

# Climate Adaptation and Local Institutions: An Assessment of The Adaptive Capacities of Key Sectors In Adansi North District

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**Abstract:** The over-domineering of political policies aimed at perpetuating power means issues of social interest such as climate adaptation capabilities are often relegated to the background. Thus, the success of adaptation efforts often hinges ultimately on the nature of institutional robustness and willingness to commit to the provision of adaptive capacity building at the local level. The objectives of this study were to assess the impacts of climate variability and change on the agricultural and health sectors in AND and assess the adaptive capacities of the same sectors. The study approach was mixed methods. Qualitative data was collected through interviews while quantitative data was consulted from weather data, DMTDP, CB, AAPs, crop yield data and OPD cases data. The magnitude of identified climate change impacts was analyzed using the formular,  $Magnitude = \frac{MEco + Menv + MSoc}{15} \times 100$ . The adaptive capacities of the key sectors were assessed using the Adaptive Capacity Wheel framework. The study revealed that rainfall, temperature and wind speed have increased in AND. This has led to a number of negative impacts with floods being the most devastating. Also, while the adaptive capacities of both the agricultural and health sectors need improving, the health sector has the better robustness.

**Keywords:** adaptive capacity, local government, local institutions, climate change, impacts, agriculture, health

## 1. Introduction

Local climate adaptation initiatives have continued to burgeon since the last couple of decades. The reasons are many. First, it is asserted that the top-down approach has not been effective enough, with national and international efforts being snail-paced (Lamb & Minx, 2020). Second, the impacts of climate change are more felt at the local level, hence, it is plausible to initiate their remedies from the grassroots where majority of the world's poor who suffer from the impacts of the climate crisis are found (Measham et al., 2011). Third, local

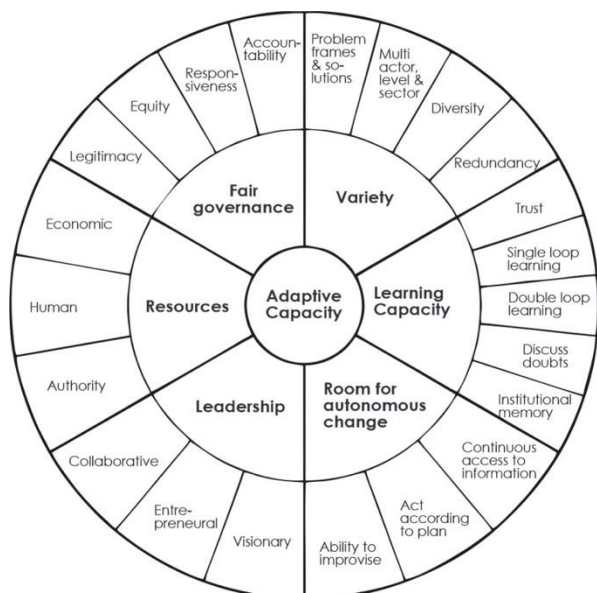
administrations boast of a sound level of flexibility in management due to their relatively small sizes compared to national and international administrations (Puppim de Oliveira, 2009) which enables them to address challenges more swiftly and effectively. Fourth, land use and regulation as well as environmental education are often controlled by local governments. Fifth, transportation and energy use, which affect emissions, may be located within the confines of local administrations, which strategically place them to address these issues more head-on. Sixth, the fact that there are economic opportunities that can be derived from adaptation efforts means local administrations ought to be allowed to coordinate them for the benefit of their locales.

The literature has highlighted that local climate action can only be as effective as local institutions are (Mubaya & Mafongoya, 2017). The effectiveness of these institutions is measured on the basis of the capabilities to surmount the many challenges that beset them, including challenging adaptation efforts. These challenges range from lack of finance to capacity constraints, poor knowledge (ecological, technological, vernacular and administrative), lack of legal and material resources, ineffective policy-making, lack of innovative industries, poor political participation, an inactive civil society and critical public spheres among others (Eisenack et al., 2014). Appreciable efforts seem to have been made by local government institutions as grassroots governance authorities to integrate climate adaptations measures in their management systems, yet these efforts have not achieved their desired goals. Generally, institutions reflect the social patterns that create stability and predictability for societies to collectively address their challenges. With the over domineering of political policies aimed at perpetuating power, issues of social interest with special reference to climate change adaptation capabilities are likely to be relegated to the

background. Thus, the success of adaptation efforts at the local level ultimately hinges on the nature of institutional robustness and willingness to commit to the provision of adaptive capacity building at the local level of governance.

The focus of this paper is therefore to assess the impacts of climate variability and change and the adaptive capacities to the impacts of the changes on key sectors specifically, the agricultural and health sectors in Ghana.

