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Reviewing spatial disparities in Climate Change – Conflict Literature

ERIK PLÄNITZ

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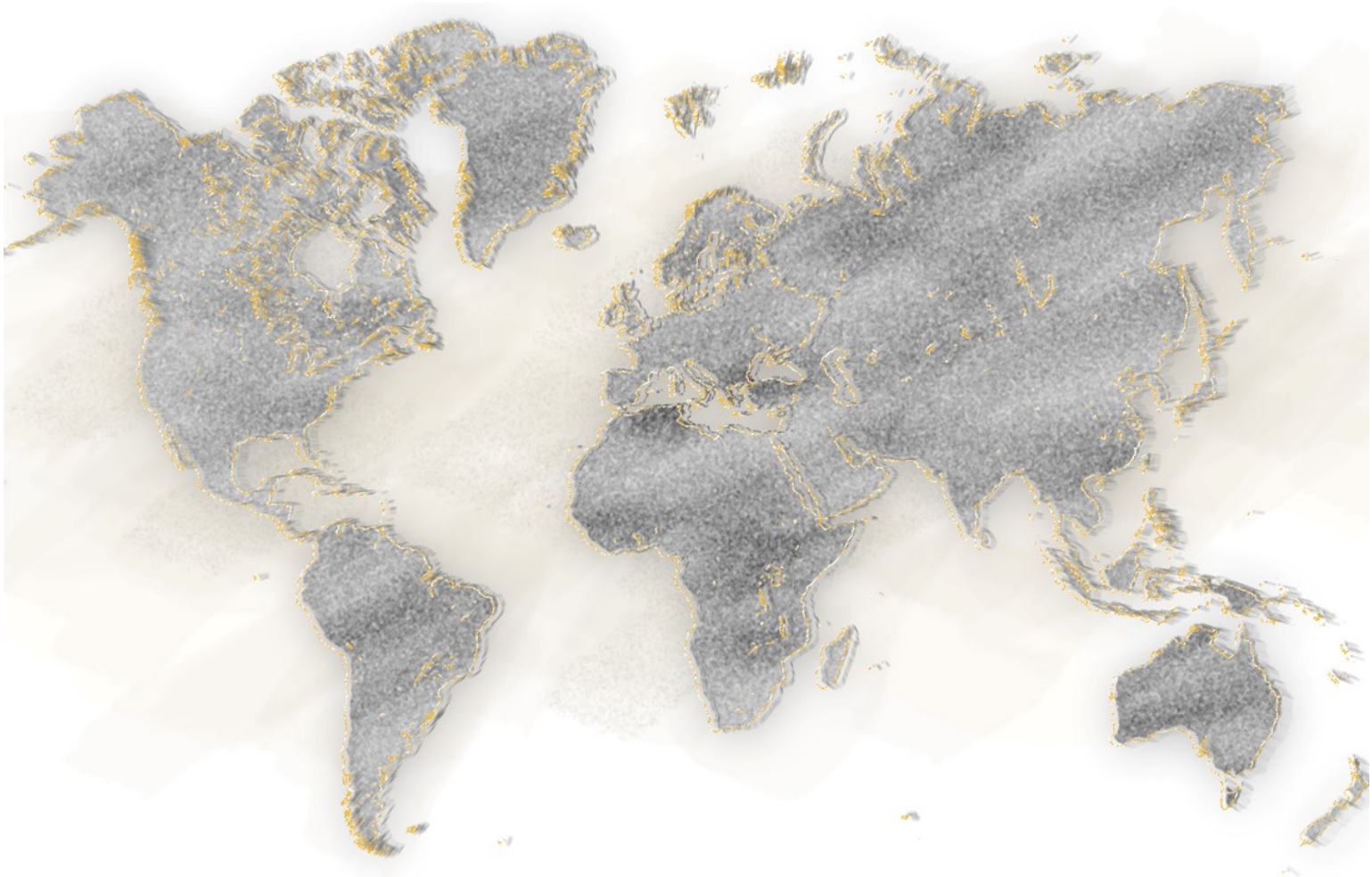

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Fixed on the Rural - Neglecting the Urban?
Reviewing spatial disparities in Climate Change – Conflict Literature

ERIK PLÄNITZ*

Abstract

African cities already are and will be facing enormous challenges arising from changing climate conditions. Increased frequencies of rainfall or sea-level rises threaten huge parts of urban settlers living in flood prone areas. City districts are likely to be submerged by the ocean in the coming decades. Coincidently, projections of population trends suggest that urbanization rates will remain at high levels. Rural-to-Urban migration increase the pressure on informal settlements that are exactly situated in those areas most exposed to changing climate conditions. The impacts such climate change conditions can have on local livelihoods already under socio-economic stress, may contribute to the onset of urban violence. In sharp contrast to these possible developments, contemporary scholarship on the relation between climate change and conflict has a strong focus on the rural. In order to empirically support this observation, I conduct a systematic literature review of peer reviewed journal articles looking at trends and patterns of this research field. The review finds that there is a significant anti-urban bias in climate change-conflict research. Despite the fact that rural livelihoods and avenues into conflict differ from urban dynamics, very little has been done to address these diverse patterns. The paper argues for more research on multi-causal pathways from changing climate conditions to violence, particularly in urban areas. Understanding the links between climate change and urban violence is crucial for developing adequate adaptation and mitigation policies.

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1. Introduction

In June 2015 the Ghanaian capital city of Accra experienced days of severe rainfall leading to flooded districts, devastated neighborhoods and homeless communities. Existing drainage systems were either clogged with waste or undersized (BBC 2015; Deutsche Welle 2015). These problems were aggravated by the fact that informal settlements which had spread around the city over the last decades blocked waterways and were proverbially washed away by the floods. In the aftermath, the local government backed by the then President John Dramani Mahama, directed the demolition of informal structures in Old Fadama - a slum that is situated in a flood prone area close to city centre. This decision sparked days of violence directed at the local administration and the party in power (Graphic Online 2015).

This brief anecdote of Accra and Ghana facing re-occurring heavy floods symbolizes the extreme vulnerability of Sub-Saharan Africa to extreme weather and urban violence.

