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Addressing Security Risk Caused by Climate Change Across Nations: The Role of Non-State Policy Actors

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Abstract

Climate change is projected to produce a lesser amount of expectable rainfall patterns, coupled with extensive droughts intermixed with fleeting but torrential rainfall which has implications on food security risks. The paper examines the role of Non-State Actors (NSAs), specifically, Non-Governmental Organizations (NGOs) in climate change governance and how they address food security risks thereof. The study addresses this objective by placing a special emphasis on the modus operandi of NGOs in helping smallholder farmers navigate through their farming cycle successfully in the Northern belt of Ghana. The study adopts the content analysis and critical stage review of extant literature and other datasets. The study observes that NGOs help smallholder farmers to build their resilience against the ravages of climate change using a more comprehensive approach along the entire value chain of the farming cycle before, during, and after the crop planting exercises. Consequently, we develop and discuss the NSAs-holistic empowerment framework which will contribute to policy, practice, and literature on the topic. The study contends that the impact of most NSAs in climate change is contingent on the resources available and their organizational prowess. The study argues for the need to forge a synergistic relationship and networks between the public and non-state actors to effectively play a more nuanced role in climate change efforts at all levels which will help address food insecurity in areas and regions currently experiencing drought, hunger, and under nutrition.

Index terms— climate change; smallholder farmers; adaptation; mitigation; resilience; NSA

1 I. Introduction

With increased climate change trends, its effects aggravate prevailing socio-economic, and ecological threats in many contexts, which may become a source of insecurity at local and national levels (Pörtner et al, 2022; Malhi et al, 2020). The security threats that may be associated with climate change include adverse effects on food, water, and energy supplies, heightened competition over natural resources, loss of jobs, environment-related disasters, and migration and displacement (Owen, 2020).

In many contexts, protracted droughts, floods, and increases in sea levels have had exacerbated influences on socio-economic livelihoods, human wellbeing, environment, and related benefits, particularly in rural regions (Pörtner et al, 2022). The focus on climate actions and green economic growth has shifted over some time to giving attention to human-related crises (Lawrence et al, 2020). One particular sector which has been severely affected by climate change is the agricultural sector, especially in the developing world (Malhi et al, 2021; Mahapatra et al, 2021). What is more problematic is that the greater population especially in the rural communities has predominantly been smallholder farmers depending on favourable climate patterns (Atube et al, 2021). With the worsening climate change situation and impacts, climate change continuously affects agricultural productivity in numerous nations across West Africa unfavourably. For example, Ebele and Emodi (2016) report that the growth rates of maize, guinea corn, millet, and rice have decreased due generally to the surge in temperature in Nigeria. On their part, Badjie et al. (2019) report how late arrival and premature termination of rainfall patterns have prompted the variation of yields of cereals and cash crops per season in The Gambia. In Sierra Leone, the climate

change dangers caused include bushfires, droughts, high temperatures, early rains, late rains, serious downpours, thunderstorms, landslides, and floods ??Rhodes et al., 2016).

With the trend of climate change coupled with contemporary social and ecological vulnerability, it has been predicted that the Sub-Saharan region will experience the worst impacts (Ntinyari & Gweyi-Onyango, 2021; Ofori et al, 2021). Climate change is projected to produce a lesser amount of expectable rainfall patterns, coupled with extensive droughts intermixed with fleeting but torrential rainfall ??World Bank, 2018). Situated along the coast of West Africa, Ghana is a typical case susceptible to climate change vulnerability, especially the rural farming communities of Northern Ghana. Essentially agricultural in outlook, northern Ghana is found in the Sudan zone; a climate zone that is found in the midpoint of semi-arid Sahel and Forest zones ??Magin 2018). With its heavy dependence on natural rainfall for agriculture, subsistence farmers across the Sudan climate zone are expected to face increased food insecurity. This point has been observed by Hjelm and Dasori (2012) that communities in Northern Ghana have witnessed greater heights of food insecurity than the remaining communities found in those regions along the south. Consequently, households in the Northern Regions that undergo food insecurity frequently are saddled with inadequate income, malnutrition, and ill health, among others greatly caused by climate change variability. For example, Nyuor et al. ??2016) report that rising temperatures in the course of the initial and late seasons have led to a decrease in the ensuing revenue that would have been obtained from a hectare of sorghum. The threats to the agricultural sector have implications on food security, socio-economic and human security threats implications since agriculture has been the source of livelihood for many households in rural communities.

