

Mainstreaming Resilience into Local Development Planning: Strengthening District Assembly Capacity for Building Community Resilience for Disaster Management in Ghana

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Project Summary

Background: This 9-month research project was initiated in response to the discourse on global environmental change and the need to mainstream environmental change adaptation into development planning to build community resilience in sub-Saharan Africa and the world at large. The research sought to examine how and to what extent district development planning was used to promote community resilience to environmental change in Wa Municipality, northwestern Ghana.

Methods: The project employed empirical studies involving mainly qualitative methods of data collection and analysis. The work involved multiple stakeholders, including the Faculty of Planning and Land Management of the University for Development Studies, the Wa Municipal Assembly and its affiliate departments (the Department of Community Development, the Department of Agriculture of the Ministry of Food and Agriculture, and the National Disaster Management Organization [NADMO]), study

Results: The project found that communities are exposed to multiple environmental stressors, such as droughts, floods, deforestation, heavy rains, windstorms, and land and soil degradation. These stressors adversely affect the sustainability of both primary and off-farm livelihoods of people in the municipality. Environmental stressors have an adverse effect on both the germination and yields of food crops. Over recent years, it has been common for farmers to experience total crop failure, for example, of groundnuts, because of drought or heavy precipitation. Efforts to build community resilience to environmental change through

district development planning are modest and cannot produce significant outcomes given the magnitude of environmental change. However, efforts are being made to focus more attention on community resilience in development planning in the municipality. Lack of funding adversely affects the implementation of such initiatives.

Conclusions: The research project achieved positive outcomes relevant for development practice. At the institutional level, it engendered discussion of and interest in community resilience in district development planning and gave it legitimacy as a policy direction. It also raised consciousness among communities about the need to scale up resilience response measures from individual and household levels to community level through community mobilization and governance. Lack of funding is the primary capacity problem affecting the implementation of initiatives to build community resilience in the municipality. An integrated policy framework is needed to enhance community resilience through district development planning, given that communities are affected by multiple stressors.

1 Introduction

In the wake of global environmental change, particularly climate change and land degradation, more and more of the world's population, both urban and rural, is exposed to natural hazards and disasters, with dire consequences for livelihoods. According to Adger and Brooks (2003), environmental change, as represented by climate and weather variability, deforestation, and land degradation, are significant factors constraining human development. In West Africa, for example, the 2007 floods in the northern half of Ghana undermined development investments, disrupted or destroyed the livelihoods of about 317,000 people, destroyed 1,000 km of roads, damaged 210 schools and 45 health facilities, and damaged or contaminated 630 drinking water facilities (NADMO, 2007). The direct emergency funding to deal with the crisis amounted to about US\$25 million (Government of Ghana, 2010). Such severe environmental events are on the rise, with changes in the frequency, intensity, and timing of weather events (Yaro, 2010). This is clearly the case in Ghana, where more intense weather events, such as torrential rains, excessive heat, and severe, dry winds arising from climate change, are projected (Government of Ghana, 2010; World Bank Group, 2011).

The effects of climate change in Ghana are spatially and socially differentiated (Minia, 2004; van Giesen et al., 2010; Yaro, 2010; MEST, 2012). The north has suffered drought as well as floods. These changes have significant impacts on rainfed agriculture. Past studies show that unpredictable rainfall patterns impose drought and flooding conditions, with consequences for crop yield variability and food security (Dietz et al., 2004; Laube et al., 2008; van de Giesen et al., 2001). Large-scale rainfall deficits can destroy plant cover, reduce evapotranspiration, increase surface albedo, and affect other aspects of water and energy balance, which can set in motion a long period of below-normal rainfall (Owusu et al., 2008). Changes in the rainfall pattern may seriously affect crop yields even in instances of slow changes (Ofori-Sarpong 1998).

Ghana's experience corroborates the assertion that the number of hydrometeorological disasters reported in Africa has increased significantly since the 1970s (EM-DAT, 2009). Over the past 4 decades, sub-Saharan Africa has experienced more than 1000 disasters, with 300 in the last 5 years alone. Since then, more than 330 million people have been affected by droughts, floods, cyclones, earthquakes, and volcanoes in Africa (EM-DAT, 2010). In Ghana, there are several areas of concern about the potential impacts of climate change. The Ghana Climate Change Policy outlines increased temperatures; rainfall variability, including unpredictable extreme events; sea level rise; increasing greenhouse gas emissions, and loss of carbon sinks (MEST, 2012).

