

*Article***Challenges and Opportunities for Mainstreaming Climate Change Adaptation into WaSH Development Planning in Ghana****Salley Alhassan ^{*}, Wade Hadwen ¹**¹ w.hadwen@griffith.edu.au^{*} Correspondence: salley7071@gmail.com; Tel.: +233208386986**Abstract:**

Climate change threatens water, sanitation and hygiene (WaSH) facilities and services, as these are intimately linked to the water cycle and are vulnerable to changes in the quantity and quality of available water resources. Floods and droughts, which pollute and reduce water delivery respectively, have now become a perennial issue to deal with in the northern regions of the country, including the Bolgatanga Municipality. This study aimed to assess the degree to which climate change adaptation measures are mainstreamed into the WaSH development planning process in Ghana. Stakeholders from government and non-government agencies were interviewed to gain perspectives on the threat of climate change, the inclusion of climate change in WaSH planning and the barriers preventing mainstreaming. In general, despite awareness and concern about climate change, adaptation measures have been regarded to be far away from the immediate concerns of WaSH development planning. Most of the current measures are reactive and respond to environmental issues rather than to climate change stressors. In essence, stakeholders expressed the view that the adaptive capacity of the Municipality was low and that mainstreaming has not yet occurred. Despite the lack of progress, there are great opportunities for mainstreaming climate change adaptation into planning through increasing awareness and capacity, legislative and institutional changes and the development of participatory systems to provide early warning systems and disaster risk analyses that will inform future planning.

Keywords: climate change; adaptation; WaSH; policy; sustainability; development

1. Introduction

Climate change has become one of the major issues threatening sustainable development all around the world. Changes to weather patterns, including the reliability and predictability of seasonal rainfall and the impacts of extreme events, now place unprecedented pressures on water resources, especially in flood- and drought-prone regions of the globe. These growing water resource challenges make sustainable development objectives, especially those directly relating to water, such as the water, sanitation and hygiene (WaSH) targets, even more difficult to achieve (Hadwen et al. 2015, UN 2015). Importantly, the impacts of climate change are as severe in African countries than in any other region of the world (Urama & Ozor, 2010), because African countries have weak climate change responses and adaptation strategies. There is widespread evidence that freshwater bodies are shrinking and losing their quality due to the current changing climate (African Development Bank, 2000). These changes make communities that depend on surface water incredibly vulnerable. Whilst significant levels of investment in WASH in sub-Saharan Africa has achieved incredible results during the Millennium Development Goal (MDG) period, the pressure of climate change threatens to undo previous interventions and hamper the continued progress that is required to satisfy the Sustainable Development Goal (SDG) agenda (UN 2015).

The impacts of climate related disasters are well documented. For example, in recent years, the three northern regions of Ghana have experienced extreme climate change pressures such as droughts,

floods and heavy storms. In 2007, these three regions experienced a serious flood disaster which claimed 31 lives, displaced about 102,250 people, destroyed 39 dams, 45 schools, 58 bridges and culverts in the Upper East Region alone (NADMO-UER, 2008) and WaSH facilities such as public toilets and household latrines were also damaged. Furthermore, another series of floods in 2010 displaced 34,553 people and destroyed 5,512 houses (NADMO-UER, 2010). These pressures exacerbate the increasing poverty levels encountered in these areas (Yaro, 2010) and threaten the attainment of development goals.

The future projections for the climate in northern Ghana paints a grim picture; temperatures will rise by 2.1-2.4°C and annual rainfall figures are expected to decrease by 1.1% by 2020 and 20.5% by 2080 (World Bank Group, 2011). These changes will directly and negatively impact the water cycle and, by association, the lives and livelihoods of people, especially the poor and the vulnerable in society.

Even with these recent events and the gloomy future projections for the climate, measures and strategies put in place to mitigate and adapt to climate change in Ghana appear to be ad-hoc (reactive) and largely in response to emergencies. As a result, the long-term consequences of climate change, and the associated anticipatory adaptation that is required to respond to these changes, are barely considered. Incorporation of adaptation measures into plans, programmes, projects and budgets can reduce the adverse impacts of climate change on the sustainability of development programmes and projects (MEST, 2010). In this way, development interventions can become resilient and this is described as climate-proofing by CARE International. In a similar way, people's adaptive capacities, particularly through their WaSH practices, can be improved and their vulnerability levels reduced through the integration of climate change adaptation into development plans (Füssel, 2007). Accordingly, there is a need to plan appropriately and pragmatically to embrace a development pathway that ensures resilience and incorporates climate change adaptation issues into all aspects of WaSH Sector development planning. Like many other developing countries, the challenge now lies with moving away from focusing solely on disaster and emergency WaSH relief, towards a forward-thinking strategic approach to WaSH development that is climate resilient (Hadwen et al. 2016).

To date, integration of climate change into development programmes in Ghana has only been considered at the National level. At the local level, it is not clear how or if district authorities are mainstreaming climate change adaptation measures into development plans. As Nelson & Agbey, (2005) noted, climate change adaptation and its integration has only become a recent issue for policy-makers and planners in Ghana and its mainstreaming remains a challenge. Given this context, this research paper aims to explore the extent to which climate change adaptation measures are being mainstreamed into the WaSH development plans for sustainable development for the Bolgatanga Municipal Assembly, in northern Ghana and, on the basis of these findings, to develop an approach which will aid in the conceptualization and mainstreaming of climate change adaptation into future WaSH policy, planning and implementation in the region.

2. Materials and Methods

Case Study Area- Bolgatanga Municipality in Perspective

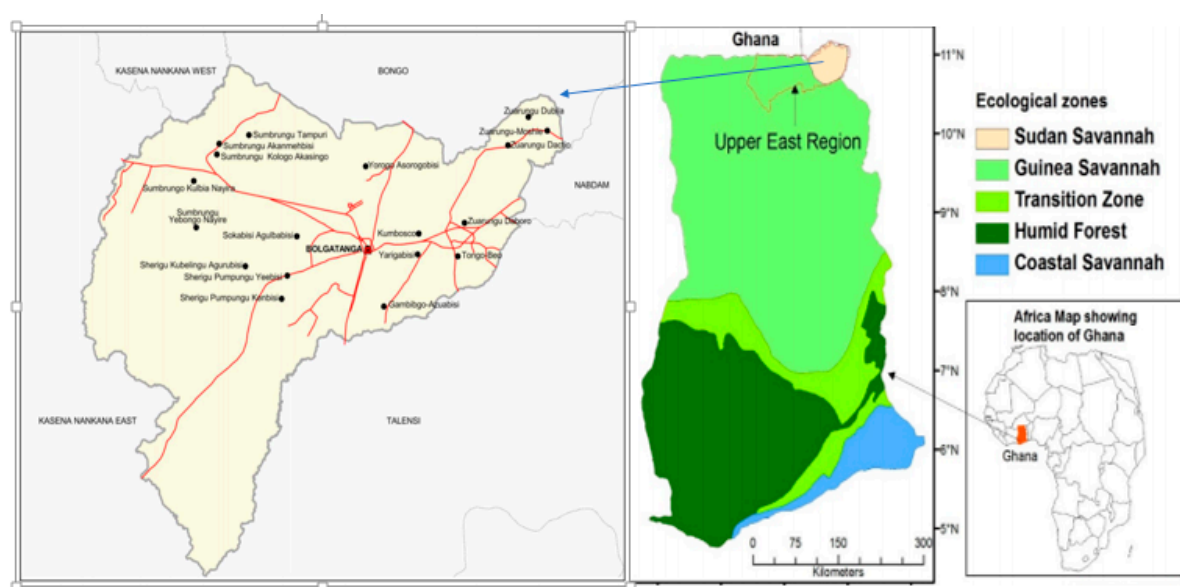
Inadequate water supply, unsanitary conditions and poor hygiene are the triple challenge of households and most development sectors. Many people in Ghana suffer from water related diseases such as malaria, diarrhoea and Cholera (DARA, 2013), and the nation is yet to implement lasting

solutions to these problems. Part of the challenge is in identifying the main sources of water supply for communities and simultaneously examining aspects of their quality and quantity and threats to their safety in the context of consumptive use.

