the sea is rough, the water gets to the town-the whole place will be flooded. They sleep on benches...a whole lot of things. Er, he was working where the canoes are. He said that [indecipherable] a house was there. The sea took everything-erode everything. So they, when they heard of this [the AdSDS project], they thought this thing [the AdSDS] will help them but they didn't see anything.
>
> K: So now what does he think should be done, or could be done, about the situation?
>
> S:...He said that if the gredges that they, if, what he think [K: groins], the groins, if they [the GoG] should do one for them in front here, he think that one will help them. But if they should just pump the sand -even that one the erosion, the sea erosion will take it again [K: indecipherable]

Yes. K: So does that mean they [the contractors/the GoG] have been doing that? They have been coming to pump the sand to raise [indecipherable]?

S:...he said they didn't do anything like that. That's what they thought would have been done...or should be done for them.

This fisherman complained about the fact that Totope was not covered by the AdSDS and bemoaned the community's struggle with erosion and flooding. These statements indicate alignment with the GoG rationalities demanding attention to flooding and coastal erosion via SDS. As a solution to the fisherman's concerns, he pleaded for just one more groin to cover the community, and in lieu of a groin, that the GoG would at least nourish their beach. His statements on beach nourishment revisit Academic 1's emphasis on beach nourishment as a more sustainable solution to coastal protection than SDS. Furthermore, the fisherman, like the unit committee member, is aligned with the GoG rationality on flooding and coastal erosion and sea defense systems because his critique expresses desire for an SDS to manage these stresses. This older fisherman is a similar subject to the Chief Fisherman with the AdSDS because both these men are not aligned to the GoG rationality which frames climate change as an economic threat, but both men are aligned to the rationalities on flooding and erosion as serious impacts that require attention via SDS. This further reinforces the idea that alignment with the GoG rationalities framing SDS as CCA have less to do with having a SDS or not, and more to do with the actual life situations and roles and responsibilities of individuals.

In spite of the above assertion, the AdSDS still appears to hold uncanny aligning power for some individuals in Totope, as evidenced by the perception of a salt miner and fish fryer who was appreciative of the functionality of a SDS that did not even cover her

community. Let us trace the process that influenced her highly appreciative views by beginning with what she described as major challenges:

> K: Ok so what are the – some of the major challenges she faces in this kind of work [salt mining]?
>
> S: …When they mine this [sand] and heap it down and they have to like move it or transport it from where it is. Other than that if it rains it will- everything will dissolve. And that one involves money. The money- sometime they use canoe – ah ha- to carry it. So you will send the canoe deep, fill it, then people will bring it to the riverbank for you. And she is saying, like, what they do at the pans, that one, now, people are using generator, the one they use to pump the water. They use to remove the water in the pan before they mine. So if you don't have money to buy the generator and the fuel to be, that one you can't do or it will be difficult for you.
>
> K: What about the fish frying? What are some of her major challenges?
>
> S: …She say people buying the fish on credit. She is hoping to recover the money. People come to her and they will buy on credit. They say they will pay next week. They never return.
>
> K: Why do you give out the fried fish on credit in the first place, knowing there is the possibility of 'no show'?
>
> S: … She say, you have no idea of telling that someone would do that.

Her challenges had to do with not being able to transport salt immediately after it is mined and thus being exposed to the risk of the rain washing the salt away. Also, she was concerned about not having a generator to pump water in order to be able to mine salt

(like others had) and having to rely on panning to extract the salt. For fish frying, her challenges had to do with constant revenue generation because customers often bought on credit and rarely paid back. She also articulated other challenges (not captured in the excerpt) such as poor access to pipe-borne water (irregular supply and low pressure) and bad roads. She also mentioned coastal erosion and lagoon flooding. We then asked her to rank the following challenges: water access, lagoon flooding, coastal (sea) erosion and flooding, and bad roads. The following is an excerpt from the conversation that ensued where she ranked access to pipe-borne water as the most important and bad roads as the least important challenge:

> K: Yes, any other problem apart from the water?
>
> S: She said the sea erosion but now that they do this thing [the AdSDS] it seems, it's okay. At times, the lagoon too flood-it overflow its bank…second. It could have been the sea, but because of the [AdSDS] project it is somehow okay so she will say the lagoon.
>
> K: Ok so, she's mentioned that the sea has sort of been made better by the groin. But what about the water [access problems] and the lagoon over flooding, what does she think could be done about those issues?
>
> S: She said, (s)he think if they should heap sand around like this, the river side, so that when it rains it will not overflow the bank. Or stone. Or rocks.

From these challenges, she is aligned with the GoG rationalities on climate change as an economic threat and flooding and coastal erosion as serious challenges needing attention. These statements reveal her alignment with the GoG rationalities on immediately addressing flooding and coastal erosion through SDS. For this salt miner/fish fryer, her

critique that she raised in coverage was not seaward but lagoonward. For her, the AdSDS as it had been constructed had reduced the problem of erosion, even though Totope had not been technically covered by it. She was now advocating for some sort of protection from the lagoon. In her recommendation of solutions, she also mentioned beach nourishment (like the older fisherman) and then went on to mention stones/rocks (probably referencing groins). Interestingly, then, this woman is aligned with the GoG rationalities framing coastal erosion and flooding as challenges to be addressed with sea defense systems because, while not being technically covered by a sea defense system, she draws linkages between reduced erosion and the SDS that does not cover them but is half a mile away from the community. She then further requests for more protection works to protect their community from lagoon flooding. But why is she so aligned with the GoG rationalities of addressing flooding (both from the sea and lagoon) and erosion through SDS. The possible answer lies in her roles and responsibilities:

K: What are your responsibilities to your family?

S: …She gives money for school…prepares food for them…pays hospital bills.

K: Do you get any support from anyone? The children's dad? Your husband?

S: …She say she has children from her previous marriage and one with her current husband. She alone takes care of the children from her previous marriage. She say the man [her current husband] only helps her with the one [child] she had with him.

K: Does her husband have any say or input in the money that you make?

S: …She say he has no input

This woman is responsible for caring for children, only one of whom her current husband supports. Her role of cooking for her household would also explain why she ranked water access above flooding from the lagoon and the sea. Thus her societal roles and familial obligations make her appreciative of SDS in reducing coastal erosion and flooding (even though her community is still exposed) and she hopes that the community will be further protected from flooding from the lagoon so she can be doubly secure in making a living for herself and her children in Totope. She presents another example of a unique adaptation subject who is aligned with the rationalities of the project of rule such that she believes the project is working for her even when there is little evidence to suggest it is.

Lessons from the Perceptions of with and without the AdSDS

Residents of Totope without the AdSDS appear more frequently aligned with the GoG rationalities framing coastal erosion and/or flooding as challenges to be addressed through sea defense systems. This is because even the critiques concerning the non-coverage of Totope by the AdSDS denote a desire for a sea defense system, and suggests that the sea defense system (the technology of governmentality in this overall analysis) might have an impact on people's perceptions of their challenges and the best ways to address them. A unique aspect of adaptation subject production in Totope, however, is the fact the AdSDS also represents neglect by the government (thus facilitating perceptions critical of the SDS's coverage) while at the same time creating a yearning to be "protected like the other communities". This dual ability of the AdSDS demonstrates how technologies of government can be used to create desires and aspirations in populations, but how at the same time populations are produced as subjects in various

ways that might include tensions between desire and disgust for the very technologies (and what those technologies represent) that they might yearn for.

For those with the AdSDS, this duality of the AdSDS is also evident in the way that the perceptions of those who are actually protected by the sea defense system are not entirely appreciative of this adaptation intervention, but critical of aspects such as functionality, design, and construction experience, reflecting this tension of having accepted a technology of governmentality (expressing appreciation for it) yet being dissatisfied with its effects or workings (critiques of functionality, design, or construction).