Limited policy and planning attention has been paid in the developing world to climate change adaptation and building community resilience to environmental change. According to Baudoin (2014), lack of financing for decentralized structures has culminated in weak state support for food crop production in southern Benin. Farmers do not trust state institutions, although they trust traditional chiefs and local organizations, even when they have limited capacity to provide support. Climate change impacts are likely to undermine planned development outcomes in a number of countries and pose significant challenges to many livelihoods and ecosystems.

Integrating climate change resilience into development planning is fast emerging as a major policy agenda item (Pervin, 2013; Camara, 2013). Climate change adaptation is increasingly on the agenda of researchers, policymakers, and program developers, who are aware that it threatens to undermine social and ecological sustainability. In agriculture, adaptation efforts focus on building rural livelihoods that are more resilient to climate variability and disaster (Nelson et al., 2009). Outside Africa, governments are fully committed to global efforts to address climate change. For example, climate change priorities were articulated in the National Adaptation Programme of Action in Cambodia in 2006 (Am et al., 2013). Results of a study by Benson (2009) in the Philippines, which is regarded as the world's most disaster-prone country, indicate that despite a weak beginning, there has been steady but slow progress toward greater consideration of disaster risk management in national Medium-Term Philippine Development Plans (MTPDP) over the past 20 years. Lofts and Kenny (2012) note that local government units develop and implement Local Climate Change Action Plans, which prioritize local needs and integrate best practices into development activities. According to Benson (2009), however, successive plans have consistently failed to identify disaster risk as a factor that could hinder the achievement of economic and development goals or to systematically treat risk reduction as an integrated, cross-sectoral objective. Instead, they have dealt with disaster risk primarily within the narrow framework of flood control, improved preparedness, relief and rehabilitation, preparedness capabilities, and ex post support to vulnerable groups.

Despite the vulnerability of sub-Saharan Africa to the combined risks of climate change and land degradation and Ghana's increasing exposure to hazards, it is unclear how and to what

extent Ghana is enhancing community resilience through its decentralized development planning system. It is also unclear how appreciative the local planning systems are of the importance and roles of indigenous and/or endogenous knowledge systems for building sustainable community resilience.

Poverty reduction has remained a priority goal in the development efforts of the country for several decades, but climate change and land degradation continue to undermine or potentially undermine efforts at poverty reduction. The Government of Ghana has embraced policy responses to environmental change, including disaster risk reduction (DRR), working with international development partners. For example, UNDP Strategic Support to the Government of Ghana in climate change and DRR policy planning at the national and district levels resulted in the development of a 5-year Plan of Action on DRR. The plan facilitated forums to promote gender-sensitive culture in DRR in 15 districts in Northern Ghana and high-level training on DRR for local authorities (UNDP, 2012). Nonetheless, there are still capacity gaps, and the greatest challenge to promoting DRR at the district level is coordination of sectoral efforts to derive the maximum synergies (Ibid.).

The human factor in the occurrence of disasters calls for policy responses at global, national, and particularly local levels. At the local level, one of the key policy options lies in building community resilience to multiple environmental risks, including drought, floods, storms, and fires. In Ghana, such a strategy will require understanding the role of local-level planning, particularly District Development Planning (DDP), and how to harness the knowledge systems of sectoral departments at district level and indigenous or local knowledge to achieve synergy for building sustainable community resilience in DRR. Many developing countries do not yet prominently embrace climate change in their development policy agendas, although they are often signatories to international conventions on climate change (Beg et al., 2002; Platt, 2007). Institutionalizing policy reforms that address the need to build community resilience in DRR will guarantee continuity of policy planning and sustain efforts to pursue poverty reduction in a sustainable manner.

The importance of indigenous knowledge or local knowledge as a strategic resource and driver of innovations for sustainable development is well known (Chambers, 1999; Ramphela, 2004; Sillitoe, 2004). It is particularly important for DDP to build on community knowledge and resources for community resilience. This approach, akin to endogenous development,¹ enhances genuine community participation, utilizes community resources, and guarantees sustainability. Because indigenous knowledge is closely related to survival and subsistence, it is not a suitable basis for local-level decision-making on issues relating to food security and natural resource management (NUFFIC and UNESCO, 1999) or for building community resilience in DRR.