This makes it more crucial for all stakeholders relevant to global climate change affairs to step up in their actions toward effective policies, interventions, and efforts aimed at stemming the tides. Traditionally, climate change governance and efforts were essentially ceded to state actors who championed these courses of action at the state and global levels. However, it has been observed that international climate change agreements continue to achieve sub-optimal commitments by states (UNEP 2013). Over time, it has become increasingly crucial that non-state actors come on board by way of collaborative governance and policy networks to effectively play a more nuanced role in climate change efforts at all levels (Abbott 2012; Bulkeley et al. 2012; Schroeder & Lovell 2012). The involvement of non-state actors in global climate governance in the last three and half decades has been a unique feature that cannot be overlooked. ??Backstrand, 2013). Consequently, it has been established in the literature and climate governance regimes that climate change adaptation ought to encompass multiple actors from the public and private sectors as well as from across civil society (IPCC 2014). This point has forcefully been argued by Lemos and Agrawal (2006) that climate change involves the typical case of an intricate multi-scalar ecological problem, where mitigation and adaptation require a diversity of actors across the state-society divide. ??äckstrand et al (2017) advance the concept of 'hybrid multilateralism' as a heuristic to demonstrate the strengthened relationship between state and non-state actors in the reviewed arena of global climate change cooperation. They conceptualize non-state actors to include civil society organizations, social movements, as well as economic actors involving, inter alia, industry and trade unions and sub-national such as local governments and cities (p 562). The increasing role and recognition of these non-state actors cannot be overestimated. For example, the Copenhagen summit brought forth a climate regime that researchers have described as multifarious, discrete, disjointed, and polycentric (Cole 2015). In other words, the summit saw and recognized numerous actors and stakeholders from varying backgrounds. On his part, Lövbrand et al. (2017) contend that the quantum of participants at the annual Conference of Parties (COPs) has increased over the years, reaching the zenith in Paris with more than 28,000 accredited participants; with at least 8000 of these designated as non-state observers. With the inception of the Paris Agreement, the observer groups present at the annual COPs are called upon to perform a more integrated role in multilateral processes through, monitoring of national action and experimentation with local, regional, and transnational mitigation and adaptation strategies.

Conceptually, the category of NSAs may be in the form of virtually anything: organizations, global associations, investors, religious communities, social networks, industry associations, and, at last, people.

Many studies either discuss the role of nonstate actors in general terms or generalize based on case studies of one non-state actor category (Fisher & Green 2004). This implies that systematic comparison of perceptions of agency across non-state actors is largely lacking (Bulkeley et al. 2012). Despite the ongoing treatise on the prospect of non-state actors contributing to mitigation and adaptation efforts by global governance scholars (Hale, 2016; Kuramochi et al., 2020), the literature has not paid greater attention to the role non-state actors might play in bringing about an appropriate response to climate change. This position has been confirmed by Baker et al. (2020) whilst the growing acceptance of hybridity in climate governance is not in doubt [one that combines public and private authority in governance], the functional participation of the non-state actors in climate governance has seen sufficient research, it appears the actual practices through which climate issues are governed towards positive socio-ecological outcomes remains underresearched. The objective of this paper was to discuss the role of non-state actors in helping smallholder farmers deal with the food and income security threats posed by climate change. Ghana's Climate Change Policy (Ministry of Environment, 2013) recognizes the dangers posed by climate change and points out that the country is especially vulnerable to climate change and variability because of its dependence on areas that are delicate to climate change, like agriculture, forestry, and energy production. In other words, farmers have become saddled with lower yields and total losses due to climate change variability, and the government appears overwhelmed. In what ways do non-state actors in the form of NGOs intervene to

help these farmers? The paper discusses the role of non-state actors [with particular emphasis on international NGOs] in addressing the food security threats posed by climate change in the Northern parts of Ghana. In other words, as climate change continues to pose threats to the agricultural activities of farmers which have rendered most of them jobless and others migrated to the urban south, the study discusses efforts by NSAs in ensuring the resultant farmers adapt and mitigate the threats by climate change. The paper is organized into five main sections. The first section is an introduction that provides background to the study as well as elicits the problem statement. The second section provides a brief literature review and theoretical framework which frames and puts the study in context. Section three of the study provides an overview of the methodology employed for the study whilst section four provides analysis and findings which have been presented in themes. The final section provides conclusions and policy implications.

