CGIAR

FOCUS
Climate Security

Exploring the Nexus between Climate Change and Human Rights

Working Paper No. 345

CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

CGIAR Focus Initiative on Climate Security

Raramai Campbell, Peter Läderach, Grazia Pacillo

Exploring the Nexus between Climate Change and Human Rights

Working Paper No. 345

CGIAR Research Program on Climate Change,
Agriculture and Food Security (CCAFS)

Raramai Campbell, Peter Läderach and Grazia Pacillo

To cite this working paper
Campbell R., Laderach P., Pacillo G. 2021. Exploring the Nexus between Climate Change and Human Rights. CCAFS Working Paper no. 345. Wageningen, the Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

About CCAFS working papers
Titles in this series aim to disseminate interim climate change, agriculture and food security research and practices and stimulate feedback from the scientific community.

About CCAFS
The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is led by the International Center for Tropical Agriculture (CIAT), part of the Alliance of Bioversity International and CIAT, and carried out with support from the CGIAR Trust Fund and through bilateral funding agreements. For more information, please visit https://ccafs.cgiar.org/donors.

Contact us
CCAFS Program Management Unit, Wageningen University & Research, Lumen building, Droevendaalsesteeg 3a, 6708 PB Wageningen, the Netherlands. Email: ccafs@cgiar.org

Abstract

Climate change is described as the defining challenge of our generation. It poses direct and indirect threats to food security, human security and global health. This study explores the impact of climate change on the rights to food, security and health within the context of sub-Saharan Africa by analysing data for correlation. To evaluate the relationships, both a global and sub-Saharan African analysis are done. To understand the extent to which people's rights can be protected from these impacts, this paper also examines existing legal protections that exist to protect people against climate change.

Data showed that climate change is correlated with the rights to food, security and health but is not the most significant determinant. The results also reveal interrelations between the rights, with health and food security having the strongest correlation. These findings are significant since it highlights the indivisibility of rights and the importance of a rights-based approach to climate change.

Keywords

Human Rights; climate change; conflict; food security; health.

About the authors

Raramai Campbell is an undergraduate student of International Studies at Roskilde University. Email: raramai.c.c@gmail.com

Peter Läderach is Flagship Leader of the Climate Smart Technologies and Practices flagship, CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) and Leader of the CGIAR FOCUS Climate Security. Email: p.laderach@cgiar.org

Grazia Pacillo Senior Economist – Climate Security, climate change resilience, food security and agriculture, Alliance of Bioversity International and International Center for Tropical Agriculture (CIAT). Email: g.pacillo@cgiar.org

Acknowledgements

This paper was written with support from the CGIAR FOCUS Climate Security Team. I would like to thank Peter Laderach, Grazia Pacillo and Oluchi Ezekannagha for their advice throughout this process. I would also like to thank my supervisor Lisbet Christoffersen. Finally, thank you to my parents and family for their endless support.

Contents

Acronyms

SSA	Sub-Saharan Africa

Introduction

Climate change is described as the defining challenge of our generation (Wang and Horton 2015). It poses direct and indirect threats to food security (Campbell et al. 2016), human security (Nordstrøm 2010) and global health (Bowles et al. 2015). It has also been described as a threat multiplier that can intensify and prolong conflicts (ibid.). Climate change involves increased temperatures, changes in precipitation, hazards, extreme weather events and sea level rise which impacts human rights through multiple pathways (Mason and Rigg 2019). Human rights are understood as moral standards that are held by all people, they can also be formalised as legal rights (Bell 2013). Its widely accepted that the rights to subsistence and food, life and security and health are basic human rights (ibid.).

To understand the full impact of climate change on human rights, it is crucial to realise their interconnected nature (Limon 2009), a violation of one right leads to the violation of others. This paper examines the link between climate change and the rights to food, security and health in sub-Saharan Africa (SSA). Africa is described as the most climate vulnerable continent (Quirico and Boumghar 2015). Von Uexkull (2016) finds that SSA will be hit most severely by regional warming, resulting in increased food insecurity, resource scarcity, extreme weather and conflicts. Climate change will also exacerbate existing socioeconomic risks and vulnerabilities (Field et al. 2014). There is significant research on how climate change impacts health (ibid.) and hunger (Myers et al. 2017) and only recently on conflict (Barnett and Adger 2007; OBrien et al. 2010). This study explores how food security, conflict and health are impacted by climate change by analysing data for correlation. In particular, this paper focuses on the security outcomes of climate change as well as the interplay between climate, food security, conflict and health.

Further, this paper examines the legal protections that exist to protect people against climate change by exploring how these rights are expressed in international and African human rights instruments. This also acts as a reference to examine climate change through a rights based approach (Humphreys 2013).

Therefore, this paper asks: How does climate change impact the rights to food, security and health?

- To what extent are food security, conflict and health interrelated?
- How does climate change impact food security, conflict and health and to what extent are governance, inequality and poverty important?
- To what extent can climate change and other impacting variables predict conflict outcomes?

Literature Review

This review explores climate change through a Rights lens and looks at how it impacts food security, conflict and health.

