
The Effect of Climate Change on Developmental Aid to Africa: A Case Study of Ghana

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Abstract

For Africa, climate change presents major development challenges as it affects the ecosystem, human wellbeing, landscape, economy, health, agriculture and infrastructure. The aim was to examine the effect of climate change on developmental aid to Africa: a case study of Ghana. A sample of one hundred and twenty (120) respondents was the subject of a quantitative study design. A closed-ended, five-point Likert scale was used in the questionnaire. Regression analysis was used to interpret the data. The results of the study showed that there is a direct significant relationship between climate change and developmental donor aid. Climate change-related aid helps agribusinesses provide with climate-resistant technologies and inputs, such as drought-resistant crops, seed varieties, fertilisers, and market access for their produce, which directly impacts productivity. According to the study, the Ghanaian government should seek to expand access to climate finance through streamlined application processes, increase capabilities for project development and create funding mechanisms for climate change.

Keywords: adaptation strategies, climate change, climate action, developmental aid, Ghana.

1. Introduction

1.1 Introduce the Problem

The continent of Africa today faces a twin development challenge of developing economically while also facing the consequences of climate change (Weiler & Sanubi, 2020). In both areas, the region has limited capacities, as acknowledged, for instance, in the climate negotiations (UNFCCC, 2015). For this reason, global initiatives to help African countries deal with this twin challenge are of high importance today (Betzold & Weiler, 2018). In particular, the reaction of international donors, both bilateral and multilateral, towards Africa's funding needs is of high relevance for the continent's capacity to attain sustainable development (Betzold & Weiler, 2018).

Ghana is one of the African countries most vulnerable to the effects of climate change. This is due to its geographical, socio-economic, and infrastructural weaknesses. As global temperatures rise, the country must increasingly face more severe droughts, floods, desertification, and other climate-related events (Robinson & Dornan, 2017). These can undermine efforts for development in the developing world and cause a significant shift in foreign aid strategies. The impact of climate change on development aid is crucial in shaping policies that encourage

resilience and sustainable growth in African nations (Muccione, Allen, & Huggel, 2017). Climate change is recognised as the major global challenge of the 21st century. Developing countries, which often have limited resources, poor infrastructure, and are heavily dependent on vulnerable sectors like agriculture, suffer disproportionately from climate-related disasters such as floods, droughts, and storms (IPCC, 2021). These nations are the least responsible for the emissions driving climate change (Weikmans, Robert, & Baum, 2017).

Climate change is one of the pressing issues of the 21st century that is threatening ecosystems, human life, and the global economy (Wisner et al., 2024). Global temperatures have risen by about 1.1°C above pre-industrial levels, according to the Intergovernmental Panel on Climate Change (IPCC), and extreme weather events are increasingly more frequent and severe (Weiler et al., 2018). These climate-related threats are particularly acute for West Africa, where they take the form of unpredictable rainfall, long-term droughts, coastal degradation, and sea level rise (Weiler & Sanubi, 2020). These impacts contribute to increasing food insecurity, population displacement, and economic instability, emphasizing the pressing need for effective adaptation and mitigation solutions (Weiler, 2019).

International climate finance mechanisms have been formed to close this gap by mobilizing climate adaptation and mitigation resources in developing countries (Shimada, 2022). Yet the value, availability and adequacy of this financing for promoting sustainable development are in question. Ghana, a West African country with several diverse ecological zones, is experiencing climate variability and extreme weather (Shimada, 2022). Climate change poses a significant risk to undermining development progress in Ghana, notably as the economy is heavily dependent on climate-sensitive sectors such as agriculture and fisheries. The role of international development assistance foreign aid, is critical to helping build resilience and supporting Ghana's response to adapting to climate change.

This contextual gap needs to be filled. This paper aims to fill this gap and contribute to the existing body of knowledge by utilising powerful instruments, such as regression analysis, to examine the impact of climate change on developmental aid to Ghana. To fill the research gaps, the study hypothesized that

H1: There is a significant positive relationship between climate change and developmental donor aid to the Ghana Agricultural and Fishery Sector.