This main objective of this research project was to find out how and to what extent district development planning is used to promote community resilience in DRR in Wa Municipality. The sub-objectives were to:

1. Assess the extent to which local authorities are mainstreaming resilience into their development plans.
2. Assess the extent to which the local planning system incorporates indigenous/endogenous knowledge systems for building community resilience.
3. Identify capacity inadequacies that constrain mainstreaming resilience into development planning.
4. Design approaches for strengthening the capacity of Metropolitan, Municipal, and District Assemblies (MMDA) to mainstream resilience into development planning.

2 Project Outputs and Outcomes

The empirical research involved communities and public institutions at the municipal level, in the process establishing links and networking for promoting research and policy in community resilience and planning. A working team on climate change and resilience was formed at the Faculty of Planning and Land Management, where the Principal Investigator and mentees worked. The project team mentored three young faculty members and one Senior Research Assistant, giving them experience in community resilience to environmental change and development planning. The project also provided impetus and technical support to the Metropolitan Assembly and its allied departments in their efforts to incorporate community resilience into Medium Term Development Plans (MTDP) and their work in general.

3 How Did You Go about Achieving Your Outputs/Outcomes?

This empirical study adopted a qualitative research approaches for data and analysis. The study was conducted in Wa Municipality in Northern Ghana and involved multiple stakeholders, including the District Assembly, relevant government agencies and departments involved in DRR management, and some communities affected by natural hazards. Wa Municipality was selected because of the increasing frequency and incidence of floods, rainstorms, and droughts affecting peri-urban agriculture and livelihoods of populations in the city and peri-urban areas.

In the process of implementing the project, some changes were made to some of the objectives based on the findings and emerging issues. After the preliminary studies, it became necessary to introduce an objective on environmental stressors affecting communities as an entry point for engaging stakeholders. The fourth objective, to design capacity building approaches for strengthening MMDA, was replaced with an objective to identify policy areas that are critical for improving community resilience. This change was made because achieving the original objective would have required more time than was available.

The research process achieved the set outcomes through the following:

- A preliminary phase involved sampling two study communities, Nakore and Kpong, doing community entries, and conducting preliminary studies to inform refinement of data collection tools.
- Secondary data review involved a content analysis of the MTDP of Wa Municipality and a literature review to support the study
- Community studies in Nakore and Kpong, involved focus group discussions with male and female farmers and youth using focus group discussion guides, and in-depth interviews of opinion leaders such as District Assembly members, chiefs, earth priests, and traditional women leaders, using in-depth interview guides.
- Community workshops for further analysis, validation, and dissemination of the findings were often followed by moderated discussions.
- At the institutional level, in-depth interviews were conducted using in-depth interview guides with officials of the Municipal Assembly and its departments (NADMO, the Department of Community Development, and the Department of Agriculture) whose activities relate to community resilience.
- Working meetings were held with the Faculty of Planning and Land Management to plan the research activities and provide guidance and feedback to support the reporting process.

This research project was meant to be implemented with the collaboration of the Ghana Red Cross Society. However, its limited visibility and lack of physical presence (staffing) in the municipality resulted in minimal collaboration.

4 What Did You Learn?

The study found that environmental change continues to occur in the communities, with drought, flooding, deforestation, rain/windstorms, loss of soil fertility, rainfall variability, land degradation, bush fires, and changes in crop and disease patterns. Rainfall variability, in particular, affects people's livelihoods. Early rains in December once enabled plant stalks to decompose for preparing fields, followed by rains in March and April for raising farm mounds, and then by May-June, the major rains start. This is the period when farmers start sowing. At this stage, the rains are torrential and fall intermittently, on the average every 4 days. After 2 months, when crops are maturing and need less water, the rains gradually become less intense. Respondents said that farm outputs used to be higher when the rainfall pattern was good, which allowed them to plan what to grow and when to reduce losses. Most said that they can no longer predict when the rains will fall, and this affects their farming schedule and livelihood planning. Moreover, the torrential rains wash away fertilizer, or rain fails to fall after fertilizer is applied, leading to losses.