A Rights Based Approach to Climate Change

There are many ways to think about climate change and human rights. Human rights can be ethical, political or legal in nature (Bell 2013), and represent shared norms and values (Cohen et al. 2013). Unlike, legal rights, ethical and political rights can be justified since they are granted to all "solely in virtue of their humanity" (Bell 2013:161). Legal rights contain rules and obligations that are enforceable (Marks 2014). They are recognised through laws, treaties or declarations (ibid.). Uvin (2007) argues that "Human rights, once set down on paper, never die" (Uvin 2007:597). A primary source of legal rights is the Universal Declaration of Human Rights (UDHR) and its legally-binging treaties: the International Covenant on Civil and Political Rights and the International Covenant on Economic, Social and Cultural Rights (ICESCR) (Marks 2014). Legal rights can be labelled as positive or negative; the former requires action to protect while the latter needs actions to be avoided (Humphreys 2009). The right to security is a civil and political right in UDHR that relates to physical integrity (Marks 2014). So it's a first generation right (Quirico and Boumghar 2015). The right to health and food are economic, social and cultural rights in UDHR that refer to social protections (Marks 2014) and are second generation rights (Quirico and Boumghar 2015). So, food, security and health are basic rights since they each contain the duty to avoid depriving, duty to protect from deprivation and the duty to help the deprived (Bell 2013). They are found in international agreements (Cohen et al. 2013).

Viewing climate change through a rights based lens provides a common frame of reference (Uvin 2007). It also creates duties to address the effects of climate change (Humphreys 2009). A key benefit of this approach to climate change is how it recentres the focus onto the vulnerable persons who are impacted (Limon 2009). It prioritises harms to people and creates a framework that can be translated into legal obligations (Humphreys 2013). This is useful since climate change is a multidimensional challenge that increases vulnerability (Dryzek 2005). Vulnerability refers "to the likelihood of experiencing harm from exposure to socioenvironmental stress and from insufficient capacity to adapt to change" (Mason and

Rigg 2019:11). It acts as a measure for the rate of climate change and a systems adaptive capacity (Busby et al. 2013). While vulnerable people will be impacted most by climate change, no one is immune (Watts et al. 2019).

Impact on Food Security

Climate change threatens food security through multiple pathways (Watts et al. 2019). Food security (or the right to food) refers broadly to food availability, accessibility, sustainability, nutrition and equity to meet dietary requirements for a healthy life (Swinburn et al. 2019). Climate change's main impact is through the reduction of agricultural and fishery yields (Bowles et al. 2015). The linkages also include social mediating factors like government capacity (Watts et al. 2019).

Importantly, weather variables significantly determine crop yields and in turn crop yields determine the quantity and the nutritional quality of food (ibid.). Africa is particularly vulnerable to the adverse effects of climate change, as drought can deplete water resources and desertification can decrease agricultural productivity (Quirico and Boumghar 2015). As climate change is expected to increase the intensity and how often extreme weather events occur, food security will suffer (ibid.). To compound this, higher food prices from reduced yields will also negatively affect global food security (Bowles et al. 2015; Cohen et al. 2013).

Food insecurity is especially harmful to vulnerable communities, particularly those based in food-insecure regions like SSA (McMichael et al. 2012). The importance of food security is contextualised when it is described as a determinant of overall health (McMichael et al. 2012). The challenge of food insecurity often prompts people to relocate to other more food secure regions (ibid.). This shows how climate change amplifies existing environmental stresses and creates new ones (Fetzek and Mazo 2014).

Impact on Conflict

Climate change has been described as a security threat which can increase risks of violent conflict (Barnett and Adger 2007) and violate the right to security. While there is no agreed definition of security, (Powell 2019) it describes a right to safety and protections from environmental or physical threats (ibid.). How climate change relates to conflict is not a simple causal relationship; Von Uexkull (2016) notes that there are indirect linkages that are influenced by political and economic contexts. Most studies describe the relationship

between climate change and conflict by examining specific aspects of climate variabilities (Bretthauer 2016). However, explainations of the link between climate change and conflict are not all consistent since different studies focus on different types of conflict and different aspects of climate change (ibid.). Contributors to conflict include "poverty, environmental degradation, governance challenges, resource stresses, ethnic divisions and demographic pressures" (Fetzek and Mazo 2014:152). SSA contains many fragile states which are especially vulnerable, making them hotspots for conflict (Bowles et al. 2015). Von Uexkull (2016) explains how it is "particularly important to identify the effect of climate variability on organized violence in sub-Saharan Africa, as future climate change will likely enhance the salience of this link" (von Uexkull 2016:12).

Other causes of conflict include food insecurity, resource scarcity, migration and shocks such as natural disasters or rising food prices (Barnett and Adger 2007; Breisinger et al. 2015). In SSA, these factors overlap and are exacerbated by climate change (Myers et al. 2017). Nordstrøm (2010) defines climate change as a mechanism that affects conflict: as a threat multiplier, a channel or a trigger for violence. It acts as a multiplier when it interacts with socio-political factors, it can also act as a channel when it is used to promote violence. Finally, it can act as a trigger if it causes sudden change that leads to conflict (Nordstrøm 2010).