Urban agglomerations in Sub-Sahara Africa are bustling economic, cultural and political hubs of their respective nations - hubs that are of utmost importance for stability and development. Often inherited from colonial rulers and designed for a few, belonging to elitist circles, African cities grew almost uncontrolled and unregulated (Hove et al. 2013; Beall and Fox 2009). Informal settlements, erected in hazardous environments, house those keeping the city running. Among those are cohorts of traders, craftsman or mini bus drivers – all employed in the informal sector and vulnerable to external threats to their livelihoods. Recent climate modeling and the increased frequency of weather anomalies show that those livelihoods are especially at risk. Flooding in urban areas, as occurred in Accra, becomes a yearly phenomenon and shorelines are at risk of being permanently submerged by the ocean (Guha-Sapir et al. 2017; Intergovernmental Panel on Climate Change 2014). As a consequence of poor or non-management of weather anomalies, those already facing economic hardship and political marginalization, may turn to urban violence as one way to channel anger. Whereas the pathways from climate change[1] to conflict in the rural area are high on the research agenda, the urban has been mostly neglected. This is despite the fact that different scenarios suggest that by mid-century more than 50 percent of Africa's population will live in cities (United Nations et al. 2015). As of 2017, urban areas on the African continent comprise 472 million people – a figure that will double in the next 25 years (Lall et al. 2017). Rural-to-urban migration, partly triggered by adverse climate change, increases the pressure on urban and peri-urban

[1] The author is aware of varying terms and concepts used in the context of "climate" including "climate variability"; "extreme weather" or "climate change". Although thought to express differing frequencies or duration of climate variables (such as rainfall or temperature), those concepts are used interchangeably in this working paper. Focusing on a specific definition would have altered the results of the literature review as there is little scholarly unity in using those terms.

settlements on the African continent. Contemporary research has focused more on conflicts over decreasing agricultural yields, scarce resources or land that are mostly directly affected by climate change (Buhaug 2016; Collier 1998; Gleditsch 1998; Homer-Dixon 1999; Soysa 2002). Scientific attention on indirect transmission from climate change to conflict in urban areas is still underdeveloped. This paper aims at systematically reviewing literature on the links between climate change and conflict to identify the existence of an urban bias in climate change-conflict literature. More precisely the paper addresses the following guiding research question: *To what extent does contemporary research on the links between climate change and conflict consider urban-specific multi-causal pathways to violence?*

This research question is being tackled by applying a systematic literature review approach that is introduced in the next section of the paper. Following on from the introduction of the methodology, the main trends in recent scholarship on the topic are presented before arguing for a need in increased scientific attention for the urban.

2. Methodological Considerations

Systematic Literature Reviews were originally used in medical science to get a grasp of research results in a more systematic way and made its way into social sciences recently. It provides an opportunity to escape the 'bias trap' in literature analysis. Traditional analyses often depart from a few existing literature reviews written by known capacities in the field of interest. However, we do not know how those authors selected their material. What was their guiding principle and why did they refer to study A instead of study B? There is a certain risk of reinstating the original authors' bias and (unintendedly) include it in the own literature review. By systematically screening all existing literature on the specific topic and selection according to their relevance, this 'bias trap' can be bypassed (Petticrew and Roberts 2006). For the purpose of this paper, literature search was carried out by a Web of Science query conducted in September 2017 that included English-speaking peer reviewed journal articles published between 1985 and 2017. Only articles published in journals with political science, human geography or geography background were considered relevant for this research. I applied a Boolean search in order to organize the query by using a combination of two Boolean operators AND and OR as well as key words. Those key words were identified in a pre-literature review. This pre-study helped to define boundaries and flag relevant key concepts. I applied the following Boolean search string:

(TS=((climat change OR climat* OR flood* OR „climat* variabilty* OR rainfall OR precipiation OR drought OR water scarcity OR weather OR disaster OR food) AND (conflict OR violence OR unrest OR political) AND (Africa)))*

The search produced a total of 1039 results that was followed by three rounds of manual selection. This selection process aimed at compensating the main weakness of a fully automated literature search. A computer is only able to look into quantities of pre-defined key words – in this case the previously introduced Boolean search string. Naturally, just mentioning key words in a text does not make it relevant for further research. For that reason I established a sub-question guiding the manual selection: *Does the article deal with pathways from climate change to conflict in Sub-Sahara Africa?* After a first round of screening based on titles, articles with no relevance for the research were excluded from further processing. Criteria for exclusion were titles that obviously pointed to other fields than the one of interest. This initial phase was followed by a second round of selection looking into abstracts. During this stage articles were excluded that although having a relevant title focused on only one part of the guiding question – either climate change or conflict – or were only mentioning the key words. Promising articles were then forwarded to the third stage of selection. The full text screening targeted the quality of the papers and their potential to contribute. It is important to stress that *quality* in this context does not refer to originality of research but the content of the article in terms of dealing with the guiding research question. The selection process left a total number of 123 articles for further coding and analysis.

Finally, in order to further systematize these articles, this dataset was uploaded to the EPPI reviewer software, an application developed and provided the Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) at the Institute of Education, University of London for the purpose to systematically review literature. This software comes with the opportunity to code, sort and analyze literature.

EPPI supports the creation of coding sets that included climate change related independent variables (such as Flooding, Drought, Food Price increases) and conflict oriented dependent variable (such as Intra-state/civil war; Interstate war; Political Violence). Furthermore, information on applied methodology, geographic scope and the results were gathered. The codes were identified during the pre-study on climate change and conflict.

The systematic analysis was triangulated, with previous literature reviews on the topic, such as Buhaug (2016) and Theisen et al. (2013), to get hold on relevant material that for some reasons were not included in the Web of Science database. In general, the literature reviews confirmed the selection made during the Systematic Literature Review.