II. Theoretical Overview a) Climate Change and Food Security Risks

A major challenge associated with climate change is food security risks. Among the key issues that are germane to the discussion of food security involve, inter alia: (1) Availability (the extent to which a community or section can make available or be given or achieve adequate food) (2) Access (the extent to which a people or community can obtain the food produced or available), (3) Utilization (the extent to which a people or community can make the most of food's benefits), and (4) Stability (the extent to which a people or community can ensure availability and access to food consistently) (FAO 2006; Barrett 2010).

Across Sub-Saharan Africa, the number and level of undernourished individuals have increased beginning of 2014 (FAO, IFAD, UNICEF, WFP, and WHO 2017). Consistent with this pattern, food insecurity is predominant all over the Northern Areas of Ghana (Hjelm & Dasori 2012). Estimating levels of food insecurity is challenging, given contrasts in scale, the meaning of terms, and data collection protocols. Nonetheless, household-level information can give further understanding of whom within a nation is at the highest risk of food insecurity, and can assist with illuminating more vigorous policy (Hussein, 2002; Barrett, 2010).

A household study undertaken by Quaye (2008) found subsistence farmers in the Northern part experienced food insecurity from four to six months out of the year, contingent on the crop. Farmers frequently depleted the millet supply in April, and could not replenish their stocks until September harvests. Other significant crops, including sorghum and maize, were lacking from June to October. As climate change advances and forces expanded desertification in the Sudanian savanna zone that traverses Northern Ghana, means subsistence farmers will probably encounter more prominent declines in yields of staple crops (Armah et al. 2011). Wossen and Berger (2015) found that climate change and the fluctuation of food costs were closely connected, bringing about higher food costs for poor families in Ghana. Be that as it may, subsistence farmers who are unable to produce surplus products cannot take part in the market, as they lack the funding and capital to do as such. In such cases, families that basically depend on subsistence farming become more defenseless against food insecurity.

3 b) Concept of Non-State Actors

The concept of non-state actors involves an array of stakeholders or actors who do not hold the sovereign powers of nation-states yet remain crucial in climate governance architecture. This point has been corroborated by Allan (2020) who contends that the array of NSAs entails cities, multinational establishments, international organizations, and private individuals who assist in varied ways to respond to climate governance.

On his part, Bevir (2009) brings the argument closer home by maintaining that the set of non-state actors responds to climate change by serving as promoters of particular policies, setting standards, and making a clarion call for efforts with or short of the cooperation of states (p.87). This suggests that nonstate actors tend to operate as entities on their own or in concert with the state in driving home their activities. According to Hoffman (2011), NSAs mostly advocate and advance their case for actions and efforts towards climate adaptation and mitigation which may include, inter alia, energy efficiency, carbon markets, local adaptation, and revolution of the built environment as well as transportation systems (p. 5).

They are a varied group, full of different motivations, capacities of action, and routes took -and have different types of presence at different levels of governance (Allan, 2020). There are different forms of NSAs in the context of climate change. These are actors who are not negotiating parties within the UNFCCC' given some recognition (Duggan, 2019).

4 Essentially, the United Nations Framework Convention on
Climate Change (UNFCCC) classifies NSAs into these dis-
tinct forms: business and industry non-governmental orga-
nizations (BINGOs), environmental non-governmental organi-
zations (ENGOS), indigenous peoples' organizations (IPOs),
local government and municipal authorities (

LGMA), research and independent non-governmental organizations (RINGOs), trade unions non-governmental
organizations (TUNGOS), farmers and agricultural NGOs, women, and gender, and youth (YOUNGO). 2 All
these have observer status or serve as observer organizations. Bevir (2009) discusses key ways that non-state
actors respond to climate change by serving or acting as promoters of particular policies or courses of action,
providing standards, and schemes, and coming out with campaigns for buy-ins and attention to these. This, they
may tend to act in concert with the public sector or act alone (p.87). This suggests that non-state actors tend
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They are a varied group, full of different motivations, capacities of action, and routes taken -and have different
types of presence at different levels of governance (Allan, 2020).