The notion of climate conflict is relevant to explore as it has been adopted by various actors (ibid.). Bretthauer (2016) argues: "climate change leads to human insecurity as it reduces the resources people need to sustain their livelihoods […] This scarcity of livelihood resources results in increased competition over resources, which in turn leads to violent conflict" (Bretthauer 2016:2). In sub-Sahran Africa, higher tempertures are associated with increases in civil war which stem from poor argicultural yields (ibid.). How climate change relates to security is not always that simple however as there are several interconnected factors that influence conflict (Field et al. 2014). Busby (2018) builds on this, stating while the link is complex, "merely saying climate forces are threat multipliers is not especially helpful" (Busby 2018:342).

Impact on Health

Climate change poses a serious threat to global health (Bowles et al. 2015). By situating climate change as a health issue, Wang and Horton (2015) argue that it makes more real what sometimes appears as a distant issue. Climate change affects health directly and indirectly. Field et al. (2014) describe three ways; directly from extreme conditions, indirectly from changes in the environment or ecosystem and lastly, indirect impacts mediated through societal systems. While the first two refer to floods or shifting patterns of disease carrying pests, the final refers to more complex health impacts such as undernutrition and mental illness (Field et al. 2014). The right to health creates a sense of responsibility for states to protect and provide access to preventative health and health care services (Swinburn et al. 2019).

Climate change's impact on health has been explored in depth and there is agreement that it exacerbates mental illness, undernutrition, allergies, infectious diseases, respiratory diseases and cardiovascular diseases (Watts et al. 2019). Heat-related illnesses from rising temperatures are also relevant (Mason and Rigg 2019) . Africa is especially vulnerable to risks to health security since access to sufficient food, clean water and health services are not guaranteed for many (Quirico and Boumghar 2015). Climate Change also has the ability to magnify and exacerbate existing chronic diseases as in SSA where the high prevalence of HIV multiplies the health risks of climate change (Field et al. 2014).

Watts et al. (2019) explains, most climate-related health impacts are mediated through complex environmental and social systems. This is expected since changes in climate result in disruptions in environmental and social systems which in turn will impact human health via multiple pathways (McMichael et al. 2012). Field et al. (2014) find that these impacts are particularly deadly for those with the least capacity to adapt and poor health systems.

Based on this review, it is important to recognise to what extent these impacts are interrelated and mediated. This is an area this paper aims to contribute to.

Conceptual Framework

Considering that “climate change is primarily a catalyst which will likely intensify tensions in vulnerable parts of the world” (Nordstrøm 2010:11), it makes sense to map the impacts of climate change on food security, security and health. Especially in SSA where the effects of climate change are mediated through asymmetries of access (von Uexkull 2016). Breisinger et al. (2015) find that food insecurity becomes concentrated in conflict affected countries. But in the same way conflict acts as risk multiplier that threatens food security , food insecurity can contribute to conflict (von Uexkull 2016). The health implications of food insecurity are vast (Swinburn et al. 2019), as are the health consequences of conflict which operate at two dimensions: directly through violence and the indirectly through the conditions it creates (Bowles et al. 2015). Conflict contributes to increased transmission of infectious diseases, food insecurity, mass migration and poor sanitation (ibid.).

Campbell et al. (2016) map the pathways between climate, health and food security as being interconnected. As explored in the literature review, health pathways will affect peoples’ nutrition which will in turn compromise their ability to adapt to future climate change risks (Campbell et al. 2016). Based on this, climate change acts as an exacerbator for pre-existing socioenvironmental vulnerabilities that will threaten people globally. Von Uexkull (2016) links exposure to climate variability, a reduction in livelihoods to an increased risk of violence as a one-way relationship. While Busby et al.'s (2013) diagram for vulnerability includes hazard exposure, resilience and governance, it does so as unconnected nodes. It does not recognise linkages. Others recognise the interplay better ut do so in a limited scope. Importantly, peoples capacity to adapt is threatened by their exposure to climate change and how it negatively impacts their rights (Mason and Rigg 2019). Systems contain interrelated connections that change and reinforce causes and effects which result in cycles that reduce abilities to adapt to long-term climate change (Fetzek and Mazo 2014). So, understanding the dynamics and feedback loops that occur between climate change, food security, security and health is crucial to identifying solutions. This paper does this by mapping the impacts (Figure 1). This figure builds on existing diagrams to create a comprehensive map to understand relationships within a broader framework. Each component is described in Table 2 in the Methodology.