Ghana is divided into ten (10) regions which include Greater Accra, Ashanti, Brong Ahafo, Central, Western, Volta, Upper East, and Upper West regions. Governance takes place at the National, regional and district levels (Bussell et al., 2014).

Bolgatanga is the regional capital as well as the administrative capital of the Upper East region (see figure 1). It is located within latitudes $10^{\circ}30'$ and $1^{\circ}55'$ North and longitudes $1^{\circ}00'$ West with a total land area of 1,620 km² (Braimah et al., 2014). It shares boundaries up north with Bongo District, down south with Talensi District, to the east with Nabdam District and to the west with Kassena-Nankana East District (Braimah et al., 2014).

Figure 1: A Map of Bolgatanga Municipality



Source: Ghana Statistical Service, (2014)

Bolgatanga Municipality has three (3) Zonal Councils namely: Bolgatanga, Zuarungu and Sumbrungu-Sherigu Councils and 37 unit committees and electoral areas with two parliamentary candidates (GSS, 2014). There are 37 elected assembly members and 16 government appointed assembly members. Currently, only three assembly members are females with two elected and one government appointed.

The municipality experiences a unimodal and erratic rainy season starting from May/June to September/October with mean rainfall figures of between 800mm and 1,100 mm annually (GSS, 2014). The rivers in the municipality are the White and Red Volta and Sissili River including their tributaries which serves as the main drainage for the area. From November to mid-February, the region experiences long dry spells with cold, dry and dusty harmattan winds. During the harmattan period, temperatures go as low as 14°C at night and above 35°C during the day. Daytime temperatures are

usually high due to the low humidity (GSS, 2014). The region falls within the onchocerciasis and “Meningitis Belt” of Africa but has been declared a suitable place for farming and settlement by the UNDP (GSS, 2014).

Water Supply in the Bolgatanga Municipality

In general terms, surface water and groundwater sources are the main sources of water supply in Ghana (Gyasi et al., 2010). The surface water supply includes rivers, streams and lakes while the groundwater supply includes hand-dug wells, boreholes and pipe borne water (Gyasi et al., 2010). Critically, the water supply system in the urban areas and cities is quite different from the water supply system in the rural areas. While the households in the urban areas and cities rely mainly on a piped water supply system, the rural areas depend largely on boreholes and hand dug wells (GSS, 2014). This system is also true within the Bolgatanga Municipality, which consists of three urban areas and a considerable number of scattered villages and hamlets. Thus, households in the core of the three urban areas (Zuarungu, Sumbrungu and Bolgatanga) depend largely on piped water, supplied and managed by Ghana Water Company Limited. In contrast, households in the peri-urban areas depend on boreholes and hand-dug wells, as these areas are not yet connected to the piped water system. It is important to point out that in Zuarungu and Sumbrungu, there are Small Town Water Systems serving these two areas.

In rural areas, surface water (streams and rivers) and groundwater (borehole and hand-dug well) are the main sources of water to communities. Traditionally, communities in rural areas depended largely on surface water from streams and rivers, but there is a growing trend for more use of and reliance on borehole water in rural areas. This trend is, in part, due to the efforts of the government of Ghana led by Community Water and Sanitation Agency (CWSA) and the benevolence of NGOs and individuals, such that most villages in the Municipality now have boreholes. Evidence suggests that this trend, away from the use of surface water sources, has reduced the incidence of water-related diseases in the Municipality (IFAD, 2006). However, it also must be noted that, the villages are still vulnerable to water shortages and water-related diseases due to the vagaries of the weather. Given these seasonal changes in water source quality and availability, most households depend on a mix of surface and groundwater supply systems depending on the geographical location.

Sanitation in the Bolgatanga Municipality

While 2008 estimates suggest that an increasing number of Ghanaians (82%) have access to improved water sources, access to improved sanitation stands at 13% (WSP, 2010). However, quality water supply, sanitation and hygiene cannot be explained in isolation of each other, as in most cases they can be determinants of each other. For example, the adequacy of the water supply can determine the sanitation and hygienic conditions of households. On the other hand good sanitation and hygienic environments determine the quality of both surface and ground water in communities (UNICEF/GWP, 2015). Furthermore, it is interesting to note that the source of water supply determines the type of sanitation used in the Bolgatanga Municipality. The urban areas that have access to piped water often use water closet toilet facilities. This represents a relatively small proportion of the entire population of the Municipality. For the areas without piped water, particularly the peri-urban and rural areas, pit latrine and KVIP toilet systems are most common.

In addition, some people within these communities resort to open defecation practices. This has remained a challenge in the Municipality, which is currently attracting attention from the government of Ghana led by the Ministry of Local Government and Rural Development and international bodies such as UNICEF (MWRWH & MLGRD, 2012). While this problem has been the main topic for discussion at various stakeholder meetings, open defecation is still widespread and is considered to be one of the major pollutant in water sources. As a result, policies are often designed to tackle water supply and sanitation situations simultaneously. This is evident when the Government of Ghana implemented a policy in 1993 aimed to ensure the sustainability of water and sanitation facilities provided through a demand responsive approach (Schäfer et al, 2009).

Approach

To assess and understand stakeholder perspectives around climate change threats and mainstreaming into WaSH policy, planning and implementation, we targeted 10 key stakeholders, from institutions responsible for water management, disaster preparedness, and environmental management from the Bolgatanga Municipality, for interviews using a semi-structured interview guide (see table 1)

Table 1: Institutions Interviewed

Municipal Staff	Assembly	Heads of Departments Responsible for Water Resources Management and Sanitation Delivery	NGOs in WASH Delivery
<ul style="list-style-type: none">• Municipal Budget Officer (MBO)• Municipal Planning Officer (MPO)		<ul style="list-style-type: none">• Ghana Water Company Limited (GWCL)• Community Water and Sanitation Agency (CWSA)• Water Resources Commission (WRC)• Environmental Health and Sanitation Unit (EHSU)• Environmental Protection Agency (EPA)• National Disaster Management Organization (NADMO)	<ul style="list-style-type: none">• Water Aid• Water Vision Technology

The responses from the stakeholders provided in-depth information on how adaptation measures are mainstreamed at the policy-making level in the Bolgatanga Municipality. We used content analysis to systematically analyse the content of respondents text qualitatively and quantitatively by looking at who said what, to whom, why and to what degree and effect (Bhattacharjee, 2012). This approach enabled us to classify each interview script into parts which were then treated as distinct units of analysis. As a result, some respondent’s answers have been directly quoted in the Results section to emphasise the argument being put forth around these emergent themes.