5 c) Theoretical Framework i. Hybrid Multilateralism, Roles and Modus Operandi of NSAs

The concept of 'hybrid multilateralism' has been discussed to denote the new landscape of international climate
cooperation which became popular during the period after the Copenhagen Summit which has become well
established via the Paris Agreement.

The concept was coined by Bäckstrand et al (2017) to mean the various forces and actors including state
and non-state actors involved and recognized in climate change governance. It suggests a bottom-up climate
policy architecture that combines voluntary pledging by states with an international transparency framework for
periodic review and ratcheting-up of ambition, in which non-state actors play important roles as implementers,
experts, and watchdogs. Additionally, hybrid multilateralism refers to an increasingly dynamic interplay between
multilateral and transnational climate action, where the UNFCCC Secretariat has taken a role as facilitator, or
orchestrator, of a multitude of non-state climate initiatives and actions.

Non-state actors tend to strappingly support climate change mitigation over people's adaptation. For example,
in an empirical study that sampled sixty (60), non-state actors, to assess their activities, it was observed that
seventy-five percent (75%) of these NSAs mainly concentrated on mitigation alone, with twenty-two percent
(22%) concentrating on both mitigation and adaptation, with 3% paying attention exclusively to adaptation
??Bulkeley et al. (2014).

As non-state actors neither do have sovereign powers nor command coercive powers as states, those NSAs who
command a few resources and with no regulatory power resort to some subtle ways of influencing climate actions.
Their main climate action activities essentially entail lobbying relevant stakeholders, orchestrating some actions,
and consensus-building with parties.

On the role of the NSA in climate governance, NSA participation can be grouped into two broad categories.
First, there are instrumental claims, which hold that CSO participation in public governance provides knowledge
to enhance problem-solving capacity, which in turn leads to more effective and efficient policy implementation ??

6 III. Method

This paper synthesizes from extant theoretical and empirical readings, predominantly sorted from peerreviewed
journal sources and pertinent scholarly books intending to examine the role of non-state actors in addressing the
security risk challenges associated with climate change. Whilst NSAs connote a broader concept, the scope of the
study was on the role of NGOs in helping smallholder farmers deal with the food security risk which often comes
as a result of unpredictable climate patterns caused by climate change. From the extant empirical literature,
the study uses the experience of four international NGOs who operate in the Northern Regions of Ghana with a
particular emphasis on how they help farmers navigate through the contours of mitigating and adapting to the
challenges of climate change. This involves taking cues from the work of Yakubu et al. (2019) which discussed
how international NGOs help farmers adapt to climate change adaptation. The literature search covered all
terms and concepts related to non-state actors and climate change. The study combined words and

The second group of arguments is normative in appeal, based on claims that participation supports democratic
values by fostering a more inclusive and deliberative form of public policy decision-making. This in turn can
enhance public support for policy and reduce policy conflict. For instance, non-state actors can give voice to

under-represented groups, thereby legitimizing and validating policy decisions and improving the democratic quality of a polity ??Bäckstrand & Kuyper 2017).

expressions related to climate change security risks and NGOs intervention; NGOs and smallholder farmer adaptation to climate change.

The varying combination of words and concepts of NSA in addressing climate change challenges and food security risks were combined variously which made it possible to obtain a pool of more relevant literature on the study. The study resorted to three main search engines which were essentially deployed due to their germaneness to the study and availability to the author: Science Direct, T and Fonline, and Google Scholar. We derived a greater pool of articles from the sources and needed to do an initial skimming and scanning of their synopsis to sort for relevance to the thesis of the paper. After the initial sorting process, all abstracts were independently reviewed by each of the co-authors. Finally, authors convened to jettison duplicated materials and mapped out a narrow down of abstracts that were scheduled for comprehensive and systematic assessment. The distinct arguments and cases discussed in each paper had to be synthesized in different phases to generate the discussions and conclusions.

7 IV. Data Analysis a) Post-Copenhagen Accord and Nature of Global

Climate Governance: Focus on NSAs Although NSAs have been involved in climate action and governance processes, the period after the Copenhagen Accord at the 15 th Session of the Conference of Parties (COP 15) in 2009 saw an intensification of NSA actions and varying efforts involving conventional and non-conventional modes of participation in order to drum home issues related to climate justice and climate action. Since the Copenhagen Summit, climate governance and diplomacy have been instrumental in improving access and ensuring inclusivity and representation of NSAs through an array of considered and participatory mechanisms ??Bernstein, 2012).