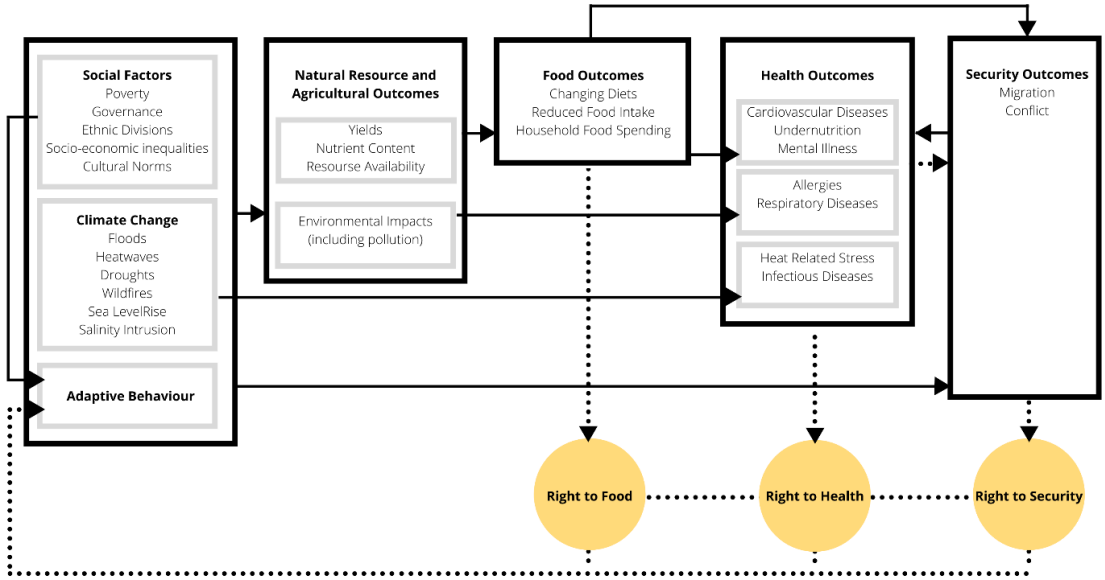

Figure 1. Impact Pathways for Climate Change and the Right to Food, Health and Security

Methodology

This paper uses a Positivist approach as it focuses on causality between climate change, food security, conflict and health. Positivism helps uncover the link between phenomena through fact-based investigations (Bryman 2016). A multi-method design combined qualitative and quantitative data by using 11 international and 9 African human rights instruments and 8 indicators sourced from INFORM Risk Index. Data was sourced through online research and secondary literature.

Qualitative Data

This analysis aims to understand how the rights to food, security and health are formalised and explain the extent food security, conflict and health are interrelated. Human right instruments include Declarations, Treaties and Conventions. So, the textual data varies in format since some instruments are non-binding. Data was sampled purposively (ibid.) The document list is in Appendix 1.

The textual data was examined using exploratory analysis coding on NVivo12 to help visualise trends and compare the occurrence (ibid.) of the three rights. By quantifying the occurrence of the rights within articles in the instruments it is possible to assume its importance.

Quantitative Data

The data required for this study was from INFORM Risk Index, a database that compiles data from over 50 databases on hazard & exposure, vulnerability and lack of coping capacity (DRMKC 2020). The data covered 2010-2019. Excel was used to combine years to get an average for each indicator. To evaluate the relationships, both a global and SSA analysis was done. The former has the advantage of a large sample size (countries), but the disadvantage of diverse conditions across the globe. Variables were selected based on their relevance for the pathways presented in the Conceptual Framework (Table 1).

Table 1 Description of Variables used from INFORM Indicators

Conceptual Framework	INFORM Indicator	Description	Limitation
Climate Change	Natural Hazard	Droughts, exposure to cyclones, earthquakes, floods and tsunamis	Problematic since it includes exposure to earthquakes and tsunamis which are not climate variables
Governance	Governance	Government Effectiveness and the Corruption Perception Index	
Food Outcomes	Food Security	Food access, food availability and food utilisation	
Health Outcomes	Health of Children Under 5	Under-five mortality rate and under weight	A relatively narrow indicator for health
Conflict	Current conflicts	National and subnational conflicts	
Poverty	Human Development Index	GDP per capita based on purchasing power parity	
Socio-economic Inequalities	Inequality	Gender Inequality Index and Income Gini coefficient	Has missing values so analyses with this variable reduce the number of countries

To analyse the data, SPSS Statistics was used. Descriptive statistics were done to check the data for normality so that parametric statistics could be used. Only Current Conflicts was heavily skewed. To overcome the limitation of the Natural Hazard variable, a subset of the global data was created ("Global climate change subset"), excluding countries above the upper quartile for the tsunamis and earthquakes indicators.

To understand the relationships among variables, correlation coefficients were calculated (ibid.). The parametric Pearson's correlation coefficient was used in most cases but where Conflict was the variable, the nonparametric Spearman's correlation coefficient was used (Meyers et al. 2013). Four sets of correlation analyses were conducted: the first to understand how food security, conflict and health are related, the others to understand how climate change impacts food security, conflict and health and to what extent governance, inequality and poverty also play a part.

To understand how climate change and other impacting variables can predict conflict , the Current Conflict indicator (not normally distributed) was converted to a binomial variable 0

(no conflicts) and 1 (conflicts), so a binary logistic regression could be conducted (ibid.) using Conflict as dependent variable.

Analysis

To what extent are food security, conflict, and health interrelated?

Table 2 summarises the document analysis for the occurrence of rights. A more detailed summary of each human rights instrument is in Appendix 2.