3. Results

3.1 Stakeholder Views of WaSH in Bolgatanga Municipality

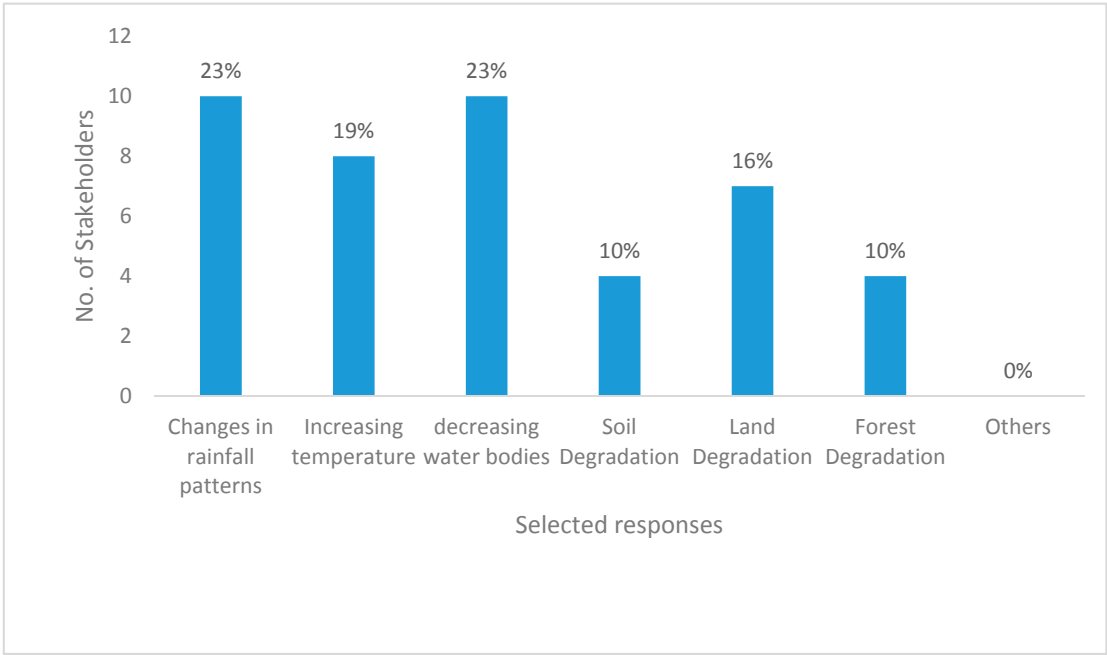
All 10 stakeholders indicated that water is available to both urban and rural households in the Bolgatanga Municipality. This implies that peri-urban and rural households travel only a short distance to access water compared to previously where they had to travel long distances to access water. On closer examination, stakeholders indicated that household members travel an average distance of 100-500 meters to access water. However, in some rural areas in the Municipality, household members still travel longer distances to access water, particularly in those communities that depend on surface water sources. This has implications for accessibility (and equality), quantity, quality and human health in the villages, as some households may be without the required quantity and quality of water, at least from time to time. In analysing such a situation, Howard & Bartram (2003), indicated that if one has to travel between 100 and 1000m (or 5-30 minutes total collection time) to access water, then the access is basic and the quantity of water to be collected will be low (unlikely to exceed to 20 l/c/d) and that the level of health concern will be at medium and quality will be difficult to assure.

Though rural areas have less access to improved sanitation than communities in urban areas (Bolgatanga Municipal Assembly, 2015), one of the stakeholders emphasised that the whole Municipality is challenged with access to improved sanitation. This person's view was that it is not simply a divide between rural and urban: unimproved sanitation is widespread and used by many people in the Municipality. The stakeholders also indicated that most households in the Municipality dispose of their solid waste at an open public dump side. Urban areas have big refuse bins placed for refuse collection while in the rural areas some households bury their refuse in a pit. The use of the open public dump sites is practiced more in the rural areas than urban areas probably due to the lack of availability of refuse containers in the rural areas. It has been estimated that only one in every 100 households have access to a refuse container (GSS, 2014). The other method of solid waste disposal mentioned is burning.

3.2 Stakeholder views of Climate Change in Bolgatanga Municipality

The Bolgatanga Municipality, along with other areas in the northern part of Ghana, has been declared as a climate risk and disaster prone area (UNEP-UNDP, 2012). Stakeholders indicated changing rainfall patterns and increasing temperatures as the manifestations of climate change in the Municipality (Figure 1) and reported that the Municipality has been experiencing greater than expected variability in rainfall and higher temperatures, especially during extreme events. These changes in rainfall patterns, decreasing water quantity in streams and rivers and increasing temperatures were the most common climate change stressors in the Municipality. These stressors included heavy downpours causing floods or long dry spells resulting in droughts that often decrease the quantity of water in rivers, streams and lakes. The stakeholders indicated that there has also been a reduction in the predictability and reliability of seasonal weather patterns, to the point that flood or drought events can now occur at any time of the year. This view is shared by the international community, as the World Bank (2011) has described flooding as perennial issue in the three Northern regions of Ghana.

Figure 2: Perspectives on changing climatic conditions in the Bolgatanga Municipality, as indicated by interviewed stakeholders.



The stakeholders indicated that land, forest and soil degradation represent some significant climate-related stressors which have also been experienced over the past years (Figure 2). This confirms the assertion that the vulnerability of an area to climate change exigencies is due to a number of inter-related factors such as reliance on rain-fed agriculture, less-developed water resources, land degradation and weak institutions (World Bank, 2011).

3.3 Sensitivity of Water Resources to Climate Change

Tributaries of the White Volta Basin and the Sisili River drain the Bolgatanga Municipality. The Yarigatanga River catchment, a sub-basin of the White Volta Basin, is the main source of water supply to the urban households in the Municipality. Thus, the Ve a Dam is used to store water for consumers in the Bolgatanga Municipality (Ofosu et al., 2014). Since the predominant sources of water in the basin are rainfall water, streams, rivers, lakes and groundwater (Megan, 2013), it is important to know how the current changes in the climatic condition of the Municipality may threaten these water bodies that replenish the White Volta Basin.

The stakeholders agreed that the surface water sources including rivers and streams are shrinking in size (Table 1), which in turns affects the water level in the Basin and in the Ve a Dam. It was also revealed that the Red Volta and Sissili rivers, both tributaries of the White Volta River, dry up for approximately two months a year due to drought (Matthews, 2013).

Table 1: The Impact of Climate Change on Water Resources

Stakeholders	Responses	Themes
Municipal Planning Unit	Water sources drying up more than before and addition to climate change, dry season farming is also a contributory factor. 13 boreholes dried.	water drying up
Municipal Budget Unit	Water sources drying up rapidly.	water drying up
EPA	Most of the rivers and dams that were hitherto not drying now dry up quickly. Farming activities along riverbanks and building in water ways.	water drying up
NADMO	Some water bodies dry out during the dry season. Unplanned building structures and cultivation of crops.	water drying up
WRC	Excessive variation between water availability during the dry season and rainy season.	water drying up
EHSU	The water sources are now drying up quickly	water drying up
CWSA	The high temperature being experienced are drying up the water bodies.	water drying up
GWCL	Water bodies are drying up. Groundwater is particularly more vulnerable.	water drying up
Water Vision Technology	Both surface and underground water bodies are depleting.	depleting water bodies
Rural Aid	Reduced water levels especially during the dry season when water in the rivers and dams are used for dry season vegetable production.	water drying up

The stakeholders indicated that compounding the impacts of drought is the excessive use of water from rivers and streams for irrigation, particularly during the dry seasons (Table 1). The stakeholders mentioned that dry season farming is widespread in the Municipality, sometimes in response to the low crop yield during the major farming season. The stakeholders added that this is also a livelihood adaptation and coping mechanism that has been adopted by farmers in the Municipality, to diversify their activities and provide for their families. However, dry season farming is difficult and the only option is to farm along the rivers, using water from rivers for irrigation (Ghana News Agency, 2014). Sometimes these farming operations significantly alter the river channel, as ditches are dug into the riverbed and pumps are used to water farms situated at the riverbanks.