The conclusion of the study offers exclusive insight into the study's contribution to the theoretical and practical implications of the study. In terms of theory and research, the study contributes by bridging the financing aid of climate change through government strategies and interventions. Also, with Ghana, the study contributes by practically boosting national institutions engaged in climate finance. Such an effort would include assistance with training and technical support for project proposal development, financial management, monitoring, and evaluation capabilities. Improving institutions will allow for more effective utilisation and access to climate financing resources. Through the adoption of these strategies, Ghana stands a better

chance of strengthening its resistance to climate change and attaining sustainable development. Based on this, the study aims to add to the already prevailing body of knowledge by filling the gap in context relating to the subject matter.

1.2 Statement of the Problem

The issue of climate change poses an existential threat to agricultural productivity and food security, especially given that developmental donor aid support for climate adaptation initiatives in Ghana has been vital. The potential withdrawal of funding for programmes like the Feed the Future Climate-Smart Agriculture (CSA) Activity could seriously hinder Ghana's efforts to build resilience against climate impacts (Cook & Chu, 2018). Additionally, the Ghanaian environment faces key risks, including the implementation of climate-smart agricultural practices, research and development of drought-resistant crop varieties, and capacity building in climate adaptation strategies. Without these initiatives, Ghana's agricultural and fishery sectors may become increasingly susceptible to climate shocks, jeopardising food security and livelihoods across the country due to insufficient development aid. This creates a contextual gap that requires further exploration. Therefore, this study investigates the impact of climate change on developmental aid to Africa, using Ghana as a case study.

1.3 Relevant Literature

1.3.1 Recipient Merit Model by McKinley and Little (1977).

The Recipient Merit Model is predicated on the idea that resources or financial aid are allocated not only on the recipient's development needs or the donor's self-interest, but also on the recipient's performance, governance quality, or compliance with particular policy requirements (McKinley & Little, 1977). According to the study's recipient merit model, the distribution of donor aid is positively correlated with the governance of recipient nations. This is because stable democratic institutions and sound economic policies guarantee that aid is used to benefit the intended recipients, which increases aid effectiveness (Weiler & Sanubi, 2020).

Thus, the essence of the study's theory is that donor aid allocation for climate change frequently assesses both Ghana's merit of receiving the aid and the relative importance of the recipient's needs in terms of reducing and addressing the country's climate change difficulties. However, research has shown that recipient merit typically makes up a very tiny portion of anticipated aid from bilateral donors, frequently being eclipsed by donor self-interest (e.g., economic openness, political alignments), even though recipient need is a considerable determinant (Chandio et al., 2020). This demonstrates that rather than being exclusively motivated by donor interests, climate change aid for Ghana's agriculture and fishing sector should be distributed in accordance with Ghana's climate change characteristics, performance, and capabilities.

1.3.2 Impact of Climate Change on Development Sectors

Agriculture: Agriculture provides jobs for roughly 40% of Ghana's population, and is also highly reliant on the climate (Anamuah-Mensah, 2017). Unpredictable rainfall patterns and severe

drought have caused low yields of crops and, consequently, food insecurity (Anamuah-Mensah, 2017). For instance, the 2017 drought led to significant decreases in maize and cocoa production, which are economically significant for Ghana (FAO, 2018). Dependence on rain-fed agriculture increases vulnerability as smallholder farmers do not have access to irrigation and weather information services. The impacts are that droughts and erratic rains result in reduced crop yields, affecting production of maize, millet and rice (Anamuah-Mensah, 2017).

Water Resources: Altered precipitation and higher temperatures both restrict water availability, particularly in the north (Oppong, 2019). This impacts household, agricultural and industrial water use and the corresponding increase in dependence on unreliable sources and the resultant strain on water resources (Oppong, 2019). The poor quality of water can result from the poor flow rates and the presence of contaminants. The supply of water is becoming more unpredictable as rainfall and evaporation increase with temperature (Oppong, 2019).