In summary of the comparison between With and Without the AdSDS, the AdSDS is not totalizing in producing "adaptation subjects" as it is unable to fully align any one actor with all of the three GoG rationalities on the challenge of the climate related impact of flooding and coastal erosion and SDS as the solution to this challenge. Further, it does not produce a single kind of adaptation subject, but instead many different subjects aligned to this project of rule in different ways. At least for those residents interviewed in this project, the rationality of climate change as an economic threat is the least powerful for shaping alignment with the project of rule, yet it is the rationality that when not agreed with (while the others are agreed with) makes the success of the project of rule most apparent. This is because agreement with the rationality of climate change as an economic threat is in response to the question "what is your major challenge (making a) living in this place?" – which represents an actor's primary interest. When an actor does not express a primary interest that views a changing climate as having a direct bearing on their ability to live and make a living, yet said actor ultimately

perceives that flooding and coastal erosion should be addressed via SDS, then the project of rule appears to be aligning their interests in a manner that supports the construction of SDS as necessary and important. The rationality of flooding and coastal erosion as serious challenges needing attention is probably the most powerful rationality shaping the alignment of individuals to this project of rule, as flooding and coastal erosion is something people experience on a community-wide scale. The rationality of addressing flooding and coastal erosion through SDS also seems to hold more weight with those without the AdSDS than those with it.

Outcomes (Conclusion)

Sights into Sea Defense Systems

The perceptions of the AdSDS described above present complex, differentiated expressions of governmentality. For example, some respondents in both vulnerability groupings (with and without the AdSDS) who focused on livelihood challenges as their main issues of concern were still supportive of a sea defense as a way to protect and improve their lives, even though a sea defense systems might not directly address the livelihood challenges they articulated. The seeming disconnect between resident needs and their perceptions of the AdSDS as addressing their needs suggests that the AdSDS is part of a project of rule that has identified flooding and erosion attributable to sea-level rise fromclimate change as a threat, and mobilized the interests of the national and district governments and the residents to agree that erosion must be managed to address that threat, even though the residents do not individually view coastal erosion as the biggest threat to their livelihoods activities. This mobilization appears to dovetail with the Dangme sentiment of addressing the concern of the many over the concern of the one.

The AdSDS is perceived by many residents (with and without) as protecting communal live(lihood)s and property and this perception aligns with an objective of this project of rule, security (of livelihoods and of lives).

With regard to the mobilized interests of district level officials, though the interests of these officials in doing their job well or being a responsible/obedient employee of the state may have been mobilized via their involvement in the AdSDS, these officials were not fully aligned with the goals of the AdSDS. Their perceptions were multiple and inconclusive, suggesting that in the case of these officials, as in the communities, governmentality is able to mobilize interests to achieve projects of rule, but this mobilization is not necessarily willing, and does not produce subjects that exist without resistance to the project of rule even within the government (McKee, 2009; Neu & Heincke, 2004; Odysseos, 2011).

In summary, the AdSDS is not a totalizing project of rule insofar as it is unable to fully mobilize the interests of both district officials and community residents (with and without the AdSDS) to agree that coastal erosion and flooding attributable to sea-level rise from climate change should be addressed as a priority, and thus produce a single homogeneous adaptation subject. For the residents of Totope however, the GoG failed in achieving this objective of security for them by not addressing flooding and coastal erosion at all. In the following chapter (Chapter Seven), I discuss a further failure on the part of the GoG in securing the live(lihood)s and property of residents in a community that is protected by the AdSDS. These two failures help explain why the coastal residents of the Ada East district have such varied alignments with the GoG objective of protecting live(lihood)s and property through sea defense systems.

CHAPTER SIX

(MAL)ADAPTATION OPPORTUNISM: WHEN OTHER INTERESTS TAKE OVER STATED OR INTENDED CLIMATE CHANGE ADAPTATION OBJECTIVES (AND THEIR UNINTENDED EFFECTS)

Introduction

This chapter introduces the terminology of (mal)adaptation opportunism[27] – the situation in which projects undertaken in the name of climate change adaptation are overrun by interests other than the stated or intended objectives of the climate change adaptation project. The parentheses around the (mal) preceding the word *adaptation* denote how interests can take advantage of maladaptation[28] in a similar manner as the positively adaptive efforts of projects. Typically, under (mal)adaptation opportunism the political interests of powerful elites take over the objectives of the adaptation project to the detriment of the poor and underprivileged. However the reverse is also possible, where those considered as poor and underprivileged can take advantage of the adaptation project to serve their own interests. Though this concept of (mal)adaptation opportunism is not necessarily novel (Terry Cannon & Müller-Mahn, 2010; Pelling, 2011;

[27] Thanks to Dr. Colette Mortreux for coining the concept

[28] Barnett & O'Neill (2010) define maladaptation as "action taken ostensibly to avoid or reduce vulnerability to climate change that impacts adversely on, or increases the vulnerability of other systems, sectors or social groups."

Satterthwaite, Huq, Pelling, Reid, & Lankao, 2007; Sovacool, Linnér, & Goodsite, 2015), I did not find a unifying terminology for this concept in the literature. Sovacool et al. (2015) discuss four concepts under the notion of what they term the "political economy of adaptation" and these concepts relate most closely to the concept of (mal)adaptation opportunism I present in this chapter. However I do not simply employ Sovacool et al. (2015)'s terminology of the political economy of adaptation but introduce a new terminology for three reasons. The first reason is that I find the term the "political economy of adaptation" too broad and too vague at first hearing, even though Sovacool et al. (2015) clarify what they mean by the term by the explanation of its four concepts: enclosure, exclusion, encroachment, and entrenchment. The second reason is that encroachment, which is basically a description for the negative ecological impact of a CCA project, seems out of place to me with the three other concepts which all have a clear human-as-actor in their execution and human-as-acted-upon in their impact. The third reason is that, unlike the political economy of adaptation, adaptation opportunism demonstrates how even maladaptation (which Sovacool et al. 2015 describe as encroachment) can also be mobilized to meet other interests. This extension makes adaptation opportunism, for me, a more comprehensive term in describing the manner in which other interests take over CCA projects and even their maladaptive effects - not simply how this appropriation results in maladaptation. My illustration of adaptation opportunism in the estuary of the Volta River in the Ada East district in this chapter highlights the case of relatively more powerful actors taking advantage of the construction of the AdSDS to serve their own interests and the interesting situation of a

relatively less privileged actor taking advantage of the maladaptation that resulted from the opportunism to serve its own interests as well.

This chapter also further illustrates climate change adaptation as governmentality by bringing in the interests of private sector actors into the discussion, illustrating how sea defense systems can mobilize (unintended) economic and/or social justice desires and aspirations. The stabilization of the shoreline at the Volta River estuary by the AdSDS made the estuary attractive for further tourism development, facilitating the decision to develop the estuary by a real estate company. This development will displace a local community. This situation represents a perverse outcome of the adaptation intervention of the AdSDS. However some members of this local community (a local community-based tourism company to be specific) took advantage of the maladaptation produced by the AdSDS to highlight their plight and advocate for their own economic security. This chapter also serves as a form of advocacy, on my part, for the plights of the potentially disenfranchised individuals at the site of the intervention because I am of the opinion that climate change adaptation (and development) more broadly cannot and should not be apolitical (Adger, Arnell, & Tompkins, 2005; Burton, Diringer, & Smith, 2006; Moore, 2012; Nagoda, 2015; Paavola, 2008; Paavola & Adger, 2006). Rather than apolitical, climate change adaptation should be, pro-poor because climate change tends to have disproportionate impacts on the poor, as the poor generally have greater exposure, increased sensitivity, and lower adaptive capacity to climate change impacts (African Development Bank et al., 2003; Tanner & Mitchell, 2008). Also the stated objectives of sustainability and resilience of climate change adaptation and development cannot be achieved if these objectives are not pro-poor (Jerneck & Olsson, 2008; O'Brien et al.,

2008). Lastly climate change adaptation cannot be equitably transformative if it does not address issues of poverty (Dodman & Mitlin, 2013). This chapter sometimes reads like a memoir due to the advocacy stance I take in this chapter and my desire to be reflexive throughout this research (Preston et al., 2015) particularly concerning my positionality to government officials and my use of this positionality in garnering information (Nielsen & D'haen, 2014).