Table 2 Number of Mentions of the Rights in human rights instruments

Human Rights Instruments	Right to Food	Right to Security	Right to Health
International	14	22	17
African	5	16	18
Total	19	38	35

Right to Food

The right to food is stated as a right that needs to be protected. It is understood as being free from hunger (FAO 2020). The Protocol to African Charter on Rights of Women in Africa provides a comprehensive overview by granting "the right to nutritious and adequate food…[and] adequate systems of supply and storage to ensure food security." In this way it captures all three essential dimensions of food security from its utilisation, access and availability (ibid.) and presents the right to food as positive (Humphreys 2009). The Pretoria Declaration underlines this by stating a benchmark of access "to ensure freedom from hunger to everyone and to prevent malnutrition." This direct framing allocates responsibility to states and suggests a protection against the adverse effects of climate change. Swinburn et al. (2019) finds that the health effects of climate change will worsen malnutrition (ibid.). ICESCR includes the right to food as a part of the broader right to an adequate standard of living. Humphreys (2009) agrees; food is a precondition to the realisation of other basic rights.

International instruments like the Rome Declaration strengthen regional commitments by listing the causes of food insecurity as including factors like poverty, conflict, corruption and environmental degradation. It emphasises the role of conflict by stating how "a peaceful and stable environment […] is a fundamental condition for the attainment of sustainable food

security." This recognition of the complex pathways that affect the right to food capture the impact of climate change (Campbell et al. 2016). The Universal Declaration on Eradication of Food further situates the right to food by clearly linking hunger to crises and inequalities.

Right to Security

The right to security is described differently in the instruments. Powell (2019) also finds that security is a multifaceted concept that takes on new meanings depending on its context. The most common understanding of it can be found in UDHR; "Everyone has the right to life, liberty and the security of person". The notion of security of person is echoed in three other international instruments. The African Charter on Human Rights (ACHPR) expands to add that all people have the right to national and international peace and security. While the specific protections it entails are not explained, it captures the multiple levels security operates at. Quirico and Boumghar (2015) note that ACHPR also includes the 'right to existence' which is relevant to climate change.

The right to security is explained in most detail in the International Convention on Elimination of Discrimination: "The right to security of person and protection by the State against violence or bodily harm." Notably, it is framed as a negative right (Bell 2013). In an African context, the Kigali Declaration and Convention on the Rights of Persons with Disabilities recognise that conditions of peace and conflict lead to human rights violations. This suggests that security is intrinsically linked to a right to life. It is clear that changes in the climate have negative impacts on peoples well-being, health and life (Wang and Horton 2015).

Right to Health

ICESCR grants "the right of everyone to the enjoyment of the highest attainable standard of physical and mental health", this general framing is echoed in an African context by the ACHPR and The African Charter on the Rights of Child. The latter adds spiritual health. Generally, health is spoken about as a service that must be provided and ensured access to. So it is regarded as a positive right (Bell 2013). The attempt to encompass all health needs within the right to health is a challenge that makes it difficult to protect (Limon 2009) since it is also linked to other rights like food in UDHR. Swinburn et al. (2019) agree, finding that the right to health extends to include other concerns such as food insecurity, water accessibility

and the adverse effects of climate change. The Pretoria Declaration on Economic, Social and Cultural Rights in Africa recognises this too.

Besides health care access, the right to health also relates to the environment in ICESCR. African instruments like ACHR are more explicit, stating that "All peoples shall have the right to a general satisfactory environment favourable to their development." By describing health within an environmental framework, it recognises it's impact on health. The Kigali Declaration further clarifies this by listing useful measures to take.

Interrelations of Rights

Kigali Declaration states that "all human rights are universal, indivisible, inter-dependent and inter-related". A statement like this is a powerful tool to protect people against climate change. Notably, Soft law instruments like declarations do not impose binding obligations, so contain language that is more ambitious. Similarly, Grand Bay Declaration lists the causes of human rights violations as conflict, environmental degradation and disease. So, accounts for climate change's impact on rights. Environmental protections occupy a third generation of rights (Bell 2013) which African instruments are shifting to account (Quirico and Boumghar 2015).

For both global full data set and climate change subset (Table 3), Food Security and Health are highly correlated, while Conflict is somewhat less correlated with Health. Food Security and Conflict are least correlated. In the case of SSA, the strongest correlation is between Conflict and Health and the weakest and not significant is Current Conflict and Food Security. These results support the idea that food security, conflict and health and by extension the rights to food, security and health are highly interrelated.

How does climate change impact food security, conflict and health and to what extent are governance, inequality and poverty important?

Food Security

While climate change is significantly correlated with Food Security, other variables are more highly correlated (Table 4). For the global data sets, the most significant determining factors are Human Development Index, followed closely by Inequality and Governance. Watts et al. (2019) comes to similar conclusions, stating that poverty and the capacity of governments

determine how risks can be managed. Natural Hazards are still significantly correlated with Food Security but with a smaller correlation coefficient. Interestingly, the Global subset (without tsunamis and earthquakes) has a higher relationship between Natural Hazards and Food Security. So, climate change is a significant determining factor for Food Security. Mason and Rigg (2019) find that climate change is expected to have a "significant negative net impact on global food security […] By 2050, this is projected to result in global net reductions in crop yields by up to 45% for maize, 50% for wheat, 30% for rice, and 60% for soybean" (Mason and Rigg 2019:185). For SSA, Governance is the most important determining factor, but the other variables follow closely behind. This is line with the understanding that food insecurity is caused by interlinked agricultural, environmental, socioeconomic and health factors (Watts et al. 2019).