Ever since UN negotiations on the global climate were initiated in the early 1990s, NGOs, businesses and local governments have been present as activists, experts, and diplomats (Newell 2000, Betsill & Corell 2001, Betsill 2015). It should be highlighted that at the global level, transnational climate governance may take different forms, involving, inter alia, private carbon reporting, labeling, offsetting and trading schemes, transnational city networks, and local grassroots mobilization for low carbon lifestyles ??Bulkeley et al. 2014). Following Copenhagen, the range of roles available to non-state observers expanded, along with their ability to exercise authority in the international climate regime (Green2014). However, different non-state actor groups play different roles in multilateral climate diplomacy. Treating 'non-state actors' as a homogeneous category can be useful for heuristic purposes, but in practice, heterogeneity prevails (Nasiritousi et al. 2016).

From the extant literature on advocacy and roles of NSAs, it has been observed that whilst some NSAs tend to seek insider status, others tend to seek radical, and systemic change (Hadden 2015). This point has been advanced by ??isher (2000) that the intensification of the climate justice movement ignited climate activism which has since witnessed fresher energy and intensification whose actors involve an array of new social groups and networks in global climate politics. The mobilization of non-state actors for climate governance (climate justice) remained crucial on the agenda of the Copenhagen meeting, whose aftermath has been several climate protests, demonstrations, and marches across the countries in the North and South in the run-up to the Paris Conference. From the foregoing, one observes that a very important landmark in the post-Copenhagen climate summit and governance regime has been the progressive coordination between the UNFCCC system and non-state actors in climate governance and efforts ??Betsill et In the year 2012 at the COP 18 held in Doha, states decided to explore a wide range of actions that could help to promote climate action and targets set out. The importance of civil society and private sector contributions was particularly highlighted in relation to developing country activities, such as finance and negative consequences resulting from climate change. In the ensuing year, the COP held in Warsaw, the UNFCCC inaugurated a website that would provide upto-date data on those collaborative climate actions happening around the globe on multiple scales by governments, international organizations, civil society, and businesses. This suggests a growing recognition of the activities and relevance of NSAs in climate change efforts and interventions. The portal has proven to be very effective and relevant in climate change issues and initiatives (Widerberg 2017)

8 b) Paris Agreement and Non-State Actors in Global

Climate Governance A careful assessment of the Paris Accord of 2015 mostly brings attention to the increasing role of local climate action in the contemporary climate governance sphere (Bang et al. 2016, Falkner 2016). The National Determined Contributions tendered in by nation-states in 2015 signify the primary instrument of the Agreement which also provides the basis from which international adaptation and mitigation efforts towards a less than 2°C mean global warming or emissions. These are voluntary contributions and pledges by states yet it recognized the relevant roles played by non-state actors in ensuring these NDCs are carried out.

The Paris Agreement formally acknowledges 'the importance of the engagements of all levels of government, and various actors' (UNFCCC 2015). The accompanying COP decision details the role of 'nonparty stakeholders, especially in enhancing (UNFCCC 2015) and calls for the 'scaling up and introduction of new or strengthened voluntary efforts and initiatives' (UNFCCC ibid). Formally, the Paris Agreement opens up for the engagement

of non-state actors in three processes: the 5-year cycles of a global stocktake of NDCs preceded by the 'facilitative dialogue' in 2018; the transparency framework reviewing mitigation and adaptation actions; and the implementation and compliance mechanism (van Asselt 2016, p. 7).

9 c) Resources of Non-State Actors

While non-state actors mostly do not possess the conventional forms of political authority and sovereignty, they nonetheless have some influence and alternative sources of power. According to Gulbrandsen and Andresen (2004), the essential skills and resources that non-state actors have may emanate from their intellectual, membership, political, and financial bases (p. 58). This point has been given support by other scholars who contend that knowledge and information remain crucial (see Etsill & Corell 2008); the economic resources and locus in the bigger society or international community (Falkner 2010); the organizational prowess and capacity, world-wide connections and its capability to mobilize (Falkner 2010); as well as its legitimacy (Gough & Shackley 2001). This point concerning the capacity of NSAs has essentially been summarized to entail: NGOs play a significant role in agenda setting and help to push some functional policies and laws which will help mitigate climate change impacts. For example, NGOs such as industry associations and research institution do engage in lobbying and agendasetting; what remains outstanding is that they follow through to see the eventual implementation of such policies by the government, and continues to monitor the effectiveness of the process (Gupta, 2010).