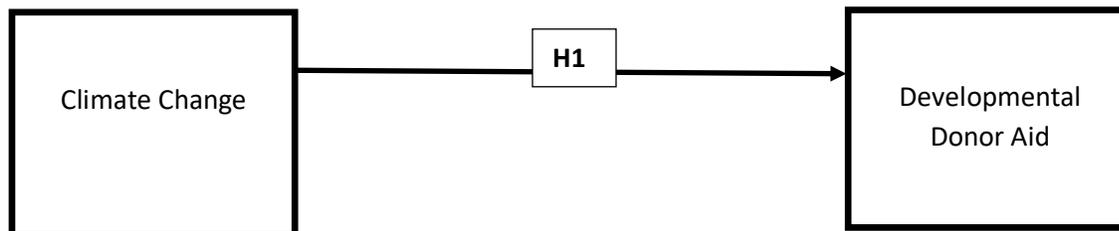
1.3.3 Empirical Review

The study conducted by Weiler and Sanubi (2020) concerning development and climate aid to Africa: comparing aid allocation models for different aid flows. A quantitative research approach was adopted using data from 1996 to 2016 for 28 OECD donors to 53 African recipients for development aid flows. The result revealed that the recipient needs model for general development aid allocation is valid in the African context, which contradicts and updates older studies which concluded that aid in Africa is not linked to development needs. Also, Huang (2013) examines how foreign aid is used to achieve the joint objectives of development, mitigation of and adaptation to climate change in agriculture in the developing world. The study adopts a quantitative approach and the results found that agriculture is underinvested and foreign aid has not increased sufficiently to assist developing countries in achieving sustainable agriculture; substantial funds are needed to finance the wide range of measures for mitigating and adapting to climate change.

Local government financing of climate change in Ghana: politics of aid and central government dependency syndrome was examined by Musah-Surugu, Ahenkan and Bawole (2018). The study was conducted using qualitative in-depth interviews in a Ghanaian context. The result indicated that developmental aid and the central government's transfer remain inadequate to meet the increasing climate change demand for adaptation costs at the local level in Ghana. In the face of the unequivocal impact of climate change risk, the study contends that local resource husbandry must be optimised through different innovations to complement other major sources of financing. Lalthapersad-Pillay and Udjo (2014) examined the implications of climate change for Africa's economic development through donor aid and found that eleven African countries are high-risk countries whose future economic development may be impeded by inadequate climate change aid. Jain and Bardhan (2023) used panel data from 119 developing economies to investigate the impact of development assistance on climate change vulnerability. Using a series of econometric techniques, Jain and Bardhan (2023) documented that foreign aid significantly drives climate change vulnerability.

1.4 Conceptual Framework and Hypotheses Development

Figure 1: Conceptual Framework



Source: Researcher Own Construct, 2025

Effect of Climate Change and Developmental Donor Aid

Prior research has shown a great significance towards foreign aid in helping developing countries to attain climate goals and sustainable development (Jain & Bardhan, 2023). Mahembe and Odhiambo (2021) indicated that donor aid directly impacts developed countries to support their climate-building actions since not all developing countries have the capacity to deal with the challenges posed by climate change. According to Zhao, Dong, Nepal and Zander (2025), foreign aid served as a source of climate finance, which helped less advanced countries to mitigate and adapt to climate change risks. Huang (2013) provided evidence to support the claim in their research on the impact of climate change on donor aid support and found that agriculture is underinvested and foreign aid has not increased sufficiently to assist developing countries in achieving sustainable agriculture. Therefore, based on the theoretical and empirical relationships between donor aid and climate change established above, the following hypothesis is proposed

H1: There is a significant positive relationship between climate change and developmental donor aid to the Ghana Agricultural and Fishery Sector.

This part of the chapter presents the methodology and procedures adopted to conduct the study concerning the effect of climate change on developmental aid to Africa: a case study of Ghana

2. Method

2.1 Research Approach

A quantitative research approach was employed with respect to the study's hypothesis. This is supported by its objectivity, capacity to handle big datasets, and potential for repeatable, broadly applicable outcomes. By gathering and examining numerical data, it is used to test theories and spot trends.