From this section onwards, I introduce the site and setting of this case of (mal)adaptation opportunism, then move on to provide four similar yet varying accounts of the issue from different community members. I follow these four accounts with four more accounts of the issues from actors outside of the community. Next, I demonstrate how the climate change adaptation project of the AdSDS was mobilized to advance the interests of people who are not poor, and finally conclude with how, even though there was a process of adaptation opportunism that created a maladaptive effect, this maladaptation was also taken opportunity of by some of those who were adversely affected by the maladaptation to advance their own needs.

Background: Site and Setting

Kewunor is a small fishing village of about 1,000 people located at the intersection of the Volta River of Ghana and the Atlantic Ocean. The village is about three miles away from the administrative capital of the Ada East district, Ada Foah, making Kewunor and its surrounding areas a major tourist attraction within the district. I specifically identify this village, as I did Totope, for two reasons. The first, is in response to requests from community members to have their plight highlighted to others. The

second, is that I hoped, in making others aware of this incident of (mal)adaptation opportunism, I could help put an end to the injustice I perceive in this situation.

A major tourist center within Kewunor is the Maranatha Beach Camp (MBC) which has budget camp style accommodation, a bar and restaurant, and tourist and service activities for patrons. The Maranatha Beach Camp also founded a primary and junior high school within the community beginning in 2005 so that the residents of Kewunor and the adjoining community Azizanya would not have to travel approximately three miles to Ada Foah for basic education. However, the activities of the MBC and the very livelihoods of the rest of the community of Kewunor face the possibility of displacement by the proposed development of luxury chalets and beach front property by the Trasacco Estate Development Co. Ltd (TEDC). TEDC is a member of the Trasacco Group, which was established in Ghana in 1974 and consists of 12 member companies with a combined workforce of about 2000 employees. TEDC is the real estate division of the Trasacco Group and has accrued over $500 million in on-going projects.

Progression of Events: Multiple Perspectives on a Single Issue

As with any issue, there is never a single story (Adichie, 2009). The following accounts summarize the views of different members of the community and other stakeholders involved in the possible displacement. The presentation of these accounts is an attempt to paint a mosaic of opinions and highlight how the members of the community whose ability to make a living is most dependent on the land and stand to lose the most economically, are the ones who often emerge as the most vocal opponents to the possibility of forced displacement. This hypothesis is most evident in this case where the majority of community members are engaged in livelihoods that are not dependent on a

Figure 6.1 Map of Kewunor

fixed piece of land (i.e. fishing activities). Knowing who or which groups of persons will be most opposed to possible displacement is important for policymakers and practitioners to understand how to mobilize community action against potentially unjust actions in the name of development or climate change adaptation. In other words activists, by identifying the relevant allies, can also take advantage of an opportunity already seized by other interests, in an effort to address social inequity. Theoretically, such knowledge of relevant allies highlights the heterogeneity of the concept of community (Brint, 2001; Coward, 2002; Klein, Réau, Kalland, & Edwards, 2007) and re-emphasizes the notion that debunks the myth of the pristine, virtuous, and noble community (or members of a community) without their own interests or agendas (Agrawal & Gibson, 1999; Cannon, 2008, 2014; Neumann, 1997, pp. 570–571). With the exception of the representative of MBC who stated that they had no fear of me identifying the organization explicitly, I have tried to conceal the identities of the other informants in order to protect them from

any possible repercussions as a result of this research. Though I conceal the identities of the government officials I spoke to, I still identify which government institutions they belong to, as government officials are less prone to suffering negative consequences as a result of commenting on such a contentious issue. The perspectives I present are my narration of the situation as was provided to me by the individuals I interviewed.

Community Level Perspectives

Key Informant A*:* According to this informant, the Ada East District Assembly (AEDA) claimed the Assembly sold the land Kewunor is currently located on to the Trasacco Group in 1975. Only some of the chiefs on the traditional council of the area were involved in the sale of the land, making this possibility of displacement a source of contention in the traditional council of chiefs. This sale however implied that TEDC had the legal rights to ask the community to move. AEDA, according to this informant, said TEDC had plans to relocate the community and the Member of Parliament (MP) for the Ada East district added that if this relocation should happen-TEDC would construct nice(r) homes for the community. However the community insisted that they would not move. This informant felt that some higher-ups were in favor of the move because people such as the MP and some of the traditional council chiefs were present at the TEDC's sod-cutting event, which had media coverage even though according to this informant some of these same individuals such as the MP and the chiefs claimed they were on the community's side. Construction after the sod-cutting had stopped, as at the time of this interview[29], but this informant gathered that construction would continue the following year.

[29] This interview took place towards the end of 2015

Key Informant B: Sometime in 2014, this informant heard that the people of Kewunor had been served a notice to vacate the current location of their community in two weeks. A local committee to manage chieftaincy issues reported this notice to the paramount (head) chief of the traditional council of chiefs, who is also the chief of Ada Foah (the Ada East district capital). The paramount chief then called a meeting with local representatives of the community on the vacation notice. Three days after this meeting, this informant received word about a sod-cutting for the TEDC construction project which was to occur in three days' time. This informant then went to inform the people of Kewunor about the sod-cutting. The people did not agree with the sod-cutting or the entire project for that matter. All the invited chiefs of the traditional council came for the sod-cutting, including the MP, with the exception of the paramount chief because he was out of the district at the time. The people of Kewunor also organized themselves at the ceremony grounds in demonstration against the sod-cutting (see Figure 6.2).

At the ceremony, the MP explained the project to the community and TEDC's plans to relocate the community. The TEDC representatives present at the sod-cutting agreed that TEDC would build houses for the community *before* they relocated them. The MP then convinced the people to allow the sod-cutting to take place since TEDC had promised to relocate them. The MP told the people of Kewunor to set up a committee so that anything regarding the TEDC project could be conveyed to the people through the committee and vice versa. The owner of MBC, however, refused to accept this agreement and vowed that he would not allow TEDC to take away the site of his operations from him. Later when the chief of Ada Foah arrived, he told the community that the land

Figure 6.2 People of Kewunor in protest at sod-cutting ceremony. Photo credit: Coalition against the sale of Kewunor to Trasacco Estate Development Co

belonged to the chief and the community, and that as far as he was concerned the traditional council had not been properly notified of this project. Therefore the chief of Ada Foah encouraged the people of Kewunor to oppose the project. The people did try to fight the project – with some of the community residents fighting some of the project staff who came to the community after the sod-cutting. Four community members were jailed for one and a half years due to such actions. The paramount chief later came to say that TEDC had now come to see the traditional council appropriately and as such the people of Kewunor should agree to the project. In response to the chief's statement, the people of Kewunor said they were willing to relocate as long as TEDC constructed new houses for them *before* they left the current site of their community. As at the time of interview, TEDC had set up some structures right at the estuary of the Volta River beyond the community (see Figures 6.3 and 6.4). However this construction had stopped

since, according to this informant, TEDC was testing the metal frames of the roof of the structures for sensitivity to sea breeze. This informant could not tell whether the area of land TEDC had begun construction on would be sufficient for TEDC's purposes or whether the company would still need to relocate the whole community. The following is a summary of this informant's conclusion of the matter:

> "If the chiefs will hear the community's cry – this must be boycotted! But others have bought into the idea [of TEDC's construction]. The resolution of this matter should be in our favor. We want to remain here because of our fishing activities."