We are in the eighth month of the year, but we cannot tell whether we are in the rainy season or the dry season. (Male farmer interviewed in Nakore)

Now we don't know the season we are in. You cannot say whether you are in the rainy season or in the dry season. We are all confused by the recent changes in the seasons. (Female farmer in a focus group discussion in Nakore)

In the past we did not know drought. The rainy season used to start with binkogli saa [the dry season], followed by saage saa [February]. These rains were the first rains that used to fall to enable us plough our farm lands. They also help in the fruiting of major trees like the dawadawa, and shea tree. (Male farmer interviewed in Nakore)

Drought is one of the main environmental stresses that has negative impacts on community livelihoods. Respondents reported that the periods between drought and rainfall have gotten longer over past years and affect the growth of crops and farm outputs.



A groundnut farm in Kpongu

Since we started fasting, we have not had rains. We should have been harvesting groundnuts and beans by now, but that is not the case. People should be applying fertilizers on their farm, people should have been sowing their crops, but all these activities are not happening because of the drought. (Male farmer interviewed in Nakore)

Some years ago, we planted groundnuts, and for 1 month there was no rain. When it finally rained, germination was poor. (Female respondent in Kpongo)

We have sown crops for 3 months now, but we are yet to record rainfall since we did the sowing. Last year, I cultivated half an acre of groundnuts. I hired people to help me sow, but at the end the harvest was poor. The yield was half a 50 kg bag, and some were even with empty shells. (Female respondent in a focus group discussion in Kpongo)

Wind and rainstorms have been increasing in the community over recent years. This affects the fruiting of economic trees such as the *dawadawa* and shea tree during their flowering periods and hence the availability of raw materials for women, especially those who work in the agro processing industry and trade in shea nuts and shea butter. Wind and rainstorms also destroy farm crops.

Our wives go to the bush and come home with empty basins. So the women have diverted to other activities to earn a living (Male respondent from Kpongu)

In Nakore, we do not have good harvest of shea nuts, so how can we engage in trade? (Elderly woman interviewed in Nakore)

The shea trees do not fruit as usual, and so we do not get enough shea nuts to process into shea butter. (Female focus group discussant in Kpongu)

Deforestation in the community is mainly a result of sand winning, charcoal making, and conversion of farm lands into residential uses.



Sand winning and the degradation of arable land in Nakore

Respondents noted that trees play an important role in rain formation, but it is difficult to stop tree cutting.

All the important trees have now been felled for charcoal. They are now felling the shea tree and the dawada, which are economic trees. Now we don't talk of the shea tree again. All the charcoal you see them carrying is gotten from the shea tree. In the past we used to have big shea trees in the community, but now you can't see even one. Now, if not in your farm you can't get shea nuts to pick. (Male farmer interviewed in Nakore)

Land degradation from deforestation, sand winning, and quarrying is leading to loss of soil fertility. Respondents said they can no longer cultivate maize without using fertilizer.

In the past, when you farmed an acre of land, you could harvest plenty of foodstuffs, but now you can sow three acres and in the end you cannot even harvest a bag. (Male farmer in a focus group discussion in Nakore)

We say we want development, so how can there be development without winning sand for building infrastructure. There cannot be development without sand winning. (Male farmer in a focus group discussion in Nakore)

We are losing our farm lands as a result of sand winning and stone quarrying. You can't imagine that you go to your farm and they have turned it into a sand winning pit. How can you do any meaningful farming under such situations? (Male farmer in a focus group discussion in Nakore)

Now our soil has lost its fertility, we can no longer farm without fertilizer. Without fertilizer, you can't do any meaningful farming. It is the rains that also determine when to apply fertilizers. When you apply the fertilizer, the rains do not fall, and then you make a lot of losses. This year I have applied fertilizer and for the past 1 month, there have not been any rains. (Female farmer in a focus group discussion in Nakore)

As a result of poor soils, you cannot grow crops such as maize without applying fertilizers. (Male farmer interviewed in Nakore)

Respondents generally agreed that over past years, the disease pattern of crops and livestock has changed, with increasing incidence and devastating effects. The change has led to lower crop yields and death of livestock.