2.2 Participant Characteristics

The study participants comprised key stakeholders in developmental aid projects and initiatives in the Agricultural and Fisheries sector in Ghana. The consists of Ghana Climate Change Adaptation Program (GCCAP), Coastal Protection and Climate Change Adaption Project: Funded by the Green Climate Fund, Renewable Energy Projects and Urban Solution Interventions (Flood). The inclusion criteria involve stakeholders that directly involved with donor aid climate change projects in the Agricultural and Fisheries sector

2.3 Sampling Procedures

Multistage sampling was one of the sample strategies employed in this investigation. The first step was choosing the study area, which is Ghana's Climate Change Developmental Aid Projects. The identification of important stakeholders in the climate change donor aid was the second step in the sample procedure, known as stratified sampling. In accordance with Developmental Aid Projects and Initiatives in Climate Change in Ghana, stratified sampling was employed to separate the population into discrete subgroups or strata according to shared traits and roles. In this instance, the Coastal Protection and Climate Change Adaptation Project and the Ghana Climate Change Adaptation Program (GCCAP) are important stakeholders. The Green Climate Fund-funded Urban Solution Interventions (Flood) and Renewable Energy Projects might be considered the stratum. The study guarantees representation from several demographic segments pertinent to the research goal by locating and choosing volunteers from each stratum. Each stakeholder group's sample size was established at the third stage. In the fourth phase, participants were chosen from among the farmers, fund managers, and fishermen

2.3.1 Sample Size, Power, and Precision

The study's total sample size consisted of 120 respondents who were selected. The selection of these categories of stakeholders was based on their experiences concerning Developmental Aid Projects and Initiatives in Climate Change in Ghana. The determination of the total sample size of one hundred and twenty (120) members was determined using a review of existing literature and the rule of thumb. Based on this, Lalthapersad-Pillay and Udjo (2014) showed that experiences from 50 to 100 observations in the selected areas justified and achieved data saturation.

2.3.2 Measures and Covariates

The study's instrument for gathering data was a questionnaire. The justification is based on the use of a large number of participants at a specific moment in time. As a result, the questions were created with the study's particular goals in mind. Closed-ended questions using a Likert scale were used for the survey. The questions are on a scale from 1 to 7.

Table 1: Variables Description and Measurement

Abbreviation	Variable	Measurement	Expected sign
DDA	Developmental Donor Aid (Dependent Variable)	This is measured by using food security, economic stability and poverty reduction	
CC	Climate Change (Independent Variable)	This is measured using shifting of rainfall patterns, high temperature, land degradation , floods and droughts, and shortage of seafoods and crop failure	+/-

Source: Filed Survey (2024)

The reliability and validity of the study were ensured in line with the subject under discussion. The justification for conducting the said test is that it helps to provide consistency among the questions. The study ensured that tests involved Cronbach's Alpha, factor loadings, composite reliability, as well as content validity.

2.3.3 Research Design

The study used a descriptive and explanatory research design because of the nature of its objective. The descriptive technique was chosen because it provides a succinct explanation of the variables used in the study. However, the use of explanatory research is justified by the fact that it clarifies the patterns of relationship between the variables being examined. Additionally, it provides a comprehensive understanding of the issue and guarantees the assessment of causes and effects among variables.

2.3.4 Experimental Manipulations or Interventions

A model based on earlier research by Weiler and Sanubi (2020) Huang (2013) was used to determine the effect of climate change on developmental aid. The following model is estimated by the study.

$$DDA = \lambda_0 + \lambda_1 CC_i + \lambda_2 CTC + e_i \quad (1)$$

Where:

DDA= Development Donor Aid

CC = Climate Change

CTR = Control Corruption (Control Variable)

GI = Green Insurance

$\lambda_0 = \text{constant of the model}$

$\lambda_1 + \lambda_2 = \text{coefficient of the model}$

$\varepsilon_t = \text{stochastic error term.}$

3. Results

This chapter presents the results of the study. The presentation of the results was in line with the theme of the study concerning the effect of climate change on developmental aid.