It is important to note that climate change affects not only surface water but underground water as well. An interview with the Municipal Planning Unit revealed that some boreholes have already

dried up and many more are becoming dysfunctional; this is widely attributed to the impacts of climate change. It was added that in the past it could take only forty (40) pumps to fill-up a 40 litre bucket, but with the current drought conditions, 60 pumps are now required. This supports the view that the groundwater table in the Municipality was dropping (Zango et al., 2014). The Rural Aid responded that more than half of water resources in the Municipality were not able to contain water all year round and this situation is expected to worsen further with climate change.

Beyond the impacts on water sources for WaSH, stakeholders also expressed the view that climate change is also impacting on food production, as farming is the channel through which climate change affects food security (UNDP-UNEP, 2011). This was evident when CWSA said in an interview that;

“Once water bodies are drying up, this will have negative impact on irrigation practices and subsequently our effort towards achieving food security” (Bolgatanga CWSA, 2016)

What makes this problem particularly challenging is the fact that the majority of people in the Municipality are smallholder farmers who depend on small and medium-sized irrigation dams for farming, rearing of livestock and other domestic activities (Asante, 2009). As the population of the Municipality grows due to migration and natural growth, there will be corresponding growth in demand for food along with competition over land and water bodies that support farming enterprises. This competition will be intensified due to the climate change impacts on water resources in the Municipality. Social adaptation responses to the water security problem include changing livelihoods, such that farming people in the Municipality may resort to alternative livelihoods like charcoal production, sand weaning and petty trading. Another coping strategy is that many young people migrate to work as labourers with other farmers in the Southern part of Ghana, which receives more rains than the Northern part. Other youth have also migrated to the cities to engage in urban petty jobs.

3.4 The Sensitivity of Social infrastructure to Climate Change

Social infrastructure, including community buildings, can also be vulnerable to the impacts of climate change. The stakeholders revealed that floods, heavy downpours and long dry spells are the ways in which climatic change can affect social and community infrastructure (Table 2). Stakeholders revealed that houses, school buildings, toilet facilities and community health buildings are the infrastructures that are mostly sensitive and vulnerable to climate change. Perhaps, this is because most houses in the rural areas are constructed with mud and roofed with thatch or iron sheets. Moreover, communities along the White Volta Basin often experience flooding with buildings and other social infrastructure being affected. Thus, the local houses are very vulnerable to heavy rainfall and often during rainy season, many of them collapse. Usually, during dry-season, it is common to see people especially women rebuilding collapsed houses or maintaining damaged ones.

Table 21: The Impact of Climate Change on Social Infrastructure

Stakeholders	Responses	Sub-themes	Main issues
Municipal Planning Unit	Most houses in the rural areas are built with mud and roofed with local materials. These buildings are easily destroyed when there are floods or heavy downpour	floods or heavy downpour issues	<ul style="list-style-type: none"> • Floods • heavy downpours • long dry spells
Municipal Budget Unit	there are reported cases of schools roofing sheet and sign boards been removed off by heavy windstorms	heavy windstorms issues	
EPA	Most of the buildings in the area have their roof been ripped off because of increase in wind speed and intensity. Flash floods also destroy homes	heavy wind speed and intensity and flash floods	
NADMO	Flooding have become an annual ritual affecting the municipality. Homes and schools in flood prone areas are affected anytime there are heavy downpours	flood issues	
WRC	high demand for water especially during dry season, affects the sustainability of social infrastructure such as water facilities	dry season issues	
EHSU	heavy windstorms destroy roof of some toilets in the municipality	heavy windstorm issues	
CWSA	every year many households suffer damages during floods	flood issues	
GWCL	most local houses are worn out by the excessive downpours and floods	flood issues	
Water Vision Technology	social infrastructure such as schools, community health post and homes are in danger due to the changes in climate	climate change issues	
Rural Aid	Rural infrastructure especially houses made of mud and roofed with thatch are the most affected when there are heavy rains	heavy downpour issues	

3.5 Climate Change and Environment

It could be inferred from the participant responses that climate change has already had an immense impact on the environment in the Municipality. In general, the stakeholders indicated that impacts on ecosystems, including filthy environments, bushfires and deforestation are the environmental issues resulting from climate change in the Municipality. The stakeholders further stated that the impact of climate change on the natural ecosystem is of great concern. In addition, interviewees expressed the view that climate change had led to the rapid depletion of natural resources due to farming activities, overgrazing, improper solid and liquid waste disposals, illegal mining and other anthropogenic activities around the Volta Basin. As mentioned by one of the stakeholders,

“Due to the impact of climate change, people have turned to exploiting the ecosystem there by depleting natural resources” (Bolgatanga Municipal WRC, 2016)

In response to these changes and the growing threat of climate change, the White Volta Basin Authority has taken measures to protect the basin from bushfires, illegal logging and encroachment (WRC, 2008). These actions also reinforce the strong commitment through the SDGs, especially SDG target 6.6, which aims to protect and restore water-related ecosystems (Osborn et al., 2015).

3.5 Climate change Adaptation Initiatives in the Bolgatanga Municipality

Climate change is predicted to have severe consequences on all sectors of the economy, particularly in Africa (Fankhauser & Burton, 2011) because most livelihood activities in Africa are predicated on natural resources (Osman-Elasha & Downing, 2007). In addition, climate change has a direct impact on water resources and services for all economic, social and environmental functions that water supports (UNICEF, 2014). Climate change affects water resources in the forms of floods, drought and pollution. As stated by the stakeholders, the Bolgatanga Municipality has already experienced droughts and floods over the years and continues to be vulnerable to these water-related disasters. These events will affect the supply and delivery of water, sanitation and hygiene services. Significantly, the uncertainties of the climatic conditions will aggravate existing problems in the WaSH sector.

In response to these challenges, there has been a global call for new strategies to adapt to the impacts of climate change. This has led many African countries to consider climate change issues and how they can be mainstreamed into development policies, including those focusing on WaSH. Most of these plans to integrate adaptation measures have been criticised as being top-down during the formation stage, with local level experiences and consultations been ignored. Though a lot of efforts have been made in this direction in Ghana stakeholders have confirmed that there are still major barriers and gaps to address. Climate change is certainly a well known problem in Ghana, with almost all of the stakeholders having participated in climate change stakeholder capacity-building programmes in the last four years. However, it is also important to point out that the public institutions have participated in more discourses than their non-governmental counterparts. This could be because such dialogue and discussions are often centralised within the top-down decision-making approach that relegate local-level participation. Most often, in Ghana, grassroot movements are not fully consulted or integrated into the National planning discourse (Water Aid, 2010). A common theme that can be inferred from the responses is that climate change discourses have focused

on awareness campaigns and adaptation strategies. In particular, GWCL and WRC have participated in climate change discussions that have focused on the impacts of climate change on water resources and climate adaptation measures such as riverbank restoration. This shows that these institutions have some basic knowledge of climate change, its impacts and risks, as well as some relevant adaptation and mitigation measures. It is, therefore, not surprising that the stakeholders expressed a strong understanding of climate change. Indeed, they variously defined climate change as; inconsistencies in weather patterns over an observed period of time; changes in the weather conditions; the unpredictable variation in the weather pattern due to increased global temperature basically resulting from anthropogenic factors; rise in temperatures and the changes in the rainfall patterns among others.