Despite the fact, climate negotiations at the global level nonetheless operate by color-coding the participants with respect to their institutional affiliation, the 2015 Paris Agreement (adopted 12 December 2015, entered into force 4 November 2016) (2016) 55 ILM 740 and later advances have additionally reinforced the role of NSAs in looking over ambitions set out, enforcement by member states, as well as compliance with emission-reduction targets (Asselt, 2016). The literature on environmental governance refers to the growing participation of Nonstate actors within the UNFCCC system as 'hybrid multilateralism' which has been the theoretical framework underpinning this paper. As explained, the concept denotes the 'intensified interplay between state and non-state actors in the new landscape of international climate cooperation' (Bäckstrand et al, 2017).

10 Table 1: Role of NGOs in Adapting to Climate Change Impact in Northern Ghana

The second case study sought to assess the role and contribution of non-state actors in addressing security threats posed by climate change with a special emphasis on how NGOs address food security threats in Northern Ghana. An analysis of the empirical literature suggests that non-state actors in the form of NGOs have been influential in helping farmers to mitigate and adapt to the nuances of climate change impacts. The various activities of the NGOs have been presented in themes below: Addressing maturity issues A major challenge posed by climate change has been the variable rainfall pattern which in recent times appears unpredictable. In other words, farmers find it difficult to determine when exactly the rains may set in and when they will cease dropping. Sometimes the rains cease at a premature period and crops which are yet to mature may suffer destruction and farmer losses whilst an eventual food crisis may occur. How do we get this challenge resolved? Non-state actors in the form of NGOs operating in Northern Ghana have been responding to this challenge by providing crops with shorter maturity periods to farmers so that even if the rains cease to flow prematurely, the crops would have reached harvest season by that time. These crops have earlygestation times to be adopted to cope with the change in rainfall pattern.

Farmer Education, sensitization, and extension services to farmers Knowledge is power and the provision of relevant climate information services to farmers goes a long way to help them understand the key issues, and occurrences, and how to navigate them. Smallholder farmers have held on to traditional or indigenous knowledge and procedures of farming for a longer period; in the wake of climate change impacts, there at times is the need to adapt by altering farm practices and farming methods that can withstand the new conditions of the time. Consequently, the relevant NGOs tend to provide farmers with new and drought-resistant methods of farming that can stand climate change conditions. These have been beneficial to smallholder farmers.

Product marketing A major challenge faced by smallholder farmers has been post-harvest losses which have been exacerbated by climate change where the life span of many crops tends to reduce. Access to the ready market, therefore, has become an important aspect in the value chain without which there will be serious food security threats exacerbated by climate change. What the NGOs do is facilitate access to wider markets so that smallholder farmers can easily local consumers for their products. In many cases also motivate farmers to identify potential markets and entities that will demand their products ahead of farming.

11 Value addition and income-generating activities

The NGOs tend to inspire smallholder farmers to add value to their raw farm products by processing raw materials such as cassava into 'gari' and rice into 'parboiled' rice. Processing the crops reduces their vulnerability to side effects of climate change and their susceptibility to becoming unwholesome. The processed products also tend to have higher price value which will augment the social and economic side of farmers.

12 Provision of Insurance Package

Due to the uncertainty that may surround crop planting and their survival due to the unpredictable nature of rainfall, smallholder farmers mostly tend to run at a loss when the unfortunate happens. Many people tend to be discouraged or even if they would, may not put in their all because of this possibility. To address this challenge, NGOs have introduced farmers to and encouraged them to adopt the practice of "crop insurance". It must be noted that this technique has not been very popular or on a wider scale due to the fact that it is coupled with some key complexities such as requiring farmers to painfully record rainfall patterns in their farmlands to get enough proof to substantiate their claim that their crops did not yield better because of poor rains and drought which will be the basis to get the claims from their insurers. More challenging the gadget to help farmers keep records of rainfall that their farmlands receive is not readily available to them.