3.1 Validity and Reliability

Table 2: Validity and Reliability Test

Construct	Items	Loading	AVE	CR	CA
	DDA1	.798	.682	.928	.825
	DDA2	.866			
	DDA3	.842			
	DDA4	.778			
	DDA5	.863			
	DDA6	.805			
	CC1	.794	.710	.936	.825
	CC2	.856			
	CC3	.867			
	CC4	.848			
	CC5	.829			
	CC6	.860			
	CTC1	.757	.654	.904	.808
	CTC2	.846			
	CTC3	.829			
	CTC4	.765			
	CTC5	.841			

Source: Field Data (2025)

Table 2 presents the validity and reliability results. According to Hair et al. (2019), this implies that the standard factor loadings should be more than the suggested threshold of 0.50. As a result, all of the loadings were above 0.50, falling inside the suggested threshold, according to Table 2 below. Additionally, the results showed the internal consistency of the study structures utilizing Cronbach's alpha and composite reliability. Thus, according to Hair et al. (2019), the threshold for composite reliability and Cronbach's alpha is 0.7. As a result, the results demonstrated that each research design had an alpha rate greater than 0.7. The study's measurement of the coefficient using the average variance extracted (AVE) was safe because every standardized coefficient was equal to or greater than 0.6.

3.2 Discriminant Validity

It measures the degree to which an indicator and its latent variables deviate empirically from other indicators (Gaskin, 2016). Discriminant validity ensures the individuality of each construct and validates its unique identification. When a construct's square root of AVE is greater than its correlation with all other constructs, it is identified (Fornell & Larcker, 1981).

Table 3: Discriminant Validity

	Climate Change (CC)	Change Developmental Donnor Aid(DDA)
Climate Change	0.826	
Developmental Donnor Aid(DDA)	0.508	0.844

Source: Field Data (2025)

Note: Bold and Italic represent the square of AVE

3.3 Statistics and Data Analysis

3.3.1 Inferential Statistics

Table 4: Inferential Statistics

Variables	N	Mean	Std.D	Min	Max
CC	120	4.25	1.534	3.01	4.501
DDA	120	4.10	1.674	2.56	4.226
CTC	120	4.07	1.696	2.48	4.137

Source: Field Data, 2025

The variable climate change (CC) has a minimum value of 3.01 and a maximum value of 4.501, as shown in Table 4. With a standard deviation of 1.534, the average value was 4.25. The value of developmental donor aid (DDA) ranges from a minimum of 2.56 to a maximum of 4.226, with an average of 4.10 and a standard deviation of 1.674.

3.3.3 Hypothesis Testing

Table 5: Regression Results

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
CC -> DDA	0.376	0.376	0.096	3.951	0.001
CTC -> DDA	-0.015	-0.014	0.057	0.264	0.080

Source: Field Data, 2025

Hypothesis 1 states that there is a direct significant relationship between climate change and developmental donor aid. The results support H1. Thus, the direct effect of climate change on developmental donor aid is positive and statistically significant ($\beta = 0.376$, $p = 0.001$). This

indicates that the high climate change experienced in Ghana has led to an unexpected shift in rainfall patterns across the country, along with increased temperatures. Ghanaian farmers heavily rely on rainfall for their crops and livestock. This irregular rainfall and higher temperatures are a result of excessive tree cutting caused by “galamsey activities” in Ghana. The implication is that the country is experiencing more frequent floods, droughts, and shortages of seafood and crops, resulting in food insecurity and increased poverty. Consequently, there is a need for increased developmental aid projects and initiatives to address these climate change challenges. The findings highlight the importance of developmental aid in Ghana aimed at mitigating climate change effects. This result aligns with the research by Trabacchi and Stadelmann (2023), which found that attracting climate change-related foreign aid investments in training programmes for farmers has increased productivity, demonstrating the direct impact of climate change on donor aid. Climate change-related aid can help agribusinesses provide farmers with climate-resistant technologies and inputs, such as drought-resistant crops, seed varieties, fertilisers, and market access for their produce (Bendandi & Pauw, 2016).