3.6 Vulnerability Assessment

Climate change vulnerability assessments predict both the current and future effects of climate change, the vulnerabilities of communities and ecosystems to these effects, and the measures that support adaptation to all the impacts (GIZ, 2007). Climate change vulnerability assessment is crucial in designing adaptation measures, particularly in communities where livelihoods are predicated on natural resources such as water and ecosystem resources. The failure to undertake vulnerability assessments will affect capacities to adapt to climate change impacts. This is clearly the case in the Bolgatanga Municipality, as it is evident that vulnerability assessment and WASH delivery in the Municipality remains a great challenge. While some of the stakeholders indicated that climate change vulnerability has not been assessed, others are uncertain about whether this activity has been carried out (Table 3). They advised that departments directly involved in WASH activities should be contacted for further information on climate change vulnerability assessment. The stakeholders who agreed that climate change vulnerability assessment had been carried out, could not measure or articulate the outcome of the assessment (Table 3). This can be juxtaposed with Oates et al. (2011), who stated that integrating climate change adaptation into mainstream development policy at the local level is less of a priority than the National level initiatives. In a related way, UNDP-UNEP (2011), suggested that awareness and institutional capacity building are key entry points to begin climate change mainstreaming. It is important to note that support for institutional capacity, particularly for mainstreaming cross-cutting issues such as climate change, is yet to be achieved in the Bolgatanga Municipality.

Table 3: Vulnerability Assessment of Climate Change and WASH in the Municipality

Stakeholders	Responses		
	Yes	No	Outcomes
Municipal Planning Unit	✓		Cannot measure the outcomes. May be you need to contact CWSA
Municipal Budget Unit		x	Assessments are not related exactly to WASH
EPA	-	-	contact CWSA

NADMO	✓		<i>The public now know the need to protect the environment</i>
WRC	✓		<i>Development of WASH strategic plan marketing for the municipality by an NGO. WRC have developed an IWRM plan for the white Volta basin</i>
EHSU	-	-	<i>I cannot be able to vividly mention whether there has been any vulnerability assessment in the municipality</i>
CWSA	-	-	<i>contact NADMO</i>
GWCL		x	
<i>Water Vision Technology</i>		x	
<i>Rural Aid</i>		x	

3.7 Adaptation Programmes and Projects

The main adaptation programmes cited by stakeholders included the opening of drainages, dredging and rehabilitation of dams, clean-up campaigns and use of drought resistant crops. These measures are implemented by the Bolgatanga Municipal Assembly in response to the current threats, including the impacts of climate change. In addition, the Environmental Protection Agency (EPA) has implemented related programmes of work which seek to diversify livelihoods from traditional agriculture to other ventures, restore riparian buffer zones and tree planting activities. Some of these activities, like riverbank restoration and riverbank alternative livelihood support are also undertaken, separately, by the Water Resources Commission (WRC). Despite these efforts towards addressing and adapting to climate change, there are still gaps to be addressed mainly because the programmes and projects lack proper coordination at the assembly level. While some stakeholders could not mention any adaptation measures put in place by the Municipal Assembly as a whole, others felt that coordination of these programmes at the assembly level was either poor or non-existent.

Questions regarding the resourcing of adaptation programmes revealed that the main source of funding for adaptation activities for the Municipal assembly were from the Internally Generated Funds (IGF), whereas funding for the decentralised departments and their activities were mostly from donor agencies. This leads to some lack of coordination in adaptation response. For example, there was no alternative livelihood programme implemented by the Municipal Assembly to adapt to climate change, whereas programmes in this space were promoted by institutions such as WRC and EPA and mainly sponsored under development assistance.

3.8 Mainstreaming Adaptation Policies into WASH Development Planning

To effectively mainstream adaptation into development planning, institutions must fully understand climate change issues and thereby discover the right areas for intervention (UNDP, 2012). As such ,

strengthening the capacity of institutions is critical to achieving successful mainstreaming of climate change adaptation issues into policy planning (Huq & Ayers 2008). Interestingly, there is evidence of this strengthening occurring in Bolgatanga, with stakeholders who attended more climate change capacity building programmes indicating that they have begun to incorporate climate change adaptation measures into their planning processes. However, it is also important to note that some stakeholders are not fully aware of the adaptation measures being implemented – many of them said that the Municipal Assembly should be contacted regarding climate change adaptation issues. This might be attributed to a lack of institutional coordination and collaboration, particularly at the Municipal level. The risks associated with poorly coordinated approaches to adaptation are that maladaptive measures may be implemented, as the actions at one level might have negative consequences at other levels of the system.

Though institutional capacity is important for mainstreaming climate change adaptation into policy planning, it is not limited to only capacity building. It is also important to develop and strengthen the structures for institutions to handle climate change issues. The necessary institutional arrangements required for mainstreaming climate change have not yet been implemented by the Municipal Assembly. In addition, it is clear that climate change issues are added to existing roles and responsibilities, as neither the Assembly nor the decentralised departments had a desk officer or focal person in charge of climate change issues.

Municipal Development plans represent an access point through which climate change adaptation can be mainstreamed. The Medium-Term Development Plan (MTDP) prepared by Metropolitan, Municipal and District Assemblies (MMDAs) in Ghana is used as a working document responding to the development challenges of the area for a period of time. The MMDAs are required to develop their action plans to harmonise with the National Medium Term Development Planning Framework (NMDTPF). This means that the Assembly's development plans and budgets should be in sync with the seven thematic areas of the NMDTPF, which includes crosscutting issues such as climate change, gender and disability. For the Bolgatanga Municipal Assembly, the MTDP for 2014-2017 based on the Ghana Shared Growth Development Agenda (GSGDA) is yet to be finalized (Bolgatanga Municipal Assembly, 2015). This therefore presents an opportunity for the Municipality to capture and highlight the emerging climate change and WASH issues and to mainstream them into the plan. Taking these types of opportunities is really important, as failure to recognize these important issues will result in a lack of resources to support adaptation and mainstreaming efforts. For example, analysis of the Composite Budget of the Bolgatanga Municipal Assembly for the 2015 Fiscal Year indicated that there was no direct climate change adaptation strategy to be followed in response to prevailing or anticipated climate change impacts. Moreover, there were seven (7) projects related to environment, water and sanitation from the 2015 Budget. These projects included public education on environmental cleanliness, monthly clean up exercises, improvements to waste management, support for soil improvement activities, provision of boreholes to communities, installation of small town water systems for selected communities and the construction of water closets and KVIP toilets (Bolgatanga Municipal Assembly, 2015). In the view of the Environmental Health and Sanitation Unit (EHSU), climate change issues were completely missing in the 2015 Budget. The EHSU stakeholder clarified further that, aside from the small number of environmental issues captured in the 2015 Annual Action Plan; there was no talk about climate change in the plan.

The stakeholder from Water Vision Technology agreed with the assertion that climate change was absent in the budget and hence tried to differentiate between environmental concerns and climate change issues. The institution emphasised that it is hard to dissociate climate change adaptation measures from measures pursued to improve the environment and added that the difference depends on the reasons behind the development of these measures. Hence, adaptation measures are intended to mitigate particular impacts of climate change and increase resilience against some forms of vulnerabilities. On the other hand, environmental measures are targeted at tackling particular environmental issues such as land degradation, which may not be specifically caused by climate change. It is important to add that climate change is likely to make environmental problems worse, which in turn suggests that mainstreaming is still required.

Although some of the stakeholders indicated that they incorporate climate change into their action plans, there had not been any vulnerability assessment or impact assessment of these projects. There could be many reasons for this inaction. As indicated by the Planning Unit, the tree planting and public education on water pollution initiatives were not fully implemented because funds were not flowing regularly and this has slowed progress substantially. It was also revealed that there was no assessment to determine the impacts of these initiatives in the Municipality.