## 2. The Adaptive Capacity Wheel



**Figure 1.** The Adaptive Capacity Wheel

*Adopted from (Gupta et al., 2010)*

The Adaptive Capacity Wheel is a framework for assessing the adaptive capacities of institutions and is based on six (6) dimensions namely; variety, learning capacity, room for autonomous change, leadership, availability of resources and fair governance. These six (6) dimensions are further expanded into twenty-two (22) criteria to assess the adaptive capacity of institutions as they try to enhance resilience.

Table 1 below details the different dimensions and criteria under each.

**Table 1.** Adaptive capacity dimensions and criteria

No.	Dimension	Criterion
1.a)	Variety	Variety of problem frames
b)		Multi-actor, multi-level, multi-sector
c)		Diversity of solutions
d)		Redundancy (duplication)
2.a)	Learning capacity	Trust
b)		Single loop learning
c)		Double loop learning
d)		Discuss doubts
e)		Institutional memory

3.a)	Room for autonomous change	Continuous access to information
b)		Act according to plan
c)		Capacity to improvise
4.a)	Leadership	Visionary
b)		Entrepreneurial
c)		Collaborative
5.a)	Resources	Authority
b)		Human Resources
c)		Financial Resources
6.a)	Fair governance	Legitimacy
b)		Equity
c)		Responsiveness
d)		Accountability

## 3. Methods

The study approach was mixed methods and the design was concurrent nested. Purposive sampling method was used to select the subjects of the study who were the heads of the Agricultural and Health Directorates as well as the District Planning Officer (DPO) of Adansi North District Assembly.

Primary data was collected through in-depth interviews conducted on the three subjects of the study vis; climate variability and change, local institutions and adaptation capacities. These were largely informal rules and values subjectively employed. Secondary data was also retrieved from academic peer-reviewed articles and institutional documents that were reviewed which also gave a picture of the policy narrative over the last few years in the district. These documents included the Adansi North District's DMTDP as well as Composite Budget 2018-2021; AAPs; and Composite Progress Reports. Observations also played a key role in the study.

After identifying the impacts of climate change in the district for each of the two identified sectors, each impact was assessed in three dimensions namely; economic (monetary value of damages to property, livelihood, and infrastructure), social (size, segments and vulnerability of population affected) and environmental (effects on species, habitats, or landscapes). Each of these dimensions was measured on a five-point scale of Very Small (1), Small (2), Moderate (3), Large (4) and Very Large (5). The formula below was used to measure the impact and magnitudes:

Impact = Magnitude x likelihood, while

$$\text{Magnitude} = \frac{ME_{\text{eco}} + M_{\text{env}} + MS_{\text{oc}}}{15} \times 100$$

Magnitudes were also classified based on this scale: 0-20 is Very Small, 21-40 is Small, 41-60 is Moderate, 61-80 is Large and 81-100 is Very Large according to United Arab Emirates Ministry of Climate Change and Environment (2019).

Data on the adaptive capacities of the key sectors were presented using tables.

## 4. Results

### 3.1 Impact of climate change on key sectors

While the impacts of climate change on the agricultural sector are enormous, floods are the most severe. Soil erosion, increased pest and disease incidences and reduced income, which were classified as “moderate” in terms of their gravity also follows suit. Others such as drought, destruction of crops, loss of arable land as well as reduced river flows and desertification were classified as “small” and “very small” respectively which means their impacts are almost negligible.

In the health sector, impact from floods, which are marked as “very large”, is the most severe followed by increase in the prevalence of diseases such as malaria, increased prevalence of respiratory and cardiovascular conditions and destruction of homes and properties which were classified as “large”. Increase in waterborne diseases (e.g. cholera, diarrhea) was also classified as “moderate”. Others such as malnutrition and displacement of people were classified as “small” while incidences in mental health issues and others were classified as “very small”.

### 3.2 Adaptive capacities of key sectors

**Table 2.** Impacts of climate variability and change on the agricultural sector in Adansi North District

Dimension	Criteria	Score
Variety	Variety of problem frames and solutions	-2
	Multi-actor, level and sector approach	1
	Room for diversity	2
	Redundancy	-1
	<b>Total</b>	<b>0</b>
Learning Capacity	Trust	0
	Single loop learning	2
	Double loop learning	-1
	Discuss doubts	-2
	Institutional memory	2
	<b>Total</b>	<b>1</b>
Room for autonomous change	Continuous access to information	1
	Act according to plan	1
	Capacity to improvise	-2
	<b>Total</b>	<b>0</b>
Leadership	Visionary leadership	0
	Entrepreneurial leadership	-2
	Collaborative leadership	-1
	<b>Total</b>	<b>-3</b>
Resources	Authority	1
	Human resources	0
	Economic resources	0
	<b>Total</b>	<b>1</b>
Fair governance	Legitimacy	1
	Equity	0
	Responsiveness	0
	Accountability	-1
	<b>Total</b>	<b>0</b>