3. Literature Review

There are few disciplines in science that are more controversially discussed than climate change and its long term effects on our planet. Ranging from total denial to awful warnings – politicians, policymakers and researchers compete for the public eye. This dissent is reflected in the growing body of literature relating climate change and conflict. Already 26 years ago, the political scientist and ecologist Homer-Dixon's essay on *Environmental Changes as Causes of Acute Conflict (1991)* sparked academic interest in exploring the links between climate change and violence that eventually received increasing attention at the beginning of the 21st century. The systematic literature review demonstrated that whereas in 2007 only six articles were published in peer reviewed journals addressing this link, the number had increased to 17 in 2016. The ever-growing body of literature has been subject to various comprehensive literature reviews witnessing the diversity of the research field and competing arguments (Theisen et al. 2013; Bernauer et al. 2012; Burke et al. 2015; Hsiang et al. 2013; Buhaug 2016). One approach to cluster the area is to differentiate according to their underlying assumption – either resource optimistic or pessimistic. The Neo-Malthusian perspective – a more resource pessimistic idea – is postulated among others by Homer-Dixon (1994; 1999), Hauge and Ellingsen (1998), Myers (1993) and Renner (1996). Based on the ideas of Thomas Malthus, supporters claim that a growing number of world population will compete for dwindling natural resources. Thus resource scarcity is considered as main driver for future violent conflict. In the context of climate change, Neo-Malthusians propose increased security threats due to environmental change related resource scarcity (Bernauer et al. 2012).

This argumentation is challenged by cornucopian scholars (e.g. Lomborg 2001; Boserup and Schultz 1990). Taking a more resource optimistic position, those scholars state that humans are able to cope with resource scarcity by technological progress. Hence, climate change induced resource scarcity does not necessarily lead to more violence.

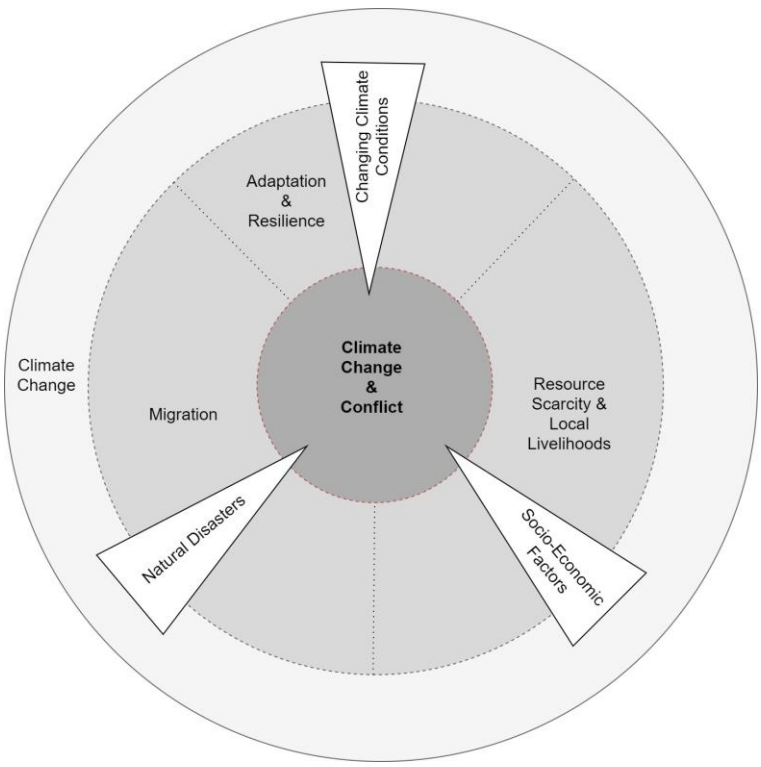
Buhaug (2016) provides another attempt to sort the body of literature. Following his argumentation, three generations of research exist - starting with the first generation that looked primarily on meteorological indicators (e.g. rainfall or temperature), but largely "failed to converge on a general and robust climate-conflict connection" (Buhaug 2016, 334), (e.g. Buhaug 2010; Burke et al. 2009; Couttenier and Soubeyran 2014; Fjelde and von Uexkull 2012; Hendrix and Salehyan 2012; O'Loughlin et al. 2012; Raleigh and Kniveton 2012; Theisen 2012). The second generation of research added indirect indicators to the analysis providing multistage approaches (e.g. Buhaug et al. 2015; Koubi et al. 2012; Schleussner et al. 2016; Smith 2014; van Weezel 2015). Among those indicators are food (in)security and production shocks.

The most recent generation of scholarship examines adverse effects of mitigation and adaptation to climate change. Accordingly, misguided implementation of certain

projects may become a pathway to violence (e.g. Hunsberger et al. 2017).

As contested as the classification of literature is to start with, as disputed are the results and conclusions on the question whether climate change is a driver for violence or not. To further understand the differing approaches and lines taken in the existing literature, it is essential to embed the discussion on the relation between climate change and conflict into a broader context. Research on that link does not appear in a vacuum but is rather closely connected with other disciplines – often with seamless transitions. The systematic literature review hints that the cluster of climate change & conflict is mainly surrounded by three related disciplines (see Figure 1). These include *adaptation & resilience* (e.g. Adger 2009; Adger et al. 2005, 2009; Bronkhorst et al. 2014; Anguelovski et al. 2014; Ziervogel et al. 2014), *migration* (e.g. Reuveny 2007; Barrios et al. 2010; McLeman and Smit 2006) and *resource scarcity*. The latter includes the large body of literature on food (in)security and water governance (e.g. Homer-Dixon 1999, 1994, 1991).

Figure 1 Literature Map – The Overlaps between Climate Change and Conflict Research



Accordingly those three disciplines are held together by a set of indicators researched in connection with climate change & conflict. In line with Theisen et al. (2013), the systematic literature review also found that changes in precipitation/rainfall and temperature, natural disasters and economic factors are among the most prominently researched chains of transmission or indicators from climate change to conflict (Theisen et al. 2013). I will now present these in more

detail.