Table 3 Correlations amongst conflict, food security and health (Spearman Correlations)

	Conflict	Food Security	Health
Global Full Set (n = 191)			
Conflict		0.13*	0.31***
Food Security			0.72***
Global climate change Subset (n = 123)			
Conflict		0.16*	0.39***
Food Security			0.73***
SSA (n = 47)			
Conflict		0.12	0.64***
Food Security			0.43***

Key for significance

*NS < 0.1 nearly significant *<0.05 **<0.01 ***<0.001*

Table 4 Pearson Correlation between Food Security and possible determining factors

	n	Natural Hazards	Governance	Human Development Index	Inequality
Global Full Set	191	0.18**	0.58***	0.73***	0.60***
Global climate change Subset	123	0.31***	0.59***	0.73***	0.60***
SSA	47	0.26*	0.39**	0.33*	0.25^{NS}

Key for significance

*NS < 0.1 nearly significant *<0.05 **<0.01 ***<0.001*

Conflict

Climate change is significantly correlated with conflict but for all datasets, Governance has the highest correlation (Table 5). This is consistent with Breisinger et al. (2015) who associates conflict with poor governance. Followed closely as having significant correlation with conflict is Human Development Index and Natural Hazards. Barnett and Adger (2007) also find that climate change increases the risk of conflict. For Von Uexull (2016), this link is not deterministic; there are multiple conditioning factors like access to food. Food Security is the least significant in all datasets, and not significant for SSA. These results support the idea that the way food insecurity contributes to conflict is linked to other factors like competition over access to limited resources (von Uexkull 2016).

Table 5 Pearson Correlation between Conflict and possible determining factors

	n	Natural Hazards	Governance	Human Development Index	Inequality	Food Security
Global Full Set	191	0.34***	0.39***	0.31***	0.25***	0.13*
Global climate change subset	123	0.35***	0.44***	0.35***	0.23**	0.16*
SSA	47	0.36**	0.44***	0.43***	-0.01	0.12

Key for significance

*NS < 0.1 nearly significant *<0.05 **<0.01 ***<0.001*

Health

Climate change is significantly correlated with health in all datasets, yet Human Development Index is highly significant, followed by Governance (Table 6). Field et al. (2014) agree, stating that health and poverty are linked. Governance is key to health outcomes since it refers to the quality of public services (Watts et al. 2019). These variables are followed closely by Food Security for global datasets but in the case of SSA, it is Conflict that is closely correlated with health. Bowles et al. (2015) also finds that conflict is detrimental to health. Natural Hazards are significant at all datasets but less than the previously mentioned variables. This is also at odds with Bowles et al. (2015) who argue that climate change is the greatest threat to global health. This contradiction could be attributed to the fact that climate change's impacts are not isolated, they exacerbate social conditions (Barnett and Adger 2007).

Table 6 Correlation between Health and possible determining factors (Pearsons except for Current Conflicts which is Spearmans)

	Natural Hazards	Governan-ce	Human Development Index	Inequality	Current Conflicts	Food Security
Global Full Set n=191	0.21**	0.68***	0.91***	0.59***	0.31***	0.67**
Global climate change Subset n=123	0.35***	0.73***	0.92***	0.64***	0.37***	0.67***
SSA n=47	0.28*	0.74***	0.89***	0.11	0.64***	0.20^{NS}

Key for significance

*NS < 0.1 nearly significant *<0.05 **<0.01 ***<0.001*

To what extent can climate change and other impacting variables predict conflict outcomes?

Considering that climate change has been much discussed as a health and food challenge before, while climate change and security have received much less attention, it is useful to see how multiple variables contribute to conflict (Table 7).

Table 7 Results from Binary Logistic Regression for the Dependent variable Conflict

	Constant	Natural Hazards	Food Security	Gover-nance	Human Develop-ment Index	Inequality	% Explain-ed
Global Full set n=179	-9.10***	0.34*	-0.29*	0.99***	0.04	0.17	74
Global climate change Subset n=115	-10.82***	0.62*	-0.29*	1.18*	0.07	0.03	77
SSA n=45	-19.54*	0.86*	-0.35	1.69*	0.47	0.20	76