Box 1: Community views on environmental change

Now we don't know the season in which we are in. You cannot say whether you are in the rainy season or in the dry season. We are all confused by the recent changes in the seasons. (Female farmer in Nakore during focus group discussions)

In the past we did not know drought. The rainy season used to start with binkogli saa [the dry season], followed by saagesaa [February]. These rains were the first rains that used to fall to enable us plough our farm lands. They also help in the fruiting of major trees like the dawadawa, and shea tree. (Male farmer interviewed in Nakore)

Now our soil has lost its fertility, we can no longer farm without fertilizer. Without fertilizer, you can't do any meaningful farming. It is the rains that also determine when to apply fertilizers. When you apply the fertilizer, the rains do not fall, and then you make a lot of losses. This year I have applied fertilizer and for the past 1 month, there have not been any rains. (Female farmer in a focus group discussion in Nakore)

In this community you cannot grow crops such as maize without applying fertilizers. (Male farmer interviewed in Nakore)

A massive reduction in crop yields in Kpongu and Nakore has aggravated hunger and poverty in the communities. Respondents from Kpongu reported that deviation in the rainfall pattern started decades ago. As a result, *tentele* has invaded their farmlands and threatens their crop yields.

Some years ago, the rains did not fall for about 1 month after we sowed groundnuts. When it finally rained, germination was poor, and this led to poor yields. (Woman in a focus group discussion in Kpongu)

We have sown crops for 3 months now, but the rain is still to fall. Last year, I cultivated half an acre of groundnuts I hired people to help me sow, but at the end I harvested half a fertilizer bag, and some were even with empty shells. (Female respondent)

Foodstuffs do not last up to the next season of the harvest on several occasions; therefore, we have to buy foodstuffs. What is obtained from the farms is usually not sufficient to feed the family, and so sales for income are not possible ... Throughout my life time, I have never witnessed a bowl of maize being sold at GH¢3.50 as it stands now. (Male respondent)

Disaster risk reduction in District Development Planning

While the municipal authorities said they are promoting DRR in Wa District development planning, communities said little is being done to support adaptation. At the institutional level, district municipal authorities report that they are engaged in interventions to help communities reduce risk and adapt to environmental change (box 2):

Box 2. Role of the Municipal Assembly in building community resilience

We have intensified community outreach and sensitization Programmes in the municipality because most of the communities are not aware that if they burn the bush it can create some anomalies in their farm produce and their household livelihoods in general. So based on that, we are working with NADMO, the fire service, and other stakeholders to ensure that bush burning is controlled entirely in the municipality.

The assembly also implemented afforestation projects, through the “Green Ghana” projects, whereby communities were assisted to have acres of lands for wood lots and plantations. The assembly is also in partnership with the Northern Rural Project, and most of the communities were assisted to engage in afforestation under the project. These are some of the numerous ways the assembly builds resilience at the community level.

In addition, there is a program for dry season farming where farmers do gardening and farm during the dry season. So you see that all those strategies are geared towards community resilience, because they now do all year round farming. This Programme was actually supported by the World Food Programme.

Municipal Planning Officer

Climate change adaptation has become an important component of the development plans of the Wa Municipal Assembly. With support from NADMO and the Ministry of Food and Agriculture, disaster preparedness activities were key in the 2010–2013 and 2014–2017 MTDP. The District Planning and Coordination Unit of the Assembly confirmed that funds had been released for preparing disaster preparedness or emergency response plans for incorporation into the 2014–2017 MTDP. A content analysis of the MTDP found that there has been a modest effort at strategy development and implementation to build community resilience to environmental change. Most of these projects have an indirect but positive bearing on building community resilience to environmental change (table 1).

Table 1. Measures to build community resilience in Medium Term Development Plans (MTDP), 2010–2013 and 2014–2017

2010–2013 MTDP	
Direct measures	Indirect measures
Support the development and introduction of climate-resilient, high-yielding, disease- and pest-resistant, short-duration crop varieties, taking into account consumer health and safety.	Set up a taskforce to encourage large-scale <i>dawadawa</i> tree development, processing, and utilization.
Develop appropriate and affordable irrigation schemes, dams, boreholes, and other water harvesting techniques for different categories of farmers and ecological zones.	Support the establishment of butter processing factories in the municipality for both local and international markets.
Promote the efficient utilization of existing irrigation facilities, especially in drought prone areas.	Strengthen research into large-scale breeding and production of guinea fowls, cattle, sheep, and goats.
Promote joint planning and implementation of Programmes with relevant institutions to address environmental issues in food and agriculture.	
Hold sensitization/awareness creation workshops at district/zonal and community levels on climate change.	
Minimize climate change impacts on socio-economic development through agricultural diversification.	
Develop policy on tree planting desertification and degradation practices.	