3.1 Anomalies in Rainfall and Temperature – Changing Climate Conditions

Although having received major attention in recent years the scholarship on rainfall and temperature is unified in uncertainties. Thus, literature in this section deals with the whole array of precipitation and temperature ranging from extreme rainfall to drought and its links to conflict. Following Malthusian arguments increased precipitation and temperature may result in swindling resources that lead to rising levels of violence. However, quantitative research on civil conflict challenges this causal chain arguing that the link between scarcity and violence is weak (Esty et al. 1998; Raleigh and Urdal 2007; Hendrix and Glaser 2007). On the question of whether dry or wet years are more favorable for the onset of conflict, Hendrix and Salehyan (2012) argue that wetter years are more prone to the outbreak of armed conflict whereas "other forms of conflict are strongly influenced by extreme positive and negative deviations from normal rainfall" (Hendrix and Salehyan 2012, 46). The same line is taken by Raleigh and Kniveton (2012) and Nordkvelle et al. (2017). The latter extend their argument to unusual dry periods stating that both dry and wet intervals increase the risk of communal conflicts.

Fjelde and von Uexkull (2012) conclude that "large negative deviations in rainfall from the historical norm are associated with a higher risk of communal conflict" (Fjelde and von Uexkull 2012, 444). In his study, Theisen (2012) argues that violence is less likely in years that follow on a year with below average rainfall. In contrast to those arguments, van Weezel (2015) finds no robust link between rainfall and conflict. O'Loughlin et al. (2012) even state that "wetter deviations from the precipitation norms decrease the risk of violence (O'Loughlin et al. 2012, 18344).

The role of temperature has been equally discussed by both quantitative and qualitative studies. Speaking on drought-induced changes, Uexkull et al. (2016) revealed that, although, the risk for violence in most scenarios is low, "agriculturally dependent groups as well as politically excluded groups in very poor countries" (von Uexkull et al. 2016, 1) tend to engage in violent acts. Detges (2016) adds to the discussion that drought-related civil conflict is more likely in areas with less developed road infrastructure and communal conflict may occur in areas with lacking water resources. Moreover, Aidt and Leon (2016) find that drought-related violence may open a democratic window of opportunity, forcing the elite to make concessions in order to avert violence. In other words, there seems to be democratic development as a consequence to drought. Riots provoked by drought may trigger institutional changes leading to democratic change. Burke et al. (2009) concluded that civil war in Sub-Sahara Africa is more likely during warmer years, sparking a discussion within academia (Schiermeier 2010). Buhaug (2010) rejected these results for methodological concerns and Burke (2010) revoked his initial finding (Buhaug 2010; Schiermeier 2010; Burke et al. 2010). However, O'Loughlin (2014) suggests that "high

temperature extremes are associated with more conflict" (O'Loughlin et al. 2014, 1), finding that timing and location of violence is dependent on economic, political and geographic factors. In general, there seems to be limited consensus on the link between positive temperature anomalies and its driving effect for violence (O'Loughlin et al. 2012; Maystadt et al. 2015; Bollfrass and Shaver 2015). This section showed that contemporary scholarship does not take into account the differing effects that changing climate conditions might have on rural and urban settings. Diverse dynamics of mobilization for violence are not yet reflected in the literature. Before further elaborating those differences in section four, the links between natural disasters as well as socio-economic conditions and violence are explored in detail.

3.2 Natural Disasters

Besides the already mentioned occurrence of droughts and floods, climate change already has been and will also be responsible for a sharp increase in natural disasters (Guha-Sapir et al. 2017). Contrary to the controversies on the previous section the links between climate change and natural disasters are widely acknowledged. Anomalies in precipitation and temperatures expose large parts of the planets population to climate calamities, including flooding, heat waves or hurricanes.

Opponents reject that hypothesis arguing that the links between natural disasters and the onset of conflict is weak or not existing (Bergholt and Lujala 2012; Slettebak 2012). Slettebak (2012) notes that sole focus on disasters may distract attention from other important conflict drivers, including poverty and governance. On the other hand, proponents underline that loss of lives and livelihoods may significantly contribute to increased risk of violence related to natural disasters – particularly in weak states. Drury and Olson (1998) argue that "increased levels of development, income equality, and regime repressiveness dampen post-disaster political unrest" (Drury and Olson 1998, 153). By implication, Drury's and Olson's (1998) findings suggest that states that are less developed and characterized by a weak regime are more prone to post-disaster violence. Proponents of that link between disasters in weak states and conflict contend that under some circumstances calamities increase the risk of violence or extend it (Nel and Righarts 2008; Besley and Persson 2011; Eastin 2016; Omelicheva 2011). There seems to be consensus that a disaster in already weak states further leads to the deterioration of state structures and their capacity to stay off rebellion. Eastin (2016) argues that state capacities already under pressure and now faced with a state of emergency are not able to fight insurgency. Thus, the duration of conflict increases. Weak states, mostly low- and middle income countries that are predominantly found in the Global South seem to be particularly prone to conflict (Omelicheva 2011). Inequality, "mixed political regimes, and sluggish economic growth" (Nel and Righarts 2008, 159) are considered factors contributing to the onset of violence civil conflict. Schleussner et al. (2016) investigate the role of ethnic fragmentation in the outbreak of natural disaster related violence. Their study

reveals that “about 23% of conflict outbreaks in ethnically highly fractionalized countries robustly coincide with climatic calamities” (Schleussner et al. 2016, 1). Considering the projected increase in natural disasters in the future and the fact that many of those fractionalized countries are located in ‘climate hotspots’ these findings are alarming. Thus, natural disasters occurring in urban areas may result in the onset of violence due to higher population density accompanied by the increased opportunity for mobilization. More people in a smaller area are affected sharing the same fate and hope for state relief. Mismanagement of expectations or poor disaster management may contribute to mass mobilization that is less likely in sparsely inhabited communities. This is closely linked to the personal situation of the individual that is affected by adverse climate change and its coping strategy. The link between socio-economic factors and climate change is established in the following section.

3.4 Socio-Economic Factors

Natural Disasters, changes in precipitation and droughts affect the economic output of a community by losses in income and yields. There is some evidence in relevant literature that the national GDP and national growth suffers from adverse climate effects (Mendelsohn et al. 2006; Tol 2002; Deschênes and Greenstone 2007; Barrios et al. 2010; Miguel et al. 2004). However, Koubi et al. (2012) question the direct link between climate change, economic growth and violence. Their empirical analysis does not show any “evidence for the claim that climate variability affects economic growth” (Koubi et al. 2012, 113).These results suggest that there indeed are dynamics below the macro level influencing violent conflict.

