Myth or reality: Climate Change Impacts a Threat to Smallholder Cocoa Farmers Livelihood in the Western-North of Ghana

Introduction

Climate change projections into the future show an even grimmer picture regarding rainfall and temperature changes in Ghana. Predictions for change in rainfall range between -3% to +7% by 2100. Comparing current rainfall figures to that of the year 2040, a common projection is a national decrease of 4% but some projections to 2100 range from -15% to +16% (USAID, 2017). Such changes will very likely increase the likelihood of extreme events occurring (IPCC 2021). For instance, flood events are likely to increase in the areas that may experience an increase in precipitation in the period stated while drought episodes may follow if the predictions of a decrease in precipitation become real. In terms of seasonal differences, a general projection is that there will be rainfall increases from July to December and decreases from March to June (Läderach et al., 2011). These shifts have the tendency to alter planting seasons and the type of crops grown in various agro-ecological zones in the country (IPCC 2021).

However, it is unclear the extent to which local communities are experiencing these impacts and how policies based on available projections of climate change and its impacts address the needs of such communities. Similarly, it is not clear how local communities cope with the effects predicted to reduce their livelihood vulnerability. Understanding their perception of impacts and their coping strategies is therefore relevant to inform robust policies that improve the adaptive capacities in such areas. This brief presents new empirical evidence on how climate change manifest in Ghana cocoa hotspot intervention areas, its impacts, and the mechanism communities in this area adopt to
reduce their vulnerabilities. Ample evidence has been established to argue that if the current trajectory goes unchecked it would impact smallholder cocoa farmers’ livelihood, national foreign exchange earnings, and overall poverty alleviation in the countryside. The analysis is focused on the Sefwi-Wiawso, Juabeso, and Bia landscape (SWJBL) in the Western North region (Figure 1), which is the bedrock of cocoa production in Ghana, a key contributor to foreign exchange earnings and national development.

We gathered data through focus group discussions involving 77 participants and a survey with 97 respondents within the landscape. Participatory assessment of vulnerability focused on analysis across different social groups and gender of perceived climate hazard and vulnerability ranking, and locally used coping and adaptation strategies.

About 70% of respondents indicated that rainfall has decreased over the last three decades. The respondents indicated that current climatic conditions were less favorable than in the past and they anticipate that conditions would further worsen in the future. For instance, the participants in all three districts mentioned that rainfall has become lower and irregular while temperature has become higher in current times than in the past three decades. Thus, their perception of changes is consistent with measured changes. Other issues raised by participants included reduced sizes/numbers of rivers, pollution of water bodies, frequent wildfires, more pest/disease problems, higher deforestation rates, and reduced wildlife in current times compared to the situation three decades ago. The most commonly perceived climate change hazards within the landscape are floods, drought, wildfires, wind/rainstorms, and pest infestation. Pest infestation and drought were ranked as having the highest impacts overall in the three districts while floods were ranked as the lowest. Adapting to climate change in the landscape would require policies, institutions, interventions, and the cooperation and coordination of all key actors to manage these risks and impacts of climate change.

Figure 1: Map of the study area
Climate Vulnerabilities and Impacts as Experienced by the Local People

The vulnerable persons in Ghanaian communities are generally exposed to climate change hazards with limited coping capacity and are the least resilient to recovery. Livelihoods in SWJBL landscape mainly revolve around agriculture where farmers cultivate both cash and food crops. Unfortunately, farmers have reported consistent declining yields for all major cash and food crops. Table 1 shows the details of the major crops and changes in their yield. Cocoa as the most important cash crop for instance is reported to record poor yields in recent years, reducing the disposable income of farmers and generally increasing poverty among residents in communities within the landscape. The main reasons adduced for the yield decline include increased pests and disease infestation, prolonged drought, erratic rainfall, less rainfall during the wet season, intense heat waves during the dry season, removal of shade trees on cocoa farms, loss of vegetation in the landscape, poor farming practices. The intensification and emergence of certain disease conditions on cocoa are attributed to the combination of climate factors and poor land management practices. For example, necrosis (the yellowing of cocoa leaves) which results in the eventual death of cocoa trees, is believed to occur due to excessive use of herbicides, intense heat waves during the dry season, poor soil fertility, removal of shade trees on cocoa farms, loss of vegetation in the landscape and poor farming practices. Like the cash crops, food crops such as plantain, cocoyam, maize, and cassava are also reported to suffer yield declines due to similar weather-related factors as listed for the cash crops. For instance, the decline in the yield of maize is attributed to disease and pest infestation (e.g. armyworms) which are favoured by irregular rainfall patterns, late start of rains and shorter periods, less rain, prolonged drought, excessive heat during drying season.