Additionally, Table 5 shows control of corruption as a control variable. Based on this, control of corruption had an indirect and significant link with developmental donor aid ($\beta = -.015$, $p > 0.05$). This implies that the control of corruption was at a high level in the management of the climate change donor aid received in the country. This shows that a high level of control of corruption on the part of the stakeholders involved in the management of the donor funds significantly improved the effectiveness of the climate change aid support. The implication is that the donor aids were largely used for intended projects with many success stories arising from community contributions on enhanced drainage projects in Accra, which reduces flood damages, adoption of climate-smart agriculture by farmers in northern Ghana, adoption of drought-tolerant crops and conservation measures, resulting in higher yields.

4. Discussion

The study revealed that the hypothesis is accepted, stating that there is a significant positive relationship between climate change and developmental donor aid to the Ghana Agricultural and Fishery Sector. The result is consistent with the work by Mahembe and Odhiambo (2021), which indicates that donor aid directly impacts developed countries to support their climate-building actions since not all developing countries have the capacity to deal with the challenges posed by climate change. This situation was put forward by Musah-Surugu et al. (2018) when they studied climate change budgetary and financing compliance in Ghana. The study found that the entire budgetary allocation for climate change-related interventions in Ghana includes local funds emanating from Ghana’s consolidated funds and LG’s IGFs, as well as donor funds that flow principally from multilateral and bilateral sources. However, the existing perspective on financing climate change across all scales of government envisions the smooth pooling of blended finance from multiple sources (Basak, 2017; Birdsall, 2012; Cook & Chu, 2018; Eguavoen & Wahren, 2015). This view reflects the substantial financial resources needed to support climate change activities, limited by the capacity of single sources (Cook & Chu, 2018).

The implication is that the high climate change experienced in Ghana has led to an unexpected shift in rainfall patterns across the country, along with increased temperatures, drought, and floods can not be solved by a single source of financing. This shows that Ghanaian farmers heavily rely on rainfall for their crops and livestock for productivity. However, the high climate change and its associated challenges of irregular rainfall, higher temperatures and floods are as a result of excessive tree cutting caused by “galamsey activities” in Ghana and unwanted gaseous waste released in the air. The implication is that the country is experiencing more frequent floods, droughts, and shortages of seafood and crops, resulting in food insecurity and increased poverty. These occurrences lead to greater economic hardship and social vulnerability of people (Boadi et al., 2018). Also, the findings indicated that the climate change actions in Ghana, with specific emphasis on the Ghana coastline, are eroded by floods, with the communities, fisheries, and tourism at risk. Residents are displaced, property destroyed and economic activities that depend on the coastal area are reduced as a result of climate change actions. This has negative implications for the livelihoods and the poverty status in the coastal zones. Rising seas and the erosion of coastlines have threatened fishing communities and biodiversity in the area. Consequently, there is a need for increased developmental aid projects and initiatives to address these climate change challenges. The findings highlight the importance of developmental aid in Ghana aimed at mitigating climate change effects. This result aligns with the research by Trabacchi and Stadelmann (2023), which found that attracting climate change-related foreign aid investments in training programmes for farmers has increased productivity, demonstrating the direct impact of climate change on donor aid. Climate change-related aid helps agribusinesses provide farmers with climate-resistant technologies and inputs, such as drought-resistant crops, seed varieties, fertilisers, and market access for their produce (Bendandi & Pauw, 2016).

The study came to the conclusion that development donor aid assistance in Ghana is strongly affected by climate change. Despite progress through focused initiatives and policy architecture, there are significant gaps in implementation, financing, and capacity. To preserve development gains and foster resilience, Ghana must mainstream climate consideration across all sectors, tap innovative financing, and engage communities further. This is where international partners and donors can help that they ensure that aid is directed to actually tackling the many dimensions of climate change actions in Ghana

4.1 Recommendations

The Ghanaian government should seek to expand access to climate finance through streamlined application processes, increase capabilities for project development and create funding mechanisms for climate change. Also, the government should promote community-led adaptation through the support of local knowledge and participatory approaches in creating locally adoptable solutions for climate change aid. Promote renewable energy, sustainable agriculture and insurance against climate and the Government should protect and restore natural ecosystems such as mangroves, forests and wetlands as affordable climate buffers.

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