When the effects of climate change meet underdeveloped state capacities not able to address the basic socio-economic needs of its citizens, a certain level of frustration is inevitable. The following brief excursus into literature on socio-economic causes of violence explains the role of livelihoods on the pathway from climate change to conflict. The destruction of livelihoods and the feeling of being left alone by the state in coping with the situation can contribute to the desire to seek “extra-legal solutions” (Kahl 2007; Mohamed-Katerere 2009; Sayne 2011). Conflicts may arise between citizens and decision-makers (Eriksen and Lind 2005). Moreover, Peters (2004) argues that social inequalities that appear as side effect of malfunctioning and ill-designed adaptation strategies can reignite or worsen conflicts over land and resources. Marginalization, corruption, political discrimination, youth unemployment and inefficient and weak regimes may motivate people to protest. The exclusion of a particular group “from their share of the national economic wealth” (Koubi and Böhmelt 2014, 29) may contribute to increased risk of violence (Cederman et al. 2011). According to Vinck et al. (2011) poverty, greed and corruption were the root causes of civil war in Liberia. Another case study of Nigeria and Guinea Bissau identified food insecurity, lack of infrastructure and access to basic social needs as drivers of conflict (Voz die Paz and Interpeace 2010). These case study results are

backed by a large set of quantitative research positing a relationship between poverty and civil war (Blomberg et al. 2006; Collier and Hoeffler 2002; Fearon and Laitin 2003; Hess and Orphanides 1995; Sambanis 2004). Recent academic work suggests that there are linkages between horizontal inequality, grievances and civil conflict (Cederman et al. 2011; Østby et al. 2009; Buhaug et al. 2008; Østby 2008). The basis of this argumentation has been laid by Gurr (1970) with his work on economic, social and political inequalities that provoke violence. Whereas the majority of authors have analyzed the national level, Buhaug et al. (2011) argue that geographic and local inequalities may lead to increased risk of violence within a country. Once again, the dynamics of climate change related violence may differ between rural and urban areas. Although food shortages hit the entire population and most likely those who are 'off the radar' in the hinterland much harder, mass mobilization is more likely in urban areas. Economic shocks, such as food price increases, already sparked events of political violence across the continent (Weezel 2014).

These sections have illustrated that the chain from climate change to violence cannot be studied isolated. Existing literature on root causes of violence need to be linked with potential external threats by climate change.

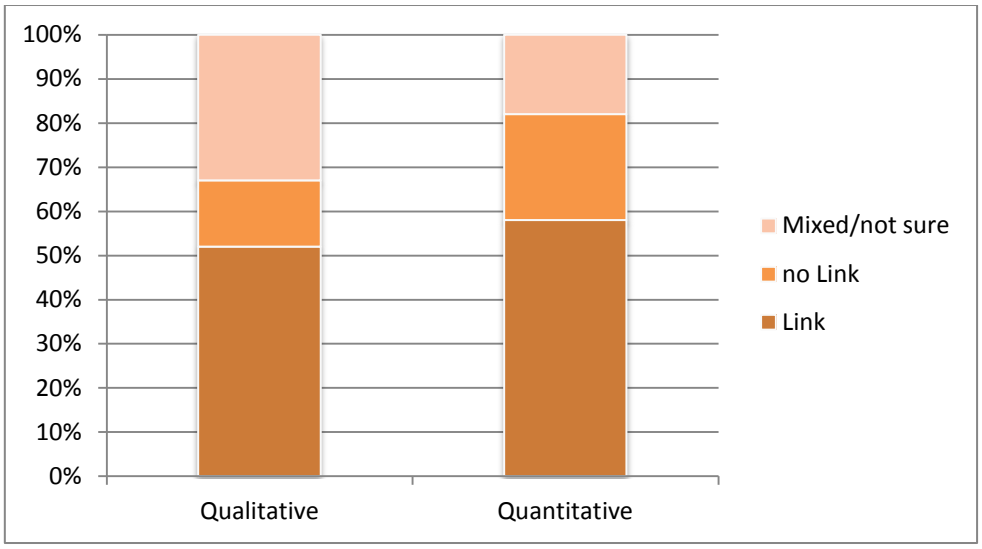
From what we have seen in the last three sections there are disagreements among researchers on the links between climate change and violence. The next sub-chapter attempts to address that from a methodological perspective and trace some variations.

3.5 A matter of research strategy?

As demonstrated in the literature review there is large range of scholarship on the links between climate change and conflict. While some argue that there is a connection between changing climate conditions and conflict, others reject this harshly. This might be explained by "differences in samples, time periods, and estimation techniques" (Theisen et al. 2013, 616). Saleyhan (2014) ascribe the large array of results to "poor conceptualization of research designs and empirical measurements" (Salehyan 2014, 1). Differing understandings and conceptualizations of climate and conflict, differing modes of data collection and theoretical approaches further contribute to apparently contradicting results.

However, the systematic literature review suggests that there is no significant gap between qualitative and quantitative research (Figure 2). 58 percent of all reviewed quantitative surveys argue that there is a link between climate change and conflict, compared to 52 percent of all qualitative studies. There seems to be some dissent when it comes to mixed results. Accordingly, 17 percent of quantitative and 33 percent of qualitative studies do not have a clear opinion or provided mixed results. In total 24 percent of quantitative and 15 percent of qualitative reviewed articles reject a connection between climate change and conflict.

Figure 2 Comparing Quantitative and Qualitative Results on Links between Climate Change and Conflict



Overall, there are more quantitative papers than qualitative on the topic. As Ide (2017) finds, between 2007 and 2013 60 percent of all studies published in upper-tier journals were quantitative and subsequently are more often quoted in literature reviews. Thus, literature reviews and case studies (usually qualitative) are overshadowed by quantitative studies. At the same time, research on climate change has experienced methodological innovations in recent years. Qualitative Comparative Analysis, GIS based studies or simulation models gained importance and call for a pluralism in methods (Ide 2017).