3.9 Mainstreaming Climate change: Challenges and Prospects in the Bolgatanga Municipality

A number of challenges regarding the mainstreaming of climate adaptation into WASH development planning were identified during the stakeholder interviews. These comprised the non-existence of institutional structures and constitutional support, lack of coordination and collaboration, inadequate information on the districts vulnerability to climate change, inadequate early warning system strategies and the trivializing of climate change issues. These challenges arise because different institutions are responsible for different aspects of the environment without proper institutional coordination at the decision making and policy implementation levels. All of these issues highlight how Ghana's climate change adaptation behaviour is typical of a developing country with poor adaptive capacity and low political influence and will. Nevertheless, there has been a series of inter-institutional dialogues and discussions, often organised by external institutions including UNDP and Care International (Bussell, et al., 2014). These dialogues provide a common platform to discuss the impact of climate change in the Northern part of Ghana and represent an opportunity for building understanding and capacity and this is an important first step towards mainstreaming.

3.9.1 Limited information on the Municipality's vulnerability to climate change effects

Stakeholders identified that information, particularly scientific information, was virtually not available in the Municipality. Though climate change issues such as flooding and drought are a perennial issue in the Municipality, there has not been any vulnerability assessment in the area nor has there been shared information on likely climate driven changes in intensity and frequency of these events. The NGOs interviewed indicated that they did not have any scientific information to enable discussion of the specific areas of the district that are vulnerable to climate change. The Municipal planning unit and the EPA also indicated that there has never been any assessment of the district's vulnerability to climate change. The UNFCCC and the IPCC agree that effective planning is reliant on the understanding of what is been planned and considering climate change adaptation, a risk assessment of current and future impacts of climate change and vulnerability conditions is

critical in enabling adaptation and building resilience (UNFCCC, 2006, IPCC, 2014). Without these processes, climate change adaptation actions become reactionary and not at all mainstreamed.

3.9.2 Non-existence of institutional structures and statutory support at the Municipal level

Establishing institutional structures is key in advancing the mainstreaming of climate change adaptation. In the NMTDPF, cross-cutting issues such as gender and disability have been identified, together with climate change, to be mainstreamed into the District Medium Term Development Plans (DMTDP). While gender and disability have been mainstreamed into the administrative structures of the Assembly, climate change is yet to receive such support. EHSU and CWSA suggested that the Municipal Assembly needs to have a climate change desk officer to promote and coordinate climate change issues. Furthermore, there has not been any statutory support for the mainstreaming of climate change and this is not only at the district levels but the National level as well (Water Aid, 2010). In the Bolgatanga Municipal Action Plans, there have been no specific funds allocated to support climate change adaptation programmes. This is, in part, due to the fact that the Assembly, by law, is not obliged to devote any funds to climate change. As a result, mainstreaming climate change issues into development planning is left as a choice in the Municipal development planning agenda. EHSU and CWSA contended that without a law obliging the District Assemblies to include climate change issues and threats, this will remain an issue for discussion without concrete actions to address it. The GWCL indicated that statutory support should be created to allow the district assemblies to commit a percentage of the District Assembly Common Fund (DACF) to fund climate change adaptation, just like the two percent allocation currently permissible for disability projects. GWCL added that unless this is done climate change issues will always be underestimated and will remain under resourced at the district level.

3.9.3 Inadequate early warning systems strategy

It is very important to share meteorological information, including climate change projections to communicate reliable information on weather conditions and threats. This is very relevant for monitoring specific climate change stressors such as floods and drought and enables the preparation of early warning measures necessary for households and farmers. An example of this comes from NADMO, who mentioned that every year, at the beginning of the rainy season, they sensitize communities in the Municipality about potential risks such as floods. This was confirmed by the Municipal Planning Unit in a similar claim that households are usually informed through announcements on radio stations particularly about the opening of the Bagre Dam Spillway in Burkina Faso, so that they can prepare against the potential risks.

In contrast, the Planning Unit added they are sometimes taken by surprise as they are not always able to determine the severity of the floods. This problem is also compounded by the fact that sometimes the Burkina Faso Authority does not communicate with them before opening the Dam's Spillway. This indicates that there is a potential transboundary issue looming between Ghana and Burkina Faso. It is essential to add that recently, efforts have been made by both countries to improve communication concerning the opening of the Dam Spillway (Bussell et al., 2014).

3.9.4 Shifting the responsibility for climate change issues

From the interviews, it could be inferred that for some stakeholders, climate change adaptation issues were viewed as someone else's responsibility. It was common to record comments such as "*contact Municipal Assembly*", "*refer to Municipal Assembly*" for information regarding climate change in the Municipality. This issue could be as a result of poor coordination and collaboration between departments in the Municipality. As Water Vision Technology puts it;

"Collaboration is only seen at review meetings and that is when we seem to share information to each other"
(Water Vision Technology, 2016).

In contrast, the Water Resources Commission (WRC) emphasises the need for collaboration with other Ministries, Departments and Agencies as integrated water resources management affects various aspects of the society (WRC, 2008). It also emphasised the need for effective collaboration especially with key stakeholder in their operational areas.

Notwithstanding the challenges recounted above, there are prospects for incorporating climate change into WASH development planning in the Bolgatanga Municipal Assembly. From the view of the stakeholders, these prospects include capacity building, vulnerability assessments, environmental impact assessments and institutional reform to integrate and mainstream climate change adaptation.

3.9.5 Capacity Building

The understanding of climate change adaptation by policy makers is essential in mainstreaming these issues into programmes. The stakeholders indicated that there should be training programmes for all the staff in the Municipal Assembly and other non-state actors such as NGOs. This is required to build their capacity not only on issues relating to climate change but also around how to effectively integrate climate change adaptation into WASH development planning.

3.9.6 Vulnerability and Disaster Risk Assessments

Despite the recognition of extreme events and the threat that climate change poses, it is clear that vulnerability or disaster risk assessments in the Municipality have not been carried out. Most stakeholders emphasised the need to carry out a thorough vulnerability or disaster risk assessment, ahead of developing strategies to mainstream climate change adaptation into planning. In this regard, such an undertaking would underpin the design of policies that will reduce the impacts of disasters, pollution and destruction of WASH facilities.

3.9.6 Institutionalising Climate Change Adaptation within Governance Structures

The lack of administrative structures to support climate change adaptation, as reported by the stakeholders, makes it difficult for climate issues to be considered in policy discourse. As mentioned previously, stakeholders suggested that District Assemblies need to have climate change desk officers who will advocate and coordinate climate change adaptation issues. The stakeholders argued that gender and disability issues have been successfully mainstreamed because there are administrative and governance structures supporting them. In this sense there is a case for a closer examination of the mainstreaming of gender and disability issues, in order to learn about the approaches that have

been taken and to adopt one that will most likely be successful for achieving the climate change adaptation mainstreaming.

4. Discussion and Conclusion

4.1 The status of WaSH in Bolgatanga Municipality

Water supply, sanitation and hygiene delivery continue to remain a challenge in the Bolgatanga Municipality. At present, service provision can only be described as basic. Although water supply has improved in recent times, there remain growing concerns around the quality and quantity of water with extreme events, fueled by climate change, representing a huge challenge for the Municipality. In addition to the climate change pressures, the main sources of water in the Municipality are vulnerable to pollution mainly from farming activities around the White Volta Basin, open defecation and poor faecal management and siltation of the Veia Dam. These activities continue to represent a threat in the WaSH sector and they are exacerbated by the changes in climate. Despite the urgency and scale of these challenges, it is clear that the Municipality has weak responsive mechanisms. This is compounded by the lack of human, financial and socio-political capacity to adapt to these climate change exigencies.

4.2 Climate change adaptation initiatives

Adaptation initiatives identified by the stakeholders to be related to climate change adaptation included clean-up exercises, opening of blocked drainages, dredging and rehabilitation of dams, use of drought resistant crops, riparian buffer zone restoration, riverbank protection, diversification of livelihoods from traditional agriculture to other ventures. All of these measures have been reactive and have not been implemented on the basis of the Municipality's prevailing and increasing vulnerability to floods and droughts.