13 Better water management

In view of the erratic rainfall pattern, it has become imperative for farmers to be educated and encouraged to make bunding or barricades in the farmlands to retain water for some time after rains. The retained water in the farmlands could improve the amount of water in the soil. The adaptation measure was rated high among all the International NGOs that were included in the study.

Access to water for farming A crucial role played by NGOs in addressing climate change food security threats has been water issues and making sure crops have access to water for reasonable farming. On some occasions, they educate and train farmers on how to deploy barricades to store water in the farms when during the rainy season which will be put to use when the rains cease prematurely. Another way by which they help in water provisioning has been the

14 Improved varieties

15 Mitigating the risks of losses

Education, sensitization, extension services

16 Value chain essentials

Better water management

17 Collaboration with stakeholders

Adaptation and mitigating the food security risks of climate change

18 V. Discussion

From the case above, this analysis discovers that non-state actors have been instrumental in contributing to climate change risk reduction and smallholder farmers' adaptation. In other words, NSAs help in building the resilience of stakeholders in order to effectively help deal with climate change impacts. From the data deduced from the extant literature, the following themes have been deduced which have been used to construct figure 1 As illustrated in figure 1 above, the study reveals that due to the variability of climate elements such as rainfall and temperature, non-state actors, specifically, NGOs assist farmers with improved varieties of crops that mature earlier before the 'bad times' set in by which time they crops are already matured. Additionally, drought-resistant crops which can withstand the long period of drought have been introduced and encouraged the farmers to use which have been ways of reducing the adverse effects of climate change on food security in these farming communities Even after introducing these drought-resistant and early gestation plants, the study highlights how NGOs go the extra mile to mitigate any unforeseen consequence which might be caused by failure of the rains to set in or unpredictably failure to 'honour its obligations' on the expected times. Consequently, NGOs encourage and assist farmers to insure their farms against any of such losses provided the latter will be able to prove that the crop failure was a result of the rains failing to come at the appropriate time with recorded evidence. Irrespective of the demands of this effort, it nonetheless remains an important intervention that meticulous farmers do incorporate to ensure certainty in their farming activities.

More importantly, knowledge is power and the ability to engage in one activity or the other involves one's knowledge and know-how of the entity. Consequently, NGOs sensitize farmers, and educate them on relevant issues regarding climate change and how to cope with same. They provide extension services to monitor and through hands-on activities encourage farmers to adopt best practices that are tried and tested. They assist in the varieties of crops and their advantages, which farming methods are conducive to the times, and other agro-related issues on marketing among others. As part of the sensitization process, farmers are introduced to ways to conserve water and deploy it to use during the dry seasons or when the rains cut summarily. These are ways that do help to reduce some of the vulnerabilities caused by climate change impacts which unattended to could have dire consequences on food security. It was gathered that local farmers do trust the information they receive from these NSA; this observation supports an argument by Haas (1992) that NGOs have functioned as epistemic communities, forming critical bridges that serve as conduits for information flow. Over time, the

NGOs have put together firm and credulous associations with local communities, governmental agencies, state, and municipal governments, playing an essential role in the capacity building of an array of key actors (ibid).

Additionally, the study discovers that NGOs assist in value chain essentials by ensuring that farmers are educated on marketing trends and how to secure ready markets for their farm produce. By also encouraging farmers to add value to their products, it helps in reducing post-harvest losses whilst increasing the returns or income that will emanate from subsequent sales of the processed farm produce. Marketing and value addition are two important activities that help in reducing food security risks associated with climate change whilst they help to reduce the poverty and vulnerability of smallholder farmers to further impoverishment.

The study has brought to the fore that NGOs have been influential in the provision of climate services defined to mean "the generation, provision, and contextualization of information and knowledge derived from climate research for decision-making at all levels of society" (Vaughan & Dessai, 2014, p. The study observes a non-state actor collaboration with state agencies in order to drum home the agenda of climate change resilience and mitigating the security risks associated thereof. In both the Ghanaian case study. The ability of NSAs to effectively coordinate and collaborate with other NSAs or the state remains determines their relevance and impact in communities. From the extant literature, a study by Deason et al (2022) observed that the NSA made an impact by collaborating with the state agencies which helped in strengthening the protection of natural sources against climate hazards. In figure 1 above, this sort of coordination of efforts is denoted by "Collaboration with stakeholders". For NGOs to be very impactful, they need to align their efforts and activities to synch with other interested parties, including the local government, other NGOs, and civil societies. The NGO collaboration with the local government other related state agencies as well as local farmers to achieve a task finds a place in the instrumental claims of NGO participation in public governance which according to Baker and Chapin (2018) involves the former providing relevant knowledge to help solve real societal problems which would lead to effective and efficient outcomes. On the other hand, their activities also find a proper place within the normative sense based on claims that participation supports democratic values by fostering a