<b>Overall</b>		<b>-1</b>
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The agricultural sector, with an overall score of -1 can be interpreted on the Adaptive Capacity Wheel as a “slightly negative effect” which is poor. Performance in most of the six dimensions was average, recording a score of 0. Learning capacity was the best performing dimension and this was attributable to the organization of several seminars and training workshops for staff at the Agricultural directorate, especially by NGOs and other external stakeholders. Leadership was found to be the worst performing dimension with a score -3.

**Table 3.** Impacts of climate variability and change on the health sector in Adansi North District

Dimension	Criteria	Score
Variety	Variety of problem frames and solutions	-2
	Multi-actor, level and sector approach	0
	Room for diversity	0
	Redundancy	1
	<b>Total</b>	<b>-1</b>
Learning Capacity	Trust	0
	Single loop learning	2
	Double loop learning	-1
	Discuss doubts	-2
	Institutional memory	2
	<b>Total</b>	<b>1</b>
Room for autonomous change	Continuous access to information	-2
	Act according to plan	1
	Capacity to improvise	-2
	<b>Total</b>	<b>-3</b>
Leadership	Visionary leadership	2
	Entrepreneurial leadership	0
	Collaborative leadership	-1
	<b>Total</b>	<b>1</b>
Resources	Authority	2
	Human resources	1
	Economic resources	0
	<b>Total</b>	<b>3</b>
Fair governance	Legitimacy	2
	Equity	0
	Responsiveness	1
	Accountability	-2
	<b>Total</b>	<b>1</b>
<b>Overall</b>		<b>2</b>

The health sector had an overall score of 2, which can be interpreted on the Adaptive Capacity Wheel as a “slightly high effect” which is good. Room for autonomous change was found to be the worst performing dimension with a score of -3 while the resources dimension had the best performance with a score of 3. This is understandable because the leadership of the health sector are highly educated and the presence of a nursing and midwifery school in the district also aids with the supply of skilled nurses and midwives in the district.

## 5. Discussion and Conclusion

While rainfall in Adansi North District has increased, it is largely due to increased insolation and as the years go by, the climate of the district may deteriorate. This will have severe consequences on agriculture and health. Some of the direst impacts that were identified to be occurring presently include floods, reduced crop yield, fires, pest and diseases and reduced incomes for agriculture and floods, increased prevalence of malaria, URTI, among others for health. Consequently, the adaptive capacities of these sectors were found to require major addressing. Also, while the adaptive capacities of both the agricultural and health sectors need improving, the health sector has the better robustness.

In the forward-looking aspect, it is imperative that collaboration between all actors and agencies in Adansi North District Assembly improves to promote effectiveness while also helping to prevent the duplication of efforts. Second, attempts at building resilience imminently especially against floods and fires and in creating alternative livelihoods must be advanced through the collaborative effort of the National Board for Small Scale Industries/ Business Advisory Commission (NBSSI/ BAC) at the assembly, NGOs and businesses. Third, education about climate change in non-technical language is needed for both actors and the general public. Fourth, development should be reconceptualized as a new paradigm, involving climate adaptation (and mitigation), that builds resilience to reduce risks now and in future while maximizing opportunities; “climate-resilient development”.

The District Health Directorate must also acknowledge the connection between climate change and health on paper, put measures in place for addressing such health concerns and educate the general populace on climate-related health risks. Being sorely under-staffed in the face of the herculean work that begs to be done, the Agriculture Directorate must make the effort to employ more officers and continually train them to be able to serve farmers and the sector which is the backbone of the district. The Directorate must also develop a very profound strategy for promoting climate-smart agriculture (CSA) in line with Ghana’s National Climate-Smart Agriculture Action Plan 2016-2020.

Central government must also release the District Assembly Common Fund (DAFCF) and other funds meant for MMDAs on time to enable them to carry out their plans, including building resilience against climate perturbations. Central government and the National Development Planning Commission (NDPC) must also look into how a binding institutional provision that forces local administrations to commit a certain percentage of their funds received and/or generated annually to climate adaptation can be instituted. In addition, a rigorous capacity building framework must be developed at the national level to build the capacities of local administrations as well as other stakeholders who are key in climate adaptation at the local level.

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