The capacity of both governmental and non-governmental institutions to respond to climate change impacts and threats in Ghana remains weak. Though there have been several climate change capacity training programmes, there is no evidence of climate change mainstreaming in the Municipal Action Plan.

4.3 Challenges and Prospects

There are many barriers which prohibit the mainstreaming of climate change adaptation issues into WASH development plans in the Bolgatanga Municipality. First, there is inadequate information about the Municipality's vulnerability to climate change and its hazards. Second, there are no institutional structures in place to mainstream climate change adaptation into the Municipal Assembly plans and there is no coordination and collaboration between stakeholders in the Municipality, making advocacy and coordination of climate change issues difficult. It was also observed that WASH professionals in both governmental and non-governmental organisations were interested in building WASH facilities and not really concerned about the impact of climate change on these facilities, probably due to the inadequate knowledge in climate change issues. This could also be exacerbated by politics, where the government is mostly interested in commissioning boreholes and toilets constructed for political gains. Also, livelihood interventions were mainly carried out by few of the decentralised institutions and these interventions were mostly sponsored

by external donors. There is a growing concern that the sustainability of these projects, or lack thereof, will become a problem after the sponsors have left. On the basis of suggestions from the key stakeholders in the WASH sector interviewed in this study, the following strategies are recommended to support the mainstreaming of climate change adaptation into WASH development planning for the Bolgatanga Municipality.

4.3.1 Capacity Building

As indicated by Huq and Ayers, (2008) the mainstreaming process should begin with building awareness and capacities of all stakeholders involved in the management of resources in the municipality. Therefore, it is recommended that the local government should organise training sessions on climate change adaptation for Municipal Assembly staff, decentralised departments, NGOs and community elders. Through these training workshops, stakeholders will be trained on how to effectively mainstream climate change issues at the local levels which are then harmonised and coordinated at the regional level and up into the National plans i.e. the NMTDPF. This will ensure a move away from the traditional top-down approach to the mainstreaming of cross-cutting issues including climate change.

4.3.2 Institutionalising and coordination of climate change

There are currently virtually no structures put in place to mainstream climate change and mainstreaming cannot take place in an institutional vacuum. Therefore, it is recommended that administrative and governance structures through the Ministry of Local Government and Rural Development (MLGRD) should create desk offices for climate change particularly at the district levels that will be in-charge of integrating and coordinating climate change adaptation issues across all sectors of the Assembly. The desk officers will ensure effective collaboration between the various stakeholders including governmental, non-governmental and decentralised departments.

4.3.3 Legislative support for mainstreaming climate change

At the National level, climate change has been incorporated into the National development policy. The approach to this incorporation has been top-down in nature and at the local level, there is no legislative support for mainstreaming climate change. Therefore, it is recommended that the government, through legislation, should oblige MMDAs to allocate a certain percentage of their revenue or the DACF to fund climate adaptation initiatives.

4.3.4 Establishing Early Warning Systems and Disaster Risk Readiness

The lack of early warning systems and disaster risk readiness has further weakened the adaptive capacity of the Municipality. Hence, to ensure effective mainstreaming, decisions must be based on climate change information that is reliable and represents a continuous assessment of climate threats, exposures and sensitivities. It is also vitally important that this information is broadly and clearly communicating to support and inform local level adaptation. The Municipality invest in the development of early warning systems and awareness programmes, to ensure that stakeholders have easy access to relevant information around system specific climate change threats or disaster risks.

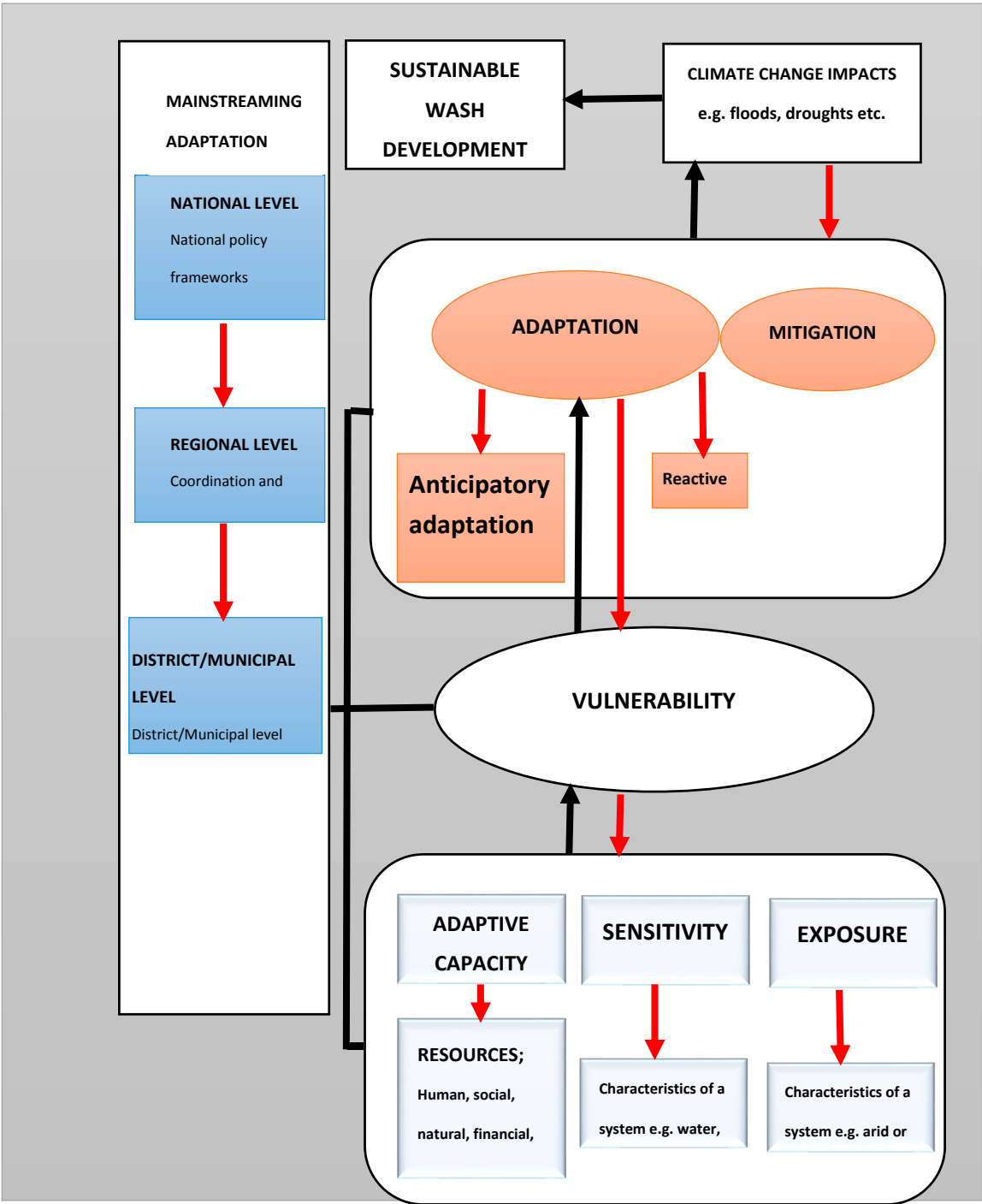
4.3.5 Integrating participatory approach to development planning

To reduce local vulnerability participatory approaches are required, as this enables the identification and selection of appropriate adaptation measures (GIZ, 2012). This approach contextualises and complements the development of policies from a bottom-up perspective. To address this, MMDAs should adopt a participatory approach which will ensure that indigenous knowledge regarding climate change impacts are captured and integrated into WASH development planning. Ultimately, the sustainability of WASH services and infrastructure in Bolgatanga Municipality will rely on the mainstreaming of climate change adaptation and greater shared understanding of the challenges that lie ahead.