2014-2017 MTDP (draft)	
Rehabilitate dams.	Build capacity of women in agri-business.
Sensitize farmers on climate change, water management and safe use of agro-chemicals	Recruit more technical staff for the Ministry of Agriculture.
Plant economic trees.	

Source: Wa Municipal District Assembly MTDP, 2010–2013 and 2014–2017.

These measures, however, are not enough to engender community resilience to the magnitude of environmental change and mitigate the development challenges that face local communities. This is probably why study respondents generally reported that no external support was forthcoming to help farmers address challenges to earning a livelihood under conditions of climate change or environmental challenges.

The farmers were left on their own (Female farmer in a focus group discussion in Nakore)

In 2001 and 2002, we had a serious disease outbreak in the community that killed a lot of our livestock, but we did not receive any external support to deal with the challenges. (Male farmer interviewed in Nakore)

Respondents explained that the guidelines for plan preparation at district level are crafted so that every decentralized department of the Assembly submits its inputs for a particular planning period. Departments and agencies such as NADMO, the Environmental Health Department, the Ministry of Food and Agriculture, and the Department of Community Development, which work closely with the communities, include major development issues faced by communities in their plans. These inputs are consolidated into a plan for the entire Assembly. Climate change adaptation remains key to the development efforts of the municipality, and this process allows for mainstreaming resilience into local plans. Climate change is also part of the set of indicators used to assess the performance of metropolitan, municipal, and district assemblies. In this context, NADMO has implemented a tree planting project in several communities to strengthen resilience to threats of desertification. Community outreach and extension services have also been intensified in all communities to help households and farmers adopt innovative approaches to cope with land and soil degradation, drought, floods, and windstorms.

Capacity of the MMDA for community resilience planning

Although all the MMDA include plans for mainstreaming resilience into local development planning, financial resources are a major constraint. For example, officials of the Department

of Community Development said they had not received any subventions from the central government for day-to-day administrative activities for the 2013 and 2014 fiscal years.

The central government has not given us any pesewa to work with, but we cannot sit down and say central government has not given us money, therefore we cannot work. We normally collaborate with other partners and NGOs to implement certain programs. We collaborate with the World Food Programme to implement some of their projects. What that means is that we will only be able to implement programs that are in their priority list. (Director, Department of Community Development, Wa Municipality)

Most departments work closely with communities and have constituted local groups to manage and report disasters and other livelihood threats in their localities, but for lack of resources, most of these groups have remained non-functional. The Municipal NADMO Coordinator reported that NADMO is supposed to organize in-service training for Disaster Volunteer Groups, who should in turn move to the various communities to implement disaster preparedness, but funds are lacking for this training and posting.

The Municipal Assembly has the human resource capacity to mainstream resilience into local development planning.

The human resource based of the department, I can say, is better because as of last year, the government employed a lot of professional graduates from the University for Development Studies. So I can say that most of the districts now have qualified personnel who are working in the departments. So in terms of human resource capacity, I can say to a large extent that it is better. (Director of the Department of Community Development)

Of all the Departments surveyed, only NADMO said it lacked the capacity to develop proposals to secure funding to run its own projects.

NADMO depends very much on the government. In this part of the world, the rich do not recognize the need to give to state institutions like NADMO to enable them to prevent the unfortunate. So to a large extent, NADMO's resources depend on government. So if the government happens not to give, then nothing better can happen. This is a serious capacity issue because if the government on which we depend fails to give what you are supposed to work with, that is really very serious ... I can say that NADMO doesn't have anything. Nothing whatsoever, and so if there is any disaster now we will be ill-prepared. We don't have materials; we are still waiting to hear what our head office will tell us. (NADMO Municipal Coordinator)

Policy recommendations for improving community resilience planning

This research project makes a number of policy recommendations toward building community resilience to environmental change through district development planning, reflecting the perspectives of communities studied.