Key for significance

*NS < 0.1 nearly significant *<0.05 **<0.01 ***<0.001*

For all the datasets, climate change is a significant determinant for conflict, but Governance is the main driver for conflict. The regression equations explain more than 70% of the variation in Conflict. The predictions of Conflict from the equations were compared to the

actual data. Six countries in SSA were predicted to have no conflict but had in fact conflict. Three of these have experienced ethnic conflict or conflicts over resources, which are not variables I had in the database. Fetzek and Mazo (2014) describe ethnic divisions and resource stresses as additional stressors for violent conflict. In Cameroon, there was violence from separatists (Rustad et al. 2020). While in Kenya, resource based conflict broke out (Relief Web 2020). For Uganda, migration from South Sudan led to conflict (Okiror 2020). For the other 3 cases that were incorrectly predicted to have no conflict, their causes are political. Burundi, Cote d'Ivore and Uganda's most recent conflict in 2020 was related to political elections (ibid.;Rustad et al. 2020). These cases show how "the root causes of conflict vary greatly with each case and are often the consequence of a combination of political, institutional, economic, and social stresses" (Breisinger et al. 2015:53). Interestingly, the regression model also predicted conflict in six countries that did not have any. Of these, Mozambique is actually an accurate prediction (Bowker 2020). Beside this one case, the other mispredictions prompt questions on how states remain peaceful.

Discussion

Data showed that climate change is correlated with the rights to food, security and health but is not the most significant determinant. The results also reveal interrelations between the rights, with health and food security having the strongest correlation. This is key since recognising the link between all rights is the first step for instruments to adapt to climate change (Humphreys 2009). As for conflict outcomes, climate change was the second most significant determinant. The methods were effective at addressing the question, and while INFORMs database had sufficient data it would be interesting to see if other indexes had similar results. An additional tool that would help visualise the impacts and highlight vulnerable sites in SSA is mapping (Busby et al. 2013).

In a similar study of climate change and human rights, Bell (2013) asks "How might we defend the claim that the impacts of climate change violate moral human rights?" (ibid.:163), she suggests two arguments. While the first asks that the right to adequate environment is expanded to include climate change, the second defends climate change as "a 'new threat' to 'old' human rights" (ibid.). In this study, climate change is considered a new threat to human rights. Bowles et al.'s (2015) study on climate change, health and conflict also frames climate change as "a 'peace inhibiter' as well as a 'threat multiplier'" (Bowles et al. 2015:392). An investigation by Busby (2018) also accounts for the many pathways climate change operates at to impact security. Contributions like these help understand direct correlations, yet there are still areas that need to be unpacked like how migration plays into this relationship (Mason and Rigg 2019). Another is to understand how climate change leads to humanitarian crises, since they are "the most likely and persistent security threats practitioners have to prepare for" (Busby 2018:342).

This study used a rights-based approach, yet it is not the only framework used to examine climate change. Some use a cost-benefit analysis (Humphreys 2009) which views climate policy as "one that allows some to suffer very great harms if, in aggregate, others benefit more" (Bell 2013:159). While a rights based approach overcomes this, it is limited since the impacts of climate change can only be linked indirectly to it (Humphreys 2009). Rights are also hard to protect due to a lack of strong enforcement institutions and accountability measures (Limon 2009). The rights climate change impacts, lie within categories of rights

that have weak protections (Humphreys 2013). Marks (2014) notes how human rights are usually enforced through implementation and monitoring measures for accountability.

Conclusion

This study's focus on climate change allowed for the whole spectrum of rights - from first generation to third generation to be examined. The correlations between climate change and these rights showed that for SSA, climate change's impact on the right to security was most significant and least significant for the right to food. Although variable, there's still correlations between the rights themselves, which raises questions to the validity of categorising and separating rights. The indivisibility of human rights is quite clear even between their generations. For the most part, this paper shows how they exist in conjunction. A more inclusive framework would help recognise the complexity of rights, their interconnections and their equal importance.

Human rights are presented in this paper in relation to climate change impacts in a way that forces us to rethink the focus and scope of current climate programs. Data here showed the strengths of the interconnections between variables. For example, the relationship between climate change and food security was as strong as climate change and health in SSA, indicating the need for current climate change programs to diversify their portfolios and recognise the need for multifaceted approaches. By extension, the performance of these programs should be revised to include indexes of human rights so problems and solutions can be framed by a human rights lens making them more aware and reactive.

This study contributes to the conversation on the extent to which climate change impacts human rights, but what is less known about is how communities can use this kind of study to advocate for better climate policies and a reduction of climate change impacts. The question is who do they advocate to? The global impact of climate change makes it difficult to attribute blame and reawakens the conversation about whose responsibility is it to be held accountable for these impacts. Who do we blame for these human rights violations? It is important to reflect on global engagement of what governments should do to reduce the violations of these rights. This paper has shown that governance and poverty are highly significant determinants for these rights, which could be helpful guides to future climate programs. This kind of study can also be used to develop an index for vulnerability so programs can ask to what extent do we alleviate these violations? So, viewing climate change through a human rights lens presents an opportunity to review existing programs

that focus on climate change and do away with their strict boundaries to create an integrative framework that allow for the messiness and interconnectivities of rights and impacts to be recognised.