New perspectives and research strategies may address shortcomings in existing scholarship as identified in recent literature reviews, arguing for studying mediating factors in the alleged causal chain from climate change to conflict or disaggregate the geographic dimension (Barnett and Adger 2007; Theisen et al. 2013; Buhaug 2016). This spatial focus is reviewed in the following section.

4. Urban-Rural Disparities

There is increasing consensus among scholarship that spatial disaggregation in climate change-conflict research is key in creating knowledge on mediating factors and relationship on the pathway to violence (Buhaug 2015). Analytical units are no longer national borders but regions marked by the same characteristics. Quantitative, qualitative and most recently QCA studies follow this grid-oriented approach. Undoubtedly, this strategy contributes to theory building. Nonetheless, it lacks evidence for a portion of the population that is gaining importance in the near future – the urban. So far, a vast majority of peer-reviewed articles focus either directly on rural areas or apply a national, regional or Africa-wide lens. The systematic literature review demonstrates that until September 2017 only five articles (out of the 123 reviewed) dealt with the links between climate change and conflict in urban areas.

Only Yeeles (2015) examined the direct relation between weather anomalies and urban unrest in Africa and Asia. Studying 50 cities on both continents between 1960 and 2006 he concludes that "heat is associated with urban social conflict, but generally does not trigger episodes and instead acts to supplement aggression while other factors govern the primary timing of social unrest" (Yeeles 2015, 158). Food price increases and shocks seem to play a role in the onset of urban unrest. Following the argumentation of Hendrix and Haggard (2015) this might be particularly true for democracies, as they provide more opportunity for political engagement. Smith (2014) states that the rise of food prices "significantly increases the probability of urban unrest" (Smith 2014, 679). Although, not solely focused on climate change and conflict, Buhaug and Urdal (2013) do not support the theory that urbanization per se lead to increased levels of unrest. In fact, disorder may be associated with economic shocks, ongoing conflict and lacking political institutions (Buhaug and Urdal 2013). Drivdal (2016) studied mechanism of adaptation to floods in Cape Town's informal settlements. She finds that "simple interventions that could improve adaptation prospects can escalate into serious conflicts" (Drivdal 2016, 12).

On the contrary, research on climate change related violence and rural conflict dynamics seems to be much more elaborated. Pastoral or communal conflicts as well as implications of rainfall anomalies and drought have been subject to case studies and quantitative analysis in the recent past. The systematic literature review revealed a run on certain parts of Sub-Sahara Africa – most prominently rural Kenya (Table 1).

From 1996 to 2016 a total of 13 articles dealt with links between climate change and conflict only in Kenya, not including papers that had a regional focus on East-Africa or do not put emphasis on conflict. This figure even increases when opening the focus and extending it to the broad topic of climate change (Hendrix 2017). Without any doubt, this region is characterized by its local conflicts that causes are diverse and complex across East Africa. Thus, climate change may indeed lead to clashing interests of farmers and herders, but putting the main emphasis on the rural entails the risk of a research imbalance between rural and urban areas.

Table 1 African Countries ranked by Scholarly Attention on Climate Change and Conflict

Country	No. of Articles
Kenya	13
Sudan (w/o South Sudan)	7
Ethiopia	4
Somalia	4
South Africa	3
Eritrea	3
Mali	3
Uganda	3
Focus on Sub-Sahara Africa	*32*
International focus	*23*

The phenomenon of 'running' on particular geographic areas within climate change research has been studied by Hendrix (2017) who described it as 'the streetlight effect in climate change research'. Based on the work of Kaplan (1964) assuming that researchers focus on cases and questions for conveniences and data availability rather than on relevance, she systematically analyzed literature on climate change in Africa. Her findings suggest that research priorities depend on factors such as land mass and total population rather than on exposure to negative effects of climate change. A British colonial background seems to be of additional interest. Consequently, Kenya and South Africa received as much attention as 29 other African countries combined (Hendrix 2017, 145). This attitude and research bias, mainly due to simple fact that research funding and capacities are originated from the Global North eventually precipitates to blind spots on the research map.

5. A case for the Urban – towards an analytical framework

Accra, Kampala or Nairobi – African capitals are facing reoccurring and devastating floods during the yearly rainy season. Climate change induced increased frequency and intensity of rainfall gets aggravated by growing informal urban settlements that are sprawling along silted drainage systems. Built on former swamps or hillsides shelters of urban dwellers are most vulnerable to natural hazards. Losses and damages from floods threaten local livelihoods (ActionAid 2006; Di Baldassarre et al. 2010; Douglas et al. 2008). Coastal zones of the African continent, often economic power houses of their respective countries, are exposed to sea-level rises. In Senegal, 66 percent of national population and 90 percent of the industries are located in the Dakar coastal zone (Watson et al. 1997). This list could be easily extended mentioning almost all major mega-cities of Sub-Sahara Africa – Mombasa, Lagos, Accra, Abidjan or Dar es Salaam. Projections on the impact of a 1m sea level rise estimate that approximately 400 meters of land would be lost in Tanzanian metropolis Dar es Salaam (Brown et al. 2011). Although a retreat of more or less 400m itself does not sound very alarming, the population density of those particular strips explains the seriousness of the challenge. By 2070 around 3.2 million people in Lagos may be exposed to coastal flooding – compared to 357.000 in 2005. If that projection proves true it is an increase of 800 percent. In Abidjan the number of affected citizens may rise from 519.000 to 3.1 million (Patmore et al. 2008).