Maranatha Beach Camp representative: Maranatha Beach Camp (MBC) is a key player in this whole saga as highlighted by media coverage on the issue (Carmack, 2014; News Ghana, 2014; Peace FM, 2014) and comments from government officials at the national and district level. According to a representative of the beach camp, sometime in the latter part of 2013, their organization received letters from the Ministry of Tourism, Culture, and Creative Arts (MOTCCA) and TEDC that the area they were currently operating from, and the whole of Kewunor for that matter, had been the property of MOTCCA for a long time and MOTCCA had now decided to sell the land to TEDC to develop beachfront property which would include 600 luxury suites, a boat marina, and a helipad. After that notice, staff from TEDC came to conduct some feasibility studies after which the Minister of Tourism, Culture, and Creative Arts came to launch the project (sod-cutting). TEDC estimated that construction would take place over the course of two years. MBC and some representatives of the community had talks with TEDC along with the MP who told TEDC that the people should not be forcibly ejected but resettled in a humane manner. According to the MBC representative, the MP was later kept on the

blind side of negotiations between TEDC and the community because TEDC started dealing directly with the community. TEDC then brought in the police and military in 2014 to forcibly eject the people from the land claiming that the community residents were squatters on TEDC's land. The people however resisted this forced removal citing TEDC's promises to provide a new site and housing for them before they moved. TEDC backed down on this removal but constructed warehouses and some structures at the estuary beyond the community (see Figure 6.1). The people of Kewunor claimed they have inhabited the land for over 50 years. TEDC did at one point want to relocate the people but no feasible[30] place nearby could be found so forcibly displacing the people seemed like the next best option to TEDC. MBC is of the opinion that the TEDC development and the community of Kewunor can peacefully co-exist without having to displace the entire community. MBC asserts that they are an affordable beach camp not just for foreigners but for Ghanaians as well and to displace them and the community of Kewunor would be a great disservice to Ghana and the world. MBC sought legal assistance in trying to meet with TEDC, as well as attempting to dialogue directly with TEDC but neither attempt yielded any results. As at the time of the interview, MBC simply wanted their story to be aired as far and wide as possible in hopes that the growing attention to the issue would stop TEDC from its development. The following is this informant's conclusion of the account:

> "You know, you know, umm…we have friends outside…our story has been aired on BBC. It aired for close to two weeks. Yeah, in series…but we believe that the more the story gets out there, the more the right thing gets done. No one is saying

[30] (a place big enough to contain the community and where the people could also continue their fishing-based livelihoods)

we don't want development. But we wanted development so that our own ecosystem could also be preserved. That is all."

Other women and men: Upon engaging six residents of the community (two together, the rest separately) on their biggest challenge to making a living during visits to the community in 2015, only two of the community residents (the two interviewed together) mentioned the threat of displacement by TEDC as their greatest concern. The other four community residents did not even mention the displacement by TEDC at all, citing other concerns such as the expensive nature of inputs for fishing and the associated lack of money to buy these inputs, and the seasonality of the fishing industry which made it hard for them to earn income all year round. The two individuals who raised concerns about TEDC were both women. Interestingly, on an initial pilot visit to the community in 2014, the first and only people to raise the TEDC displacement issue were again also a group of women. It would be irresponsible of me to argue that female residents emerge more concerned about the displacement than men based on this dearth of a sample size. However there might be some connection as to whether the greatest concern about the TEDC displacement from a lay community resident perspective may have a gendered dimension. Such a connection obviously warrants further investigation to be more conclusive-further investigation which I cannot unfortunately conduct with the current information I have. The observation that few Kewunor residents actually cite the possible displacement by TEDC as a major challenge also reinforces the point that the framing of problems that outsiders tend to project on communities are not necessarily the foremost thing on community members' mind (Nyantakyi-Frimpong & Bezner-Kerr, 2015). With this in mind, I accept that I may be kicking up a storm that is not a major problem for

residents at an individual level. However, the various perspectives I have reviewed, the fact that it was in the group of two individuals that the TEDC displacement was mentioned, and the accounts of community protests indicate that this possible displacement is a concern at a community level.

Non-Community Level Perspectives

Ada East District Assembly: A representative of AEDA provided me with the following account of the situation. Before 1980, the area of land that the community of Kewunor currently occupies, as well as the estuary of the Volta River (much of which has eroded into the sea) was designated a protected area. As such no development or habitation occurred in that area. Shortly after 1980, AEDA allowed habitation in the protected area and the earliest ancestors of the people of Kewunor settled there. AEDA instructed the inhabitants not to build any permanent (with cement and iron rods) structures on the land as the permission to live on the land did not imply permanent residence. (The residents of Kewunor have largely adhered to this directive with the exception of the school structures built by MBC). Recently (confirming the time periods given by other accounts I have discussed), TEDC and the Ghana Tourism Authority (under the auspices of MOTCCA[31]) entered into a Public Private Partnership to develop a 250 facility beach resort consisting mainly of chalets at the estuary of the Volta River. TEDC in principle (with no formal agreement or memorandum of understanding as far as this representative could tell) agreed to relocate the residents of Kewunor before TEDC began construction. TEDC came to the District Assembly for a building permit and the

[31] The Ghana Tourism Authority is a public service agency under MOTCCA responsible for regulating, marketing, promoting, licensing , classifying, researching and developing tourism in Ghana

District Assembly inquired of TEDC their plans for relocation. TEDC reiterated to the District Assembly TEDC's commitment to relocating residents *before* construction. After receiving the permit however, TEDC began construction at the first groin of the AdSDS at the edge of the community (see Figure 6.1). The residents of Kewunor then notified AEDA of TEDC's actions. AEDA then questioned TEDC as to why the company had gone ahead with construction before relocating the residents. TEDC responded that the company was time-constrained to meet the budgetary allocations for the project and so as a result TEDC would do the relocation hand-in-hand with the construction. The community members were not satisfied with TEDC's stance and so, at the sod-cutting to officially launch the project, the community members protested (see Figure 6.2) to the extent that the representatives of TEDC and the invited dignitaries had concerns for their safety. The TEDC construction was halted as a result of the community's action.

When I questioned the AEDA representative as to why AEDA gave TEDC the building permit before any physical sign of relocating the community of Kewunor, the representative relayed to me how constrained the Assembly was in this whole issue. The Public Private Partnership is a national project (just like the AdSDS) and at that level, national interests, concerns, and desires trump district level realities - let alone desires. It is almost as if TEDC coming to seek a permit from the Assembly was not really a matter of permission at all but of following a prescribed process. TEDC officially needs a building permit to stay within the bounds of the law but it is not as if AEDA could actually refuse TEDC the permit, especially if the national government had instructed AEDA to issue TEDC a permit (a phenomenon of autonomy subsuming which is quite common in Ghanaian state governance). As a result of the constraints on District

Assembly autonomy, the AEDA representative implied that the Assembly could not do or say anything in response to TEDC's claims of wanting to do relocation hand-in-hand with construction. In the representative's own words: "the Assembly is constrained in this matter because it is a national project."

Ministry of Tourism, Culture, and Creative Arts (MOTCCA): MOTCCA was identified by the AEDA and MBC representative as responsible for forging a partnership with TEDC. Therefore on the day I sought out officials of the Ministry of Environment, Science, Technology, and Innovation (MESTI) in Accra, I made it a point to speak to some officials of the MOTCCA concerning the TEDC issue in the Ada East district. Conveniently, MOTCCA was right next door to MESTI (the two ministries are separated by a staircase that runs the height of the building through the middle) so I simply crossed over to MOTCCA after my work at MESTI was done. However unlike MESTI, in which a researcher on the DECCMA project (to which I am affiliated) provided me a connection to the Director of Environment of MESTI, I did not have any contacts or leads within MOTCCA. As such I had to be very careful about what I said to whom I was able to speak to - particularly regarding why I was at MOTCCA. In this situation, my affiliation with the DECCMA project, and my positionality to the government officials as a "PhD student who needed help" was very useful. I was able to speak to a representative of MOTCCA about "tourism development in the Ada East district" (the phrasing of the purpose of my visit) and my telling this representative that I was affiliated with the University of Ghana made this representative more open to speak to me. I spoke with this representative about a project called COAST - Collaborative Actions for Sustainable Tourism (GEF IW: LEARN, 2012), which had actually been mentioned by a

representative of MESTI in my interviews with MESTI officials and which AEDA mentioned in its 2016 budget (Ada East District Assembly, 2015, pp. 15–16). However the COAST project, as I soon realized, had nothing to do with TEDC and its actions in Kewunor. As such I had to stop beating around the bush and be direct with the MOTCCA representative. Thankfully, we had discussed the COAST project long enough for us to establish some level of rapport so the MOTCCA representative did not seem blindsided or ambushed by my question as far as I could tell. The representative relayed to me that they had no knowledge of the issue and that the Ghana Tourism Authority (GTA) would be the better agency to inquire about the issue from – as GTA was in charge of the programmatic initiatives of MOTCCA. Over at the MOTCCA headquarters, they mainly handled policy issues.