4.4 Moving towards mainstreaming

There are two ways of mainstreaming adaptation processes, namely: 1. an autonomous process of adaptation, and 2. adaptation through planning (Schipper et al., 2010). For the autonomous process, two aspects of climate change are considered: adaptation and mitigation (Barker, 2007). In this study, the emphasis is on the adaptation element. Easterling et al., (2004) and Barker, (2007) described adaptation to be either reactive or proactive. In this regard, adaptation is controlled by the characteristics of the system's vulnerability. In addition, vulnerability is also a function of the system's adaptive capacity, sensitivity and exposure.

Figure 2: Conceptual Model for mainstreaming climate change adaptation measures into development planning



Source: Authors construct, (2016)

WaSH development planning is a decision-making process involving a wide range of activities, at different institutional scales and across different developmental stages (Figure 2). At the National level, planning comprises policy formulation, development of National policies such as the Ghana Shared Growth Development Agenda (GSGDA) prepared by the National Development Planning Commission (NDPC), preparation of National budget by the Ministry of Finance and Economic Planning (MoFEP) and preparation of other sectors plans and budgets. Similarly, work plans prepared by the districts are coordinated at the regional level in a manner that will ensure they are well-matched with National policy guidelines. Work plans at the district level are also developed to

fit into the NDPC guidelines. With procedures provided by the Secretariat of the District Assembly Common Fund, the district composite budgets are developed (Bolgatanga Municipal Assembly, 2014). The process of mainstreaming includes the integration of climate change adaptation issues into WaSH sector policies, plans and budgets at these National and municipal levels (Lebel et al., 2012). Once this has been achieved, the coordination and harmonization processes will need to take place at the regional level. To this end, the black arrows and lines in the conceptual model shows the relationship between policy at multiple levels and adaptation actions and how mainstreaming these policies will support better adaptation outcomes (more anticipatory actions shown in bigger box).

4.5 Conclusion

Climate change adaptation strategies are yet to be mainstreamed into the development plan of the Bolgatanga Municipality, even though climate change is clearly one of the most threatening and cross-cutting issues in the Municipality. Our research has highlighted the views of stakeholders, which suggests that the Municipality's vulnerability to climate change is recognized as being high, while its adaptive capacity remains low. Further to this, most adaptive initiatives that have been executed to date have targeted environmental problems rather than climate change threats, per se. As a result, the Municipality's strategy to combat climate change has been reactive and focused on non-climatic threats. These approaches have come at the expense of efforts to mainstream climate change adaptation at the Municipality's level.

The reasons for the lack of mainstreaming at present include lack of institutional capacity, lack of institutional coordination and collaboration, no statutory support for mainstreaming climate adaptation, inadequate knowledge on climate change and its stressors/hazards. As a result, the current WASH development planning process in the Municipality cannot readily ensure adaptability, which is essential for climate change adaptation. Notwithstanding these challenges, the Municipality has prospects for mainstreaming climate adaptation into development planning. For example, there is a wealth of indigenous knowledge on climate, including extreme events, which is not yet exploited. There remains an opportunity to influence the yet to be finalised Medium Term Development Plan (MTDP) for the Municipal Assembly to ensure that climate change adaptation and WASH issues are mainstreamed to achieve a wide range of development objectives. Learning from recent experiences around mainstreaming gender and disability issues into planning processes, an optimistic view should be taken towards mainstreaming climate change into Ghana's planning policies in the near future. Successful mainstreaming of climate change will also support improved outcomes across multiple sectors as well as achievement of the sustainable development goals.

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Appendix

Interview Guide for Municipal Assembly Staff, Heads of Departments/Agencies and NGOs

**MAINSTREAMING CLIMATE CHANGE ADAPTATION INTO THE WASH SECTOR PLANS
FOR SUSTAINABLE DEVELOPMENT IN THE BOLGATANGA MUNICIPALITY**

Date of Interview: Contact number

Section A: Current State of Water supply, Sanitation and Hygiene in Bolgatanga Municipality

1. What are the main sources of water supply in the Municipality?.....
2. Is water available to people’s homes? How far do some people have to go get water?.....
3. Do any of the water sources in the municipality dry out? If yes, when and for how long?.....
 - a. Are the available water sources of sufficient quality for drinking?.....
 - b. Are some of the water sources more polluted or contaminated than others?.....
4. What are the issues (threats/pressures) relating to water quantity and quality for people?
5. What types of sanitation are used by people in the Municipality?.....
6. Are there areas or group of people that do not have adequate access to improved sanitation?.....
7. What is the normal practice of solid waste disposal for the affected population?
 - a. Refuse pit?
 - b. Public dump?
 - c. Bins?
 - d. Others?.....

Section B: Vulnerability of the Municipality to Climate Change

1. What are some of the changes the Municipality experienced since the past ten years? (*Use the following as prompts*)
 - a. Rainfall patterns? (Droughts, floods and disease outbreak)
 - b. Temperature?
 - c. Water bodies? (Rivers, streams, dams etc.)
 - d. Soil Degradation?
 - e. Land Degradation?
 - f. Forest Degradation?
 - g. Others?.....
2. Describe the impact of climate change on the following in your municipality;
 - a. Water resources.....
 - b. Irrigation Agriculture.....
 - c. Human health and security including sanitation.....
 - d. Social Infrastructure.....

e. The environment.....

Section C: Adaptation Initiatives

- 1. Within the last four (4) years, have you attended any programme on climate change?.....
 - a. If yes, how many programmes?.....
 - b. Briefly state what you have learnt from the programme(s)?.....
- 2. What is your understanding regarding climate change?.....
- 3. Has there been any assessment of the vulnerability of climate change and WASH in the Municipality?.....
 - a. If yes, briefly state the outcomes/findings (ask for a copy if available).....
 - b. If no, explain why?.....
- 4. Does the municipality have a disaster risk reduction (e.g. flood? Draught? Or disease outbreak?) strategy?.....
 - a. If yes, briefly describe the strategy (ask for a copy if available).....
- 5. What adaptation programmes and projects have been put in place by the Municipal Assembly over the past years (may be 5 years or more)?.....
- 6. Are there other programmes and projects that have been carried out by other organisation other than the Municipal Assembly?.....

Organisation	Focus area	Adaptation initiatives	Duration of programme/project
1.			
2.			

- 7. Were the initiatives coordinated by the assembly? If yes, how was it coordinated?.....
- 8. Are there any funds allocated for tackling climate change threats as and when they occur? Could you please mention examples?.....

Section D. Mainstreaming of Adaptation Policies

- 1. Do you incorporate climate change issues in Water resources management in the Municipal Medium Term Development Plan? What climate change issues have been captured in the Municipal Development Plans?.....
 - a. If yes, could you please give examples? (Ask for the copy of MMTDP if available).....
 - b. If no, give reasons why?.....
- 2. Describe the funding arrangements for these initiatives.....
- 3. Has the initiative been fully implemented? What percentage? Could you explain why?.....

- 4. Has the initiative had any effect on the vulnerability level of the Municipality?.....
- 5. Could you please mention the challenges and prospects for mainstreaming climate change into development planning in the municipality?.....
 - a. So far what has worked well?.....
 - b. Could you explain why things worked well.....
 - c. So far what has not well?.....
 - d. Could you explain why things did not work well?.....
 - e. What measures needs to be put in place?.....

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