19 VI. Conclusion and Policy Implications

The activities of NSAs have become more pronounced and nuanced in the period after Copenhagen Conference and reinforced by the Paris Conference. The importance of civil society and private sector contributions have particularly been highlighted in relation to developing country activities, such as finance and the negative consequences resulting from climate change. With the Paris Conference where states are obliged to submit Nationally Determined Contributions (NDCs), it can be realized these NDCs can only be fully realized with the state acting in concert with non-state actors.

The study concludes that NSAs vary in size, influence, and ability to make a meaningful impacts in terms of reducing the security risks posed by climate change. Based on their resource availability and organizational prowess, they are able to make an impact in the lives of smallholder farmers to help reduce losses incurred by climate change.

The study argues that the ability of NGOs to make an impact in the lives of smallholder farmers requires a holistic and more comprehensive approach that addresses the multifarious forces that militate against food security and climate change. In this study, it was observed that the NGO addressed the issues across the varying value chain starting with educating the mindset, helping with the variety of crops to plant, how to plant well and store water, how to insure against a foreseeable loss of crops due to climate change, postharvest issues including value addition and marketing.

The study recommends deeper collaboration between state actors as well as local governments and non-state actors with the goal of maximizing the impact they all make in the lives of smallholder farmers in their quest to adapt to climate change. Since these entities have a common goal of ensuring the welfare of local people in building their resilience towards climate change impacts, their efforts will be meaningful if there is a coordination of efforts.

20 Statements and Declaration



Figure 1: (

Engagement can also promote governance transparency, thus mitigating the risk of governments catering primarily to influential domestic interest groups (Dombrowski 2010). By pushing for monitoring and stakeholder consultation mechanisms, CSOs can also help foster the creation of formal accountability mechanisms in the system of governance, particularly within public administration (for further discussion, see Bernauer & Gampfer 2013). CSOs participate with the state as actors in international climate change negotiations (Lane & Morrison 2006, United Nations 1992), being recognized as an essential component of good governance (Banks et al. 2015). CSOs also participate as key agents in the implementation, monitoring, and evaluation of climate change policy (Haris et al. 2020).

Figure 2:

Figure 3:

1. Ability to invoke moral claims
2. Knowledge, expertise
3. Access to networks
4. Access to key agents and decision-making processes
5. Access to resources and position in the global economy (see Keck & Sikkink, 1999; Boström & Tamm Hallström, 2010).

d) Role of Non-Governmental Organizations (Ngos) in Climate Change Discourse

The United Nations through its UNFCCC

categorizes accredited NSAs into nine clusters which involve those representing: business and industry non-governmental organizations (BINGOs), environmental non-governmental organizations (ENGOS), indigenous peoples' organizations (IPOs), local government and municipal

independent non-governmental organizations (RINGOs), trade unions non-governmental organizations (TUNGOS), farmers and agricultural NGOs, women, and gender, and youth (YOUNGO)

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Figure 4:

- 1). The utility of climate information for driving farm management practices and decision-making in relation to when and what crops to plant in relation to climate change and variability cannot be over-emphasized (Vaughan et al., 2019; Singh et al., 2017).

Mainstreaming CIS into development planning and agricultural systems requires that stakeholders especially smallholder farmers have a full understanding and appreciation of the issues involved in climate change adaptation (UNDP, 2012). Various studies (Ayers et al., 2014; Ellis et al., 2013; Pilato et al., 2018) have highlighted the need to build awareness of climate change issues amongst stakeholders in order to mainstream climate change issues. Lack of awareness or trusted information about uncertainties, risks, opportunities, and trade-offs presents challenges to policymakers (

Figure 5:

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.3 Consent to Participate

Informed consent was obtained from all individual participants included in the study.

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