Ghana Tourism Authority: Hence I set off to track down the genesis of TEDC's engagement in Kewunor at GTA. Upon arriving at GTA, I spoke to a representative of the Authority. This time I was more direct with my mission, probably because I felt like I had a better lead into the discussion (i.e. "MOTCCA asked me to come speak with you"). On hindsight, such a lead in was probably not the best way to begin because the representative became immediately defensive and avowed that GTA had nothing to do with the TEDC issue – at least from the representative's response to my question, I was certain that the GTA knew nothing about the issue. The representative then went on to explain how GTA had helped the founder of MBC set up their establishment, and contributed to the founder's professional development by sponsoring the founder to attend international trainings and workshops on tourism. The GTA representative told me how at the start of TEDC's actions in Kewunor, the founder of MBC had come to GTA

complaining about the unjust treatment and that this representative had personally advised the founder of MBC to fight the issue.

When I asked this GTA representative whom they thought was responsible for partnering with TEDC (if GTA was not), the representative said that AEDA was probably in cahoots with TEDC. The representative upon a slight pause added that someone higher up at the national level could be responsible as well but we would never know. The representative went on to bemoan how the national government was more or less selling the country's assets to foreign investors and companies. The representative also stated that organizations like MBC helped provide employment for the local youth as many of these youth served as tour guides, camp workers, and volunteer leaders for MBC. I have no idea what might have gone on before but it appears the GTA representative may have had some disagreement with the District Assembly, outside of this Kewunor issue, and this disagreement was probably the reason why the GTA representative was quick to initially suggest that the District Assembly was responsible for TEDC's construction in Kewunor. I found the GTA representative's suggestion that the District Assembly was responsible for the TEDC issue almost aggressive and somewhat too readily prepared as a response to my question.

I am inclined also to disagree with the GTA representative's second assertion that someone higher up the national food chain is responsible for TEDC's ability to take action in Kewunor. Out of the three news articles I reviewed on the Kewunor issue (Carmack, 2014; News Ghana, 2014; Peace FM, 2014), all allude to GTA as being in support of TEDC's project. Therefore if three news articles on this issue are implicating GTA with TEDC, then it is likely that the GTA representative's denial of the Authority's

involvement in the issue is not the full story. This might also explain why the GTA representative was so defensive at my first suggestion of the Authority's involvement and why the representative later backed down from their defensiveness a bit and suggested that someone higher up within the national government was responsible. It is possible that the GTA representative was trying to deflect me from the Authority's involvement with and support of TEDC.

TEDC representative: After going to GTA, I felt like I was being given the run-around by representatives of the government – from AEDA to MOTCCA to GTA. However there was one key player in this whole saga I had not spoken to – and that was TEDC itself. So I made the trip to TEDC's headquarters on the outskirts of Accra to see what information I could glean from the company. I did not have a lot of hope of even being able to speak to anyone about the Kewunor issue, as various media reports I reviewed suggested TEDC was not responsive to requests for information (Carmack, 2014; News Ghana, 2014; Peace FM, 2014). This also aligns with accounts of the MBC representative regarding TEDC's non-response to MBC's requests for dialogue. In light of this knowledge, I was actually surprised when a representative from TEDC willingly took me into their office even though they had a sense of what I was at the company to inquire about. I told the representative I was affiliated with the DECCMA project and even offered the representative a project brochure in an attempt to give DECCMA and my affiliation with the project more legitimacy. I then asked the representative pointedly about their proposed investments in Kewunor, making it clear that I was not coming from a stance of accusation but that I wanted to hear from TEDC themselves because I had heard too many accounts in which they were painted in a negative light. The TEDC

representative then asked me what the DECCMA project had to do with the allegations against TEDC. I explained to the TEDC representative that I considered an alleged issue as theirs a different or unexpected impact within the context of a climate-stressed environment such as Kewunor, and so such an issue warranted further investigation within the context of the DECCMA project. The TEDC representative then told me that the only person who could adequately answer my concerns regarding these allegations was the Managing Director, who at the time was outside the country. Two of the media reports identify Mr. Ian Morris as the Managing Director of TEDC who signed a letter dated October 21st 2013 that was served to the people of Kewunor stating the following:

> "The site you are currently occupying was acquired by the Government of Ghana in 1974 under Executive Instrument dated 26th April 1974 for Tourism purposes. TEDC has acquired this site from the Government of Ghana through the Ghana Tourist Board and regularized its ownership with Dangmebiawe Clan[32]. TEDC is now to take occupancy of the site and commence the construction of a high class tourist resort and boat marina (News Ghana, 2014; Peace FM, 2014)…with this in mind, we are requesting that you remove your structures from the project site within 30 days and discuss with the Dangmebiawe Clan a suitable area for your relocation (News Ghana, 2014)"

Pushed as I did to get the TEDC representative to offer any information at all on the issue, the representative would not even categorically admit that TEDC had any investments in Kewunor, let alone offer any information on the issue. I did however feel like the representative treated me better than I expected because he offered me a cell

[32] One of the clans of the Dangme people located in the Ada East district

phone number that I could call to follow up. He also assured me that he would relay my request to the Managing Director and that, if in two weeks' time no one had contacted me with regard to my information request, I could follow up with him at the number he had provided.

Many of the prior accounts cited TEDC as having begun construction in Kewunor. The structures with metallic frames for the roofs are currently situated very close to the first groin of the AdSDS (see Figure 6.3 for image of structure and refer to Figure 6.1 for relative location of structure to first groin of AdSDS). Trasacco is printed on the metal frames used in the structures (see Figure 6.4) so at least from the frames alone TEDC definitely does have investments in Kewunor.

As of March 2016, construction on the TEDC development had halted and the community of Kewunor remains in place, but I am uncertain as to whether this state is temporary or permanent.

Making Sense of the Fragments: Taking Advantage of Climate Change Adaptation for Non-Pro Poor Ends

The foregoing case demonstrates how various interests coalesce in oppositional and contradictory ways. As such the conflicting accounts and blame shifting are welcome, even though messy to work through. In as much as I would have loved to pinpoint who allowed TEDC into the Ada East district and Kewunor in particular, it is clear that TEDC is in Kewunor and that their ability to be in Kewunor was enabled by the construction of the AdSDS. In my opinion, it was the commencement of the construction of the first groin of AdSDS that signaled to TEDC that the Volta River estuary was now

safe for development. Prior to the construction of the AdSDS, it was common knowledge that the estuary had a particularly high rate of erosion. The sea was washing away much of the land and so any infrastructural investments made in such a precarious and increasingly marginal environment would not be profitable.

Even the District Assembly, in its budget statement, mentioned how coastal erosion was affecting the tourism potential of the district by washing away prime coastal infrastructure such as historical forts and preventing the construction of new residential or commercial developments (Ada East District Assembly, 2015).Furthermore, AEDA made the following statement in its 2016 budget statement regarding TEDC:

> "As part of efforts to promote tourism through the full maximization of existing tourism potentials, the District has played facilitating role with an estate developer- Trassacco Estate Development Company to build over 250 chalet facilities at Kewunor- Azizanya around the Volta River Estuary. The project, which aims at generating employment as well as raising the living standards of the people, is making crucial efforts to tap into the trickle down prospects of the current oil finds. As a result, it has been specifically designed to suite foreign investors who will work in the industry as well as high class dignitaries. The complex issue to deal with now, relates to measures to ensure proper

Figure 6.3 Trasacco Structures at the Volta River Estuary

Figure 6.4 Metal frame with Trasacco Past Roof printed on the frame

> environmental sustainability of the eco-system including issues of resettlement and adequate compensation." (Ada East District Assembly, 2015, p. 15)

AEDA's goals are thus aligned with TEDC's objectives because TEDC is fulfilling AEDA's stated goal of tourism development in the district.