In contrast, the systematic literature review shows that only five percent of research is dedicated to the security implications of climate change of 38 percent of the African population (World Bank 2017b). Admittedly, this statement is oversimplifying but illustrates the research problem. Whereas African cities grow, faced with significant rural-to-urban migration and exposed to climate change the scholarly focus tends to remain unchanged. Apart from a few exceptions (e.g. Yeeles 2015), academia has so far not linked adverse effects of climate change and the risk of violence in African cities. In consequence the theoretical framework to be established

in this section draws on the body of urban violence literature adjusted to climate change as triggering factor. As already noted urbanization per se is unlikely to have substantial effects on the onset of urban violence. In the context of this paper, the definition of urban violence is adopted from Raleigh (2015) who introduced it as "violent acts for political purposes that rather occur within spaces with population density of over 1,000 people per km" (Raleigh 2015, 92). Rural and urban violence vary significantly. Whereas rural mobilization is often clan-based and ethnicity centered, urban violence is most effective when the organizers manage to unite the heterogeneous agents found in cities. Those agents are mainly spontaneous groups of rioters and protesters loosely or informally organized (for a discussion see Philipps & Kagoro 2016). It's not the stereotype of a formalized rebel group known from many episodes of civil conflict across rural Africa, but individuals gathering for a certain event and splitting soon thereafter. Literature on the question *why* do people perpetrate acts of urban violence can by divided into two major blocks (i) demographic and (ii) socio-economic factors. Opening the first box – the set of demographic factors – reveals the attempt to explain the phenomena by rural-urban migration or youth bulge. Accordingly, the influx of mainly unskilled, young workforce from remote areas into already densely populated cities comes with the increased risk of violence. Reuveny (2007) identified five channels from migration to conflict that increase the likelihood of violence. Hence, scarce resources or weak property rights may lead to competition among residents and migrants. Ethnic tensions, distrust and political instability in the receiving area are other driving factors. Of certain relevance in the context of rural-to-urban migration is the increased receptivity of frustrated in-migrants for political agitation of dubious agents (Reuveny 2007). The role of the 'youth bulge' in the onset of violence is contested. Whereas opponents claim that there is at least a certain effect of existing youth bulge on conflict (Goldstone 2010; Urdal 2006; Collier et al. 2008). Results of Urdal (2006) suggest that risk of violence increases through "abundant supply of youths with low opportunity costs …[having]… stronger motives for violence may arise as youth bulges are more likely to experience institutional crowding, in particular unemployment" (Urdal 2006, 607). In a more recent study Flückiger and Ludwig (2017) find that increasing cohorts of population in the age of fifteen to nineteen raise the risk of a low-intensity conflict. Fearon (2011) and Sommers (2011) challenge those findings arguing for the identification of effects caused by youth bulge. Sommers claim that contextual factors such as the availability of small arms or drugs that facilitate recruitment into militias and youth gangs are overlooked in theorizing the 'youth' as security threat (Sommers 2011). Urdal's (2006) argumentation that a desperate economic situation of the individual might facilitate mobilization of the 'youth' draws a line to the second huge block in urban violence literature. This body aims to explain the occurrence of violence by changing socio-economic conditions. As one of the most prominent factors poverty is regarded key to the onset of urban violence. In 2014, about 55 percent of the urban population in Sub-Sahara Africa lived in slums (World Bank 2017a) without regular access to

water, sanitation or electricity. Those parts of the population are heavily dependent on income generated from the informal economy. According to estimations of ILO in 2014 the vulnerable employment rate stood at 76 percent in Sub-Sahara Africa (International Labour Organization 2015).

The saga of 'the urban' as light house of economic development that offers plenty of opportunities can hardly stand any statistical test – regarding Sub-Sahara Africa. Although rural areas are still in the lead in total poverty, urban poverty is rising at faster rates and "the poor are urbanizing at a higher rate than the population as a whole" (Raleigh 2015, 94). Economic growth is not translated into the wellbeing of the individual and does not lead to prosperity. This inequality potentially results in "political radicalization and unrest—especially if certain groups suffer from systematic social exclusion" (Østby 2016, 1). Fjelde and Østby (2014) find that areas characterized by strong inequalities are more prone to communal conflict than others.

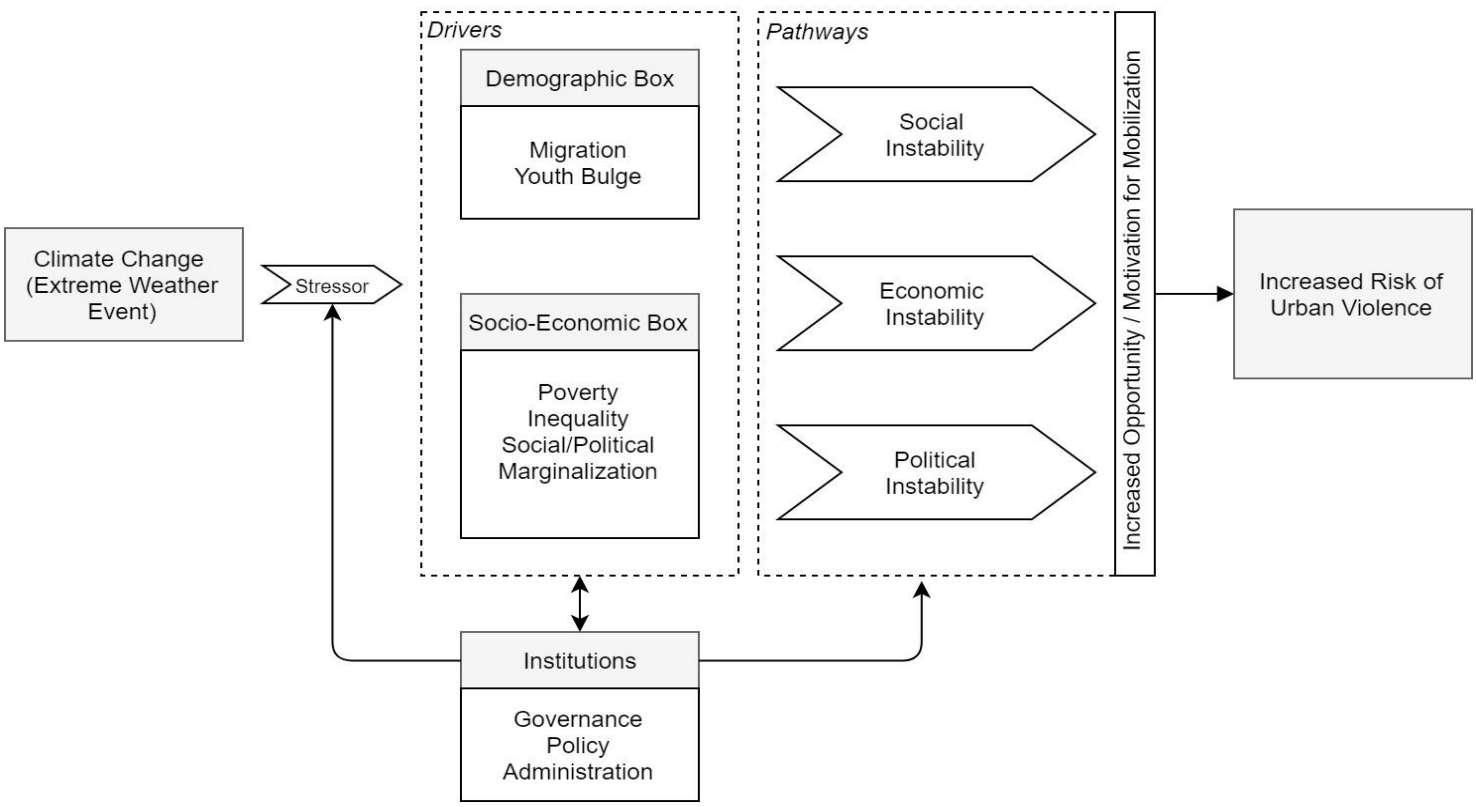
Disillusioned by shattered dreams, inhuman living conditions and striking inequality, urban dwellers are detached from economic development. Once there is an imbalance between urban growth and economic growth the risk of violence increases (Goldstone 2002).