- Promote effective education and enforcement of legislation for natural resource conservation, particularly conservation of trees and vegetation and management of sand winning to promote vegetative regeneration for enhanced livelihood support.
- Continuously promote tree planting in general and woodlots to meet the bio-energy needs of communities and reduce their need to cut down trees for energy purposes, such as making charcoal or use as firewood.
- Promote livelihood diversification through access to financial credit, inputs, and training in both agriculture (food crops, poultry and livestock production, gardening) and non-agricultural and trade livelihoods (access to protective clothes for construction work and quarrying).
- Promote the blending of traditional and new crop varieties that are resistant to drought or heavy precipitation.
- Promote access to and minimal application of fertilizer and other agro-chemicals such as pesticides, which farmers now use because of infertile soil conditions and changing rainfall and disease patterns.
- Promote the use of organic manure from cow dung and poultry droppings, which farmers now use on a limited scale because they are difficult to get in large quantities.
- Engender community response to climate and environmental change through the active leadership of traditional authorities, including chiefs, earth priests, youth groups, and community-based groups.

5 Immediate Impact

The project yielded positive outcomes in the field of development practice. First, it engendered discussion about community resilience in the Metropolitan Assembly and its allied departments, and the authorities' interest in the subject gave it legitimacy and engendered confidence that it is an appropriate policy direction. Second, it raised consciousness among communities about the need for community governance and in the process engendered discussion and interest in scaling up resilience response measures from individual and household levels to community level through community self-mobilization. Interest and momentum are building for promoting community resilience through research, policy planning, and implementation among the stakeholders in the project. These include the Wa Metropolitan Assembly, its affiliate departments, and the University for Development Studies, represented by the Faculty of Planning and Land Management. While many members of this faculty are used to working on research as individuals, the project engendered a spirit of teamwork that is encouraging others to follow suit. Communities are also beginning to engage in dialogue about how they can promote community mobilization and community response to build community resilience.

6 Future Impact

Community dialogue about building community resilience will take the domain response beyond individual efforts and adaptation measures. This research will contribute to scientific understanding and policy formulation through publications that will explore the connections between environmental change, livelihoods, and local knowledge systems and policy planning.

7 Conclusions

Communities are exposed to multiple environmental stressors at the same time, and these adversely affect the sustainability of both primary and off-farm livelihoods in Wa Municipality. Although some efforts are being made to focus attention on community resilience in district development planning, efforts are modest and cannot produce significant outcomes given the magnitude of environmental change. Lack of funding is the primary constraint to the implementation of community resilience planning and implementation in the municipality.

The research findings suggest a need to evaluate the future progress of the Wa Municipal Assembly in incorporating community resilience planning into district development plans and the effectiveness of implementation in addressing the challenges of environmental change. Direct technical support and training in community resilience planning and DRR are needed for key personnel. There is also a need to assess how to facilitate community governance to promote endogenous and sustainable community response to environmental change.

A comprehensive and integrated policy framework is appropriate for enhancing community resilience through district development planning, given that communities are affected by multiple stressors at the same time. Such a policy framework should make provision for the following key interventions:

- Promoting natural resources conservation and regeneration, particularly the conservation of trees and vegetation, arable lands, soils, and water resources
- Promoting agricultural diversification and adaptation by enhancing access to appropriate inputs such as seed, poultry and livestock breeds, organic manure, and fertilizer for food crop production.
- Promoting diversification to non-farm livelihoods by enhancing access to credit, training, and technologies and clothing to protect against health hazards.
- Promoting self-help community response to complement individual and household responses. This will also provide an appropriate institutional framework at the community level for engaging with external development agencies to build community resilience to environmental change.

8 Publications

This research project has not yet produced publications, although there are ongoing initiatives to publish the findings in the following papers:

1. Assessing Environmental Change through Local Knowledge in Northwestern Ghana
2. Environmental Change and Livelihood Vulnerability in Northwestern Ghana: Vulnerability of Indigenous Economic Tree Species to Climate Change: Implications for Livelihood Sustainability in Northwestern Ghana
3. Disaster Risk Reduction through District Development Planning under Environmental Change in Northwestern Ghana
4. Endogenous Knowledge Systems and Building Community Resilience to Environmental Change: Evaluating the Role of District Development Planning in Ghana
5. Capacity Assessment for Community Resilience Planning through Decentralization under Environmental Change in Northwestern Ghana
6. A Proposed Policy Framework for Building Community Resilience to Environmental Change through District Development Planning under Environmental Change in Northwestern Ghana

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