MOTCCA[33] also stands to gain from TEDC's investment. MOTCCA's link to TEDC is the weakest. However one objective of MOTCCA is to create an enabling environment for tourism in Ghana and TEDC's construction in Kewunor is clearly tourism related. The only thing TEDC may have been concerned about was the exposure of the estuary to coastal erosion, but as I have demonstrated, the AdSDS has addressed that concern.

Conclusion

Attempting to Bring All Aspects Full Circle: Prosperity through Tourism

I began this chapter by stating that I was in favor of pro-poor adaptation. I have outlined some of the ethical reasons for pro-poor adaptation – the need for equitable distribution of adaptation support (African Development Bank et al., 2003; Tanner & Mitchell, 2008); and a desire for holistically sustainable, resilient, and transformative adaptation (Dodman & Mitlin, 2013; Jerneck & Olsson, 2008; O'Brien et al., 2008). One practical reason for international development donors and governments to consider pro-poor adaptation is that adaptation that pays no attention to poverty ultimately retards economic growth for all (African Development Bank et al., 2003). A second reason I

[33] From this point on any reference to MOTCCA simultaneously refers to GTA

would like to suggest is that in this current age of populism and denial of realities such as the existence and impacts of climate change, international donors in particular and governments may need to frame climate change adaptation (and even mitigation) more as a way to reduce poverty than as a moral or ethical obligation. From the accounts I have presented, it appears that the issue of climate change as manifest in sea level rise, and a response to it through the construction of the AdSDS, brought to the fore the economic interests of various actors and created an opportunity for many stakeholders to meet their different needs, whether related to adaptation or not. In other words, this problem and its solution created adaptation opportunism. Though MBC was resident on the site long before the construction of the AdSDS, it is unlikely MBC could have continued to remain at the site for the long term given the rate of erosion at the estuary (Bollen et al., 2010; IMDC, 2011). The threat of relocation resulting from the AdSDS – though a maladaptation in this case - presented opportunities for MBC to mobilize social justice interests in ensuring that ultimately their economic interests were preserved[34].

The construction of the AdSDS also clearly mobilized the economic interests of TEDC through the discourse of economic prosperity through tourism from AEDA and MOTCCA. The only group of actors who appear not to have been bitten by this bug of economic prosperity through tourism are the other community residents of Kewunor. These residents mobilized mainly around the concepts of justice and disenfranchisement, but generally their interests were subsumed under the larger economic interests of the

[34] It is hard for me to disentangle economic motivations from the social justice actions of MBC such as the provision of education to children in Kewunor. For example, I do not know what motivations MBC had to build a permanent structure such as a school in Kewunor, given the fact that in a number of years Kewunor itself might not have existed had it not been for the AdSDS. However, as part of a large campaign to address its own economic motivations, this school did serve as an anchor for the mobilization of social justice issues.

institutional actors described above. Therefore, in the case of adaptation opportunism around this sea defense system, economic interests though appear to be more powerful at influencing action or response than purely a matter of principle based on social justice (Kluge, 2003; Miller, 1999; Paine, 2000). This case study illustrates that governments, policymakers, and evaluators of projects need to be aware of adaptation opportunism which, in the case of the AdSDS, can ultimately result in a maladaptation where an "action taken ostensibly to avoid or reduce vulnerability to climate change impacts adversely on…other systems, sectors, or social groups" (Barnett & O'Neill, 2010, p. 211). The relationship here between adaptation opportunism and maladaptation is that TEDC, the AEDA, and the MOTCCA took advantage of the AdSDS (the adaptation intervention) to invest in the Kewunor area and this investment ultimately resulted in a maladaptation for the MBC and the people of Kewunor by placing the latter group at risk of displacement from their homes. In response, the MBC took advantage of the maladaptation to advocate for the security of MBC's economic interests. It appears that, in this case, both the adaptation intervention and its maladaptive effect were mobilized by different parties to further economic interests. The extent of mobilization however in this case was unequal demonstrating that though multiple actors can mobilize a(n) (mal)adaptation, not every actor equally benefits from such mobilizations.

CHAPTER SEVEN

DISCUSSION AND CONCLUSION

Introduction

This chapter ties all the preceding discussions together to answer the research questions I posed in Chapter One. In this chapter I begin with broad headings that reflect each of the three major research questions guiding this study. After discussing the questions in turn, I outline some future research directions this study suggests and conclude with a statement on how governmentality helps trace the messy, non-linear process that is climate change (mal)adaptation and helps explain why certain maladaptive adaptations such as sea defense systems are consistently chosen by the GoG and to a lesser extent appreciated by the people for which the GoG builds these defenses.

Perceptions, (Un)Alignment, and the Production of Adaptation Subjects

Perceptions of Residents

Regardless of residents' perceptions on the AdSDS, coastal erosion and/or flooding did not emerge at the top of resident's articulation of major challenges in (making a) living along the coast of the Ada East district. Some of the most mentioned challenges were associated with stressors such as capital and inputs, revenue, water access, and sanitation (see Figure 5.5). Coastal erosion comes in fifth and flooding tenth out of 23 listed challenges, so these processes still demonstrate importance in discourses.

The fact challenges related more directly to livelihood activities often came up first is revealing of resident perceptions of the relative importance of environment or a changing climate as a challenge in making a living or living in a place. For example in Totope, no one expressed challenges clearly linked to a changing climate as their most important challenge. This is not to say that no one expressed any challenges related to a changing climate or physical environment but for no one was this kind of challenge the major issue they were grappling with in making a living. This absence of an environment-first framing of challenges is especially striking in an environment that many would consider especially vulnerable to climate impacts. In the dry season, the Songor Lagoon dries and in the rainy season it floods. Also, high tides and ocean upwelling continue to erode the land seaward of the community. The reason for this absence of an environment-first discourse is because in Totope, people have lived in the same place for years and the environment-related impacts of coastal erosion and flooding have become a backdrop against which the rest of their live(lihood)s are playing out and not the main act[35]. This livelihood-first discourse confirms research that demonstrates that the climate is often not the most important stressor in the lives of people who live in environments which the rest of the world considers climate-stressed (O'Brien & Leichenko, 2000; Carr, 2014; Nielsen & Reenberg, 2010; Nyantakyi-Frimpong & Bezner-Kerr, 2015).

This weak alignment with the GoG rationality framing climate change as an economic threat however makes the project of rule of SDS as CCA become even more

[35] This backdrop phenomenon was present in an initial assessment of the Mali Agrometeorological Advisory program where farmers did not view irregular rainfall as a challenge because irregular rainfall was so much a part of their day-to-day lives that it did not stand out as a challenge (E. R. Carr, 2014a)

apparent when some residents begin to express appreciation of (with the AdSDS) and desire for (without the AdSDS) the AdSDS. In fact no resident categorically rejects the AdSDS and wishes for something else. Even those with the AdSDS who critique aspects of it (such as its design, functionality, or experience of construction) are doing so because they in effect appreciate it and wish it were working better than it was or that its construction had not come at such an inconvenience to them. Though every coastal resident is in effect a subject of the project of rule of CCA via SDS, this project does not produce its subjects evenly. The reasons for these perceptions are a combination of notions of a sense of the communal need as greater than that of the individual, individual roles, responsibilities, and life situations, and the two cases of the failure of the GoG to protect live(lihood)s and property occurring at either end of the AdSDS. The first case is at the estuary where the community of Kewunor faces the threat of being displaced as a result of having the AdSDS. The other case is between the Songor lagoon and the Atlantic Ocean where the community of Totope also faces displacement, but from the ravages of both the sea and the lagoon as a result of not being protected by the AdSDS. The objective of securing live(lihood)s and property is clearly not being fulfilled for individuals in these two communities by the GoG via the AdSDS. As such, it is unsurprising that the views of residents living in the Ada East district on the AdSDS are aligned with the project of rule that is SDS as CCA in various ways.