According to the farmers and participants at the focus group discussion, farmers in the study landscape have adopted several measures to cope with the declining yields of cash and food crops, but do not necessarily address the effects of climate change and variability. These measures, according to the farmers, include tree integration into cocoa farms to provide shade for crops and to slow soil moisture loss in fields of cash and food crops; cash crop diversification (e.g. from cocoa to cashew); shifting cultivation or clearing of forest lands for crop cultivation; and application of agrochemicals (mineral fertilizers, pesticides, insecticides, and herbicides) at rates that are far from being environmentally-friendly to increase crops yield. However, the farmers also indicated that the application of agrochemicals improves crop yields in the short term, and that crop yield reduces greatly in the long term.
Table 1: Major crops and changes in their yields due to climate change

<table>
<thead>
<tr>
<th>Agriculture Crops</th>
<th>Changes Observed</th>
<th>Study Areas</th>
<th>Causes/drivers</th>
<th>Aspects of livelihoods affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash crops</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Cocoa</td>
<td>High reduction in cocoa yields over time</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td></td>
<td>Increase in pest and disease infestation</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Necrosis (yellowing) in cocoa leaves resulting in eventual death of cocoa trees,</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Abortion of immature cocoa pods</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Food crops for both cash and subsistence</td>
<td>Plantain</td>
<td>Poor yield, destruction of immature plantains, death of plantains</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Maize</td>
<td>Disease and pest infestation (e.g. army worms), low yield, growth retardation</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Cocoyam</td>
<td>Very poor yield, tubers get rotten before harvesting</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Cassava</td>
<td>Poor yield, tubers get rotten before harvesting, disease and pest infestation</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
Adaptive Capacities and Coping Mechanisms of Communities to Climate Change Hazard

Different coping strategies and adaptation practices were found in the SWJBL to minimize the effects of climate change and climate variability. The most common coping strategy for both men and women in the landscape is integrating trees on farms. Residents consider on-farm tree integration of particular importance in the landscape since many grow cocoa (Theobroma cacao) which needs shade trees for sustained optimum productivity. Other strategies include adopting additional livelihood activities (e.g., construction, beekeeping), installing an early warning system within the community, and cash crop diversification (e.g., some farmers switching from cocoa to cashew crop). However, current strategies towards crop diversification in the landscape are considered insufficient and lack support from both the private and public sectors. The present study was set in a cocoa-forest-dominated landscape. Evidence from a similar study in Indonesia indicates that in landscapes with different economic opportunities and priorities, existing adaptation strategies vary (Widayati et al. 2021).

Furthermore, fire volunteer groups are set up in communities to prevent fire occurrence (usually caused by farming activities, hunting, and natural sources) by sensitizing farmers on the use of fire on their farms. About 51.5% of the respondents reported that they typically receive some warnings before the occurrence of climate change hazards. The remaining 48.5% indicated that they do not receive prior notification. The sources of climate hazard warnings in the landscape include the media (radio), local government authority (District Assembly), non-governmental organizations, and agricultural extension officers. Despite adopting different coping strategies and adaptation practices, respondents encounter some barriers for the effective and continued application of the adopted adaptation strategies. These include (1) limited access to financial services and incentives needed to make investments to continue adopting climate-resilient practices; (2) limited access to timely information on climate risks and responses partly due to understaffed extension officers; and (3) insufficient harmonisation and coordination of actions to address the impact of climate change vulnerability in the landscape by both government and private sector.

Regarding the long-term application of coping measures, more than 50% of both men and women considered their coping measures applicable over the long term (Figure 2).

Figure 2: Effectiveness and long-term applicability of coping measures adopted by respondents

![Bar chart showing effectiveness and sustainability of coping measures adopted by respondents.](image)
Conclusion

The study suggests that climate change impacts are observable at the local level. Current climatic conditions are now less favourable than in the past, and it is anticipated that conditions would even further worsen going into the future. The most common climate change hazards within the landscape are floods, drought, wildfires, wind/rainstorms, and pest infestation. Pest infestation and drought are ranked as having the highest impacts overall in the three districts, while floods are ranked as the lowest. Most farmers in the landscape get their working capital from cocoa proceeds, therefore the exposure and vulnerability of their wealth are intrinsically linked to the exposure of cocoa and other cash crops. The study showed that local communities in the landscape had initiated adaptation strategies that need to be recognized and re-enforced through policies and programmes. The study also suggests that adaptive capacities already exist in the landscape, and climate actions in the landscape should recognize these existing adaptive capacities and not assume that they need to start from scratch. The study showed that local communities encounter some barriers in the application of adaptation strategies, including limited access to financial services and incentives for investments in climate-resilient practices; limited access to timely information on climate risks and responses; and poor harmonisation and coordination of actions to address the impact of climate change vulnerability in the landscape.

Recommendations

Proposed recommendations and some follow up actions are:

1. Harmonise and institutionalize climate change education into existing agriculture and cocoa extension service delivery.
2. Proper harmonization and coordination of all interventions that seek to address the impact of climate change in the landscape.
3. Promote crop diversification through target training, value chain development, farmer organizations to reduce post-harvest losses and off-farm wealth creation in cocoa-growing communities.
4. Improve awareness-raising on climate change mitigation through timely information dissemination via local media platforms e.g., community centres and radio

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