If urban political institutions or administration tasked to channel anger or improve the framework of living fail to address the needs of the most vulnerable, a feeling of marginalization may result in political frustration. As a response strategy on phenomena such as marginalization, corrupt officials and inadequate service delivery, militias or political gangs may get engaged in grievance based riots (Beall 2007; Raleigh 2015). The deterioration of most African cities and their administrations began in the late 1970es. Faced with the economic turmoil of the global regression and international actors praising the neo-liberal 'cut back' of the state, governments of the Global South were advised to lay off state employees, to thin out administration and reduce service delivery. Accompanied by the international donors' 'anti-urban bias' (Beall 2011), focusing on rural development rather than urban areas, cities were off the radar. This contributed to the status quo of poorly planned and governed cities across the region. Beall and Fox (2009) refer to it as 'laissez-faire' urbanization that – left unchanged – "means give up and suffer the consequences" (Cohen 2001, 57). Strengthened local governance, that includes city administration, proper policies and structures as well as political parties and civil society that are able to tackle issues raised by the city dwellers are considered as way to reduce the risk of urban violence (Beall and Fox 2011).

These various streams of literature evolving from climate change and urban violence research can be integrated into a single model attempting to explain causal relations on the pathway from adverse climate effects to an increased risk of urban violence (Figure 3). As outlined in the section on climate change literature, climate anomalies such as extreme temperature and rainfall or climate change induced disasters (floods, hurricanes) are considered as stressor to cities already under pressure. Adverse climate conditions might have conflict-accelerating impact on

drivers of urban violence. Increased pressure on the urban demographic and socio-economic conditions might result in social, political and economic instability - a breeding ground for agents eager to mobilize individuals or groups for their agenda. This opportunity and motivation for mobilization eventually increases the risk of urban violence. The entire chain from climate change to violence is under constant influence of the 'institutions box', integrating local governance, policy and administration of state and non-state actors. By interfering into drivers, pathways or the management of climate anomalies the impact of institutions may have a cushioning or worsening effect on the process.

Figure 3 Proposed Analytical Framework on Climate Change and Urban Violence



6. Conclusion and ways forward

Despite ever-increasing rates of urbanization across the region of Sub-Sahara Africa these parts of the population still do not enjoy the research coverage as their rural fellow citizens. The systematic literature research unveiled a significant gap in research on links between climate change and violence in an urban context. In contrast, pathways from climate anomalies to conflict in rural areas have been widely examined. In line with the streetlight theory and research findings of Hendrix (2017), the review demonstrated scientific interest is granted foremost to areas that are already under observation. Hence, Kenya takes the lead in climate change-conflict literature.

Research takes the risk to repeat the mistakes policy makers and development practitioners made years ago - blinded by an 'anti-urban bias', major efforts are still directed to the hinterlands, nearly neglecting the sprawling cities of the continent. Overshadowed by the 'run on the rural,' urban areas grew in an almost uncontrolled manner leaving poorly governed entities and administrative structures. Institutions are barely able to address the needs of the most vulnerable of the city - urban dwellers living in slums, dependent on the informal economy with no or limited access to basic goods. Poverty, youth unemployment and inequality are considered key enablers for increased opportunities for mobilization. External threats posed by extreme weather in the wake of climate change could eventually lead to escalation and the onset of urban violence.

Both, data on past disasters and scientific climate modeling suggest that urban areas in Sub-Sahara Africa are subject to environmental changes. Sea-level rise and increased frequency of natural disasters are scenarios that urban dwellers are exposed to in the future. Due to their living conditions and housing situation on water ways or coastal areas the urban poor are most vulnerable to threats resulting from climate change.

Contemporary research is inadequate to address challenges rising from those implications. There is still little knowledge on the indirect mechanisms of transmission from adverse weather to conflict. Although the body of literature on this is growing (e.g. food prices, economic shocks) the field remains underdeveloped. To address these shortcomings, future research needs to integrate the differences between rural and urban into more appropriate research designs. Urban areas are characterized by heterogeneous population, diverse livelihoods and a multitude of mobilization opportunities distinguishing them sharply from rural areas. Thus, conflict dynamics will most likely differ from those found in the hinterland. This needs to be reflected in research. More precisely, future research should (i) take into account the mélange of drivers for urban violence and (ii) investigate under which conditions adverse climate effects contribute to the onset of conflict. In the urban context mono-causal effects are very unlikely, requiring research strategies taking into account a broad set of indicators. The list of external threats potentially triggering urban violence could also

well be longer than in rural areas. Another stream of research (iii) should focus on adverse effects of adaption policies and practices in cities across the region. Recent events in African cities suggest that it is not an extreme weather event that sparked unrest, but the reaction of the city administration. Inadequate mitigation strategies on climate change that threaten urban livelihoods might be another avenue into increased urban violence; this avenue equally demands appropriate research designs.

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