What the framings of major challenges, coupled with the perceptions of the AdSDS, by residents of the Ada East district illustrates is that even though residents of the communities along the coast might be appreciative of adaptations that directly relate to their ability to make a living, because of the Dangme sense of community, these

residents might choose adaptations that offer a more communal benefit, such as sea defense systems. This sense of communal needs is evident in preferences such as for potable water or a toilet facility, both of which are communal facilities. For example, in Totope, many residents – particularly women – were most concerned about the availability of water, which is a daily problem not only for them particularly, but for the population as a whole; a problem confirmed from other news sources (Gakpo, 2016b; Quarmyne, 2013). This is not to say that current coastal residents in the Ada East district would not appreciate more individual (than SDS) adaptations such as early warning systems, climate information services, climate risk insurance, and/or loans) but given a choice they are more likely to choose a more communal adaptation..

Perceptions of Government Officials

With the exception of the project impact assessment officer, none of the other three government officials interviewed expressed a clear perception on the SDS as CCA. However in the discourses of the officials concerning their occupational concerns all, but the natural resources management officer (NRMO), expressed alignment with one or more of the GoG rationalities on the project of rule that is SDS as CCA. What the alignment with the GoG rationalities indicates is that if the GoG continues to focus on coastal erosion as a threat worth addressing via SDS[36] it will most likely go ahead with the implementation of sea defense systems, aligning the interests of different government officials in different ways such that the project can move forward.

[36] As at the time of writing, the government had transitioned from the NDC (the political party under which the GoG implemented all three sea defense systems) to the NPP, so there is no guarantee the government discourse will persist unchanged

This is clearest in the issue of evaluation of the impact of a sea defense system (which was a recurring theme among residents). The evaluation by district level officials is often timescale dependent, while for the national level project impact assessment officer project completion seemed to be the determinant of success, with little or no regard for impacts post-completion. Both an attention to project completion and subsequently timescales are aligned with the GoG discourse of protecting live(lihood)s and property through sea defense systems. However project completion and timescales align different government actors in different ways and to different extents. An initial attention to project completion allows for actors to declare the project of rule which is CCA via sea defense systems a success in the short-term. An attention to timescales, however either allows for this success to be reinforced or negated depending on what impacts of the sea defense system occur in the long-term.

Perceptions of Academics

Both of the academics I interviewed are not in support of sea defense systems as solutions to coastal erosion, which demonstrates their lack of alignment with the GoG objective of securing live(lihood)s and property via SDS. Both these actors reflected ecological sensitivity in their assessments of sea defense systems and this is why they are not aligned with the GoG objective. For these individuals, there is no point in protecting people and their property when the place in which these people live will be negatively impacted by the proposed protection. The academics rather construct the CCA needs in the VRD to require working with nature. These academics call for sustainable and long term approaches based on science (early warning systems) and engineering (beach nourishment) that work with, not against, nature. For these actors, working with nature

involves engineering, which is less intrusive to the local hydrology than sea defense systems, such as beach nourishment; or science-society based approaches such as early warning systems.

One of these individuals also discusses the issue of timescales regarding the evaluation of the success or otherwise of sea defense systems much like some of the district level government officials. The attention to timescales in the evaluation of sea defense systems constructs the area under question (in this case the VRD) as a continually vulnerable and simultaneously adapting place. This is because sea defense systems upon their initial construction serve as a form of adaptation for those who are protected by such structures but over time intensify the climate-related vulnerabilities of coastal erosion for communities without a sea defense system. Sea defense systems demonstrate a feedback loop between vulnerability and adaptation and how changes in one affect the other. Lastly, the attention to timescales in the evaluation of sea defense systems allows for conversations concerning climate change vulnerability and the success or otherwise of interventions to deal with such vulnerability, to be continued long after the completion of a sea defense project.

While attentive to timescale and context, however, the academics were not focused on issues of emotion and affect in the identification of vulnerability and the selection of adaptation options. One of these actors explicitly discounted the role of emotion and affect in determining a sustainable solution to coastal erosion and flooding attributable to climate change, while the other did not make any comments on affect or emotion. Such discounting does not create space for the voices and concerns of community residents – who of all parties involved in sea defense systems are the most

likely to employ affect and emotion through mediums such as place attachment or cultural heritage and/or valuation (Adger, Barnett, Chapin III, & Ellemor, 2011; Donner & Webber, 2014; Graham et al., 2013; Haywood, 2014; Haywood, 2016; Walker-Springett, Butler, & Adger, 2017). Affect and emotion can serve community residents well in providing a means to articulate and advocate for adaptations to climate change that might best suit them. Also, it may be affect and emotion that serves to align many community residents to the project of rule that is SDS as CAA. The ignoring or non-focus of these two academics on affect and emotion may likely contribute to the reason why these actors are not as aligned as community residents.

Perceptions of Consultants and Contractors

Though the views of these actors (consultants and/or contractors) are not particularly integral to determining what adaptations should be implemented in response to a constructed notion of vulnerability, their perceptions will still influence the nature of the adaptation when these consultants and contractors are brought in to build a sea defense system.

The consultants (IMDC and Ecorem) and contractors (Dredging International) on the AdSDS did not agree with the GoG framing of the challenge of coastal erosion which ignored the contribution of the Akosombo dam to sediment starvation in the VRD. The consultants and contractor acknowledge both the dam's role in contributing to erosion in the VRD and the role of sea-level rise in contributing to erosion. Acknowledging the role of the Akosombo dam in past and present rates of coastal erosion in the VRD creates space for others to at least question the provision of sea defense systems as the ultimate solution to coastal erosion (as I have done in this dissertation). This acknowledgement of

the Akosombo dam's role, coupled with the recognition of the role of sea-level rise in contributing to future rates of erosion, allows for various actors involved in the implementation of sea defense systems to address the causes of coastal erosion at their sources, and better design responses to this challenge.

Implications for Climate Change Vulnerability Assessments and Adaptation Planning

Take Context (such as Culture) into Account

Without a consideration of the contextual factors within a place that might influence the assessment of vulnerability, as well as the framing of and capability to act upon adaptation efforts, some segments of a population might not benefit from adaptation as they should (Carr et al., 2015; Carr, 2014; Carr, Fleming, & Kalala, 2016; Carr, Onzere, et al., 2015; Carr & Onzere, 2017; Carr & Owusu-Daaku, 2016; Onzere, Kalala, Owusu-Daaku, & Carr, 2015). For example, the Dangme sentiment that sees communal need as greater than that of individual need (Kuwornu-Adjaottor, 2015; Sawyerr, 2012) influenced the perceptions of some community residents of the AdSDS and suggests that community-wide adaptation efforts may be preferred to individualized solutions.

Sea Defense Systems Can Create Space for (Mal)Adaptation Opportunism

It is clear that sea defense systems have aligned the interests of many residents of the district, and represent visible structures that can garner votes in future elections (D'Alisa & Kallis, 2016). However the literature suggests that these structures, currently designed with groin technology, also can be highly maladaptive (Angnuureng et al., 2013; Appeaning Addo, Jayson-Quashigah, & Kufogbe, 2011; Boateng, 2009; Mensah & Fitzgibbon, 2013) because they cause further erosion downdrift where there are no

defenses. This dissertation, through the case of (mal)adaptation opportunism in Kewunor in the Ada East district, offers another framing of how this infrastructure can produce maladaptive outcomes. The case of (mal)adaptation opportunism I presented in this research is not necessarily new or unheard of (Sovacool et al., 2015), particularly in the arena of land grabbing and climate change (Harvey & Pilgrim, 2011; Smucker et al., 2015; Sovacool et al., 2015). However it is clear that potentially maladaptive projects such as sea defense systems (for other communities who do not have them and on the physical environment) create opportunities for other interests to mobilize adaptation projects toward other goals. When such (mal)adaptation opportunism occurs, it erodes the potential for climate change adaptation to be just, pro-poor, equitable, or truly transformative. If such equitable and just outcomes are the goal of governments, civil society, and local communities (Owusu-Daaku & Diko, 2017), then relevant stakeholders need to heed advice on how to prevent maladaptive outcomes (Atteridge & Remling, 2013; Barnett & O'Neill, 2010; Barnett, O'Neill, Waller, & Rogers, 2013; D'Alisa & Kallis, 2016; Jones, Carabine, & Schipper, 2015; Juhola, Glaas, Linnér, & Neset, 2016; Magnan, 2014; Magnan et al., 2016; Scheraga & Grambsch, 1998). (Mal)adaptation opportunism indicates a new way in which maladaptation becomes possible within a project of rule – by highlighting not just an incident of maladaptation (the threat of displacement to community residents by a real estate company as a result of the construction of the AdSDS) but how even that maladaptation was taken advantage of by other actors to advocate for their interests (a local nonprofit/business calling attention to their potential displacement in hopes of stopping the displacement).

Do Not Discount the Role of Affect and Emotion in Influencing Decision-Making

One way of addressing the potential for (mal)adaptation opportunism before it occurs, is by not discounting the role of affect and emotion in influencing decision-making. As I have mentioned more than once, affect and emotion are powerful factors in influencing decisions on matters related to the environment. These factors must be highlighted and, more often than not, prioritized in order prevent (mal)adaptation opportunism as the articulation of motivations and sentiments might help reduce the probability of someone knowingly or unknowingly taking advantage of the benefit of (mal)adaptation afforded them to the detriment of another actor. . While governmentality can help explain how seemingly disparate actors can be aligned to sometimes mutual goals, it provides no prescription on what should be done in light of such an understanding or analysis. Adaptation decisions are judgment calls that all stakeholders need to make and be explicit about in order to come to some common solutions which may not be ideal for all but would not be extremely inequitable for some (Adger, 2016; de Boer, Wardekker, & van der Sluijs, 2010; Sovacool et al., 2015).

The National Government Needs to Take Into Account District Government Realities to Produce Community Acceptance of Implemented CCA Interventions

Despite the stated decentralization of Ghana's governance structure (Baruah, 2017; Friedrich-Ebert-Stiftung Ghana & Institute of Local Government Studies, 2010), I have demonstrated through the example of the District Planning Officer's perception of the AdSDS and the case of (mal)adaptation opportunism that this decentralization exists only in theory and not in practice. The problem with this top-down approach to planning and implementation is that district government officials more often than not feel

constrained with regard to their ability to influence the outcome of projects that do not originate or are not funded locally at the district. In fact, DECCMA research on this topic suggests that district level officials have a high interest in adaptation efforts but low influence on the outcome of such efforts; with the reverse being true for national level officials who tend to have a high influence on the outcome of adaptation efforts but relatively low interests in the adaptation efforts themselves (Allan et al., 2015). This constraint is seen in the Ada East district in the (in)abilities to acquire contractor equipment for emergency works or to protect the people of Kewunor from (mal)adaptation opportunism. When district government officials feel continuously constrained in their work as far as national government initiated CCA projects are concerned (Adu-Boateng, 2015; Antwi-Agyei, Dougill, & Stringer, 2015; Shemdoe, Kassenga, & Mbuligwe, 2015; Smucker et al., 2015; Sova, Thornton, Zougmore, Helfgott, & Chaudhury, 2016; Sova, Chaudhury, Nelson, Nutsukpo, & Zougmoré, 2014), it becomes increasingly difficult for district officials to assist in the promotion of project acceptance among community residents or ensure the sustainability of the project (Owusu-Daaku & Diko, 2017).

Though GoG representatives, district officials also experience the realities of district needs and challenges - often on a daily basis. This dual role of representation and experience makes district government a key potential resource for effective project communication and implementation. However, their potential in this role can only be fully realized if the district government receives more autonomy from the national government in a practical sense, where the district government can actually influence the outcome of a national government-level initiated project. Learning platforms on how to

integrate district opinions have been applied within the Ada East district. These platforms take cognizance of local community realities and provide a pathway for incorporating those realities into national level planning (Dovie, 2017). Such platforms can be taken up by either the national government and applied in other districts to test their viability, or be advocated for by districts themselves in hopes that the districts can convince the national government of the usefulness of such learning platforms.

Expand the Scope for Climate Change Adaptation Decision-Making

Various sections of society in Ghana need to advocate for the expansion of the scope of climate change adaptation planning – from predominantly government officials, academics and community residents to include the media (Owusu-Daaku & Diko, 2017) the private sector (Mees et al., 2012) and other civil society groups. This dissertation demonstrates how the national government, with its officials, policies, programs, and projects, is the primary actor driving discourses of vulnerability and adaptation that necessitate sea defense systems. Broadening the range of actors to be mobilized and aligned can change projects of rule and their goals. In Ghana, community residents have little or no say in GoG adaptation planning that impacts their lives (Sova et al., 2016). This lack of community resident/grassroots input into the decision-making process becomes even more pronounced at an international level (Sova et al., 2015). Currently the CCA landscape in Ghana is very much influenced by the projects of international donors (Sova et al., 2016) and large research consortia such as DECCMA. However, the study of sea defense systems as CCA makes it clear that such actors have little to no say in whether the GoG will implement a sea defense system in a particular area. Instead, the actor to take up expanding the current landscape for CCA decision-making, planning, and

implementation is the national government. However, with many other interests competing for the national government's attention it is not likely that such an expanded decision-making landscape will develop without some advocacy and pressure from the other stakeholders.

Areas for Further Research

Like many research enterprises, the result of this project is more questions. In this section, I outline four future directions in which I envision taking this research. The first issue I would like to take up is the analysis of the making of adaptation subjects via the SDS in the Keta municipality in order to enable me complete the comparative analysis of SDS in the Ada East district and Keta municipality which was the initial aim of this dissertation research. In this document, time constraints and the emergence of the case of (mal)adaptation opportunism within the context of a local governance structure led to a focus on the Ada East district. Initial assessments of the information from the Keta municipality, however, indicate that the residents in the municipality might be more aligned with the project of rule that is SDS as CCA, but this assertion will require similar research as I have done for the Ada East district to validate.

The next future research area is an exploration of nature-based coastal defenses, infrastructure, and technology to illuminate the socio-political contexts that make such projects viable and possible, both in the United States and internationally (preferably extending this current work in Ghana). There is an emerging literature on working with nature to protect coasts and shorelines (Beck, 2014; Deltacommissie, 2008; Narayan et al., 2016; Spalding et al., 2013; Temmerman et al., 2013; Temmerman & Kirwan, 2015; Tessler et al., 2015; Van Wesenbeeck et al., 2014; World Bank, 2016) and various

projects/case studies that explore this technology (American Planning Association et al., n.d.; Changing Course, n.d.; The Nature Conservancy, n.d.). I would particularly like to undertake this research in collaboration with physical scientists and economists to test the physical viability and costs and benefits of such nature-based approaches, and the ways in which physical costs and benefits align with the social costs and benefits of nature-based sea defense systems.

The third area is to research the funders, consultants and contractors of sea defense systems to expand Bijker (2007)'s notion of technological cultures, which seeks to understand the culture of technology associated with different societies, as reflected in the types of infrastructure or technology these societies employ to address various problems. For example, I found that the discourse of the consultants and contractors of the AdSDS was different from that of the GoG and I would like to ethnographically engage these consultants and contractors in an attempt to determine a reason for such differences.

Conclusion

The exploration of vulnerability and adaptation to coastal erosion in the VRD demonstrates that the complex environments of river deltas require multidimensional approaches (such as methodologically linking political ecology to governmentality through frameworks such as LIG) through which to attempt to trace observed processes of (mal)adaptation and give reason for the outcomes, good and bad, that result. This dissertation contributes to this process – in particular the politics of adaptation; and how an analysis of such politics can assist in our understanding of maladaptation. The concept

of (mal)adaptation opportunism is an analytic lens on the projects of rule surrounding SDS as CCA that allows us to see how they can be taken advantage of by actors with economic interests to the detriment of the equity and justice goals of adaptation. Such understandings can enable future adaptation decisions that promote the sustainability and well-being of coastal populations in Ghana and beyond. It is my hope that the findings of this dissertation have contributed in some small way to this larger global goal.

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