Appendix

Appendix 1 - List of Human Right Instruments Analysed

African Human Rights Instruments

- African Charter on Human and Peoples Rights (1981)
- African Charter on the Rights and Welfare of the Child (1990)
- African Union Convention for the Protection and Assistance of Internally Displaced Persons in Africa (2009)
- Declaration on Gender Equality in Africa (2004)
- Grand Bay (Mauritius) Declaration and Plan of Action (1999)
- Kigali Declaration (2003)
- OAU Convention Governing the Specific Aspects of Refugee Problems in Africa (1969)
- Pretoria Declaration on Economic, Social and Cultural Rights in Africa (2004)
- Protocol to the African Charter on the Rights of Women in Africa

International Human Rights Instruments

- International Convention on the Elimination of All Forms of Racial Discrimination (1965)
- International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families (1990)
- International Covenant on Civil and Political Rights (1976)
- International Covenant on Economic, Social and Cultural Rights (1966)
- Rome Declaration on World Food Security (1996)
- Universal Declaration on Human Rights (1948)

- Universal Declaration on the Eradication of Hunger and Malnutrition (1973)
- Convention on the Elimination of All Forms of Discrimination against Women (1979)
- Convention on the Rights of Persons with Disabilities (2006)
- Convention on the Rights of the Child (1989)
- Convention Relating to the Status of Refugees (1951)

Appendix 2 - Document Analysis Results

Table summarising occurrence of rights in the documents analysed

Human Rights instrument	Right to Security	Right to Health	Right to Food
African Charter on Human and Peoples Rights	3	4	1
African Charter on the Rights and Welfare of the Child	2	4	
African Union Convention for the Protection and Assistance of Internally Displaced Persons in Africa	6	3	3
Declaration on Gender Equality in Africa			
Grand Bay (Mauritius) Declaration and Plan of Action	2	1	
Kigali Declaration		2	
OAU Convention Governing the Specific Aspects of Refugee Problems in Africa	1		
Pretoria Declaration on Economic, Social and Cultural Rights in Africa		1	
Protocol to the African Charter on the Rights of Women in Africa	2	3	1
International Convention on the Elimination of All Forms of Racial Discrimination	1	1	
International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families	1	1	
International Covenant on Civil and Political Rights	3		
International Covenant on Economic, Social and Cultural Rights	2	3	2
Rome Declaration on World Food Security	1	1	4
Universal Declaration on Human Rights	3	1	1
Universal Declaration on the Eradication of Hunger and Malnutrition			3
Convention on the Elimination of All Forms of Discrimination against Women	1	2	1
Convention on the Rights of Persons with Disabilities	3	2	2
Convention on the Rights of the Child	5	6	1
Convention Relating to the Status of Refugees	2		

References

Barnett, Jon, and W. Neil Adger. 2007. “Climate Change, Human Security and Violent Conflict.” Political Geography 26(6):639–55.

Bell, Derek. 2013. “Climate Change and Human Rights.” Wiley Interdisciplinary Reviews: Climate Change 4(3):159–70.

Bowker, T. (2020). *Civilians reel as violence spins out of control in Mozambique*. Aljazeera. Retrieved December 1, 2020 (https://www.aljazeera.com/news/2020/11/11/we-want-the-war-to-stop-attacks-spread-in-mozambique)

Bowles, Devin C., Colin D. Butler, and Neil Morisetti. 2015. “Climate Change, Conflict and Health.” Journal of the Royal Society of Medicine 108(10):390–95.

Breisinger, Clemens, Olivier Ecker, and Jean-François Trinh Tan. 2015. “Conflict and Food Insecurity: How Do We Break the Links?” Conflict and Food Security.

Bretthauer, Judith M. 2016. Climate Change and Resource Conflict. New York, NY : Routledge.f

Bryman, Alan. 2016. Social Reasech Methods. fifth. Oxford, UK: Oxford University Press.

Busby, Joshua. 2018. “Taking Stock: The Field of Climate and Security.” Current Climate Change Reports 4(4):338–46.

Busby, Joshua W., Todd G. Smith, Kaiba L. White, and Shawn M. Strange. 2013. “Climate Change and Insecurity: Mapping Vulnerability in Africa.” International Security 37(4):132–72.

Campbell, Bruce M., Sonja J. Vermeulen, Pramod K. Aggarwal, Caitlin Corner-Dolloff, Evan Girvetz et al. 2016. “Reducing Risks to Food Security from Climate Change.” Global Food Security 11:34–43.

Cohen, Robin, Paul Kennedy, and Maud Perrier. 2013. Global Sociology. 3rd ed. London: Macmillan Education UK.

DRMKC. 2020. “INFORM Methodology.” European Commission. Retrieved December 1, 2020 (https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Risk/Methodology#inline-nav-2).

Dryzek, John S. 2005. The Politics of the Earth: Environmental Discourses. 2nd ed. Oxford University Press.

FAO. 2020. “Food Security and the Right to Food.” FAO. Retrieved September 14, 2020 (http://www.fao.org/sustainable-development-goals/overview/fao-and-the-post-2015-development-agenda/food-security-and-the-right-to-food/en/).

Fetzek, Shiloh, and Jeffrey Mazo. 2014. “Climate, Scarcity and Conflict.” Survival 56(5):143–70.

Field, Christopher B., Vicente R. Barros, David Jon Dokken, Katharine J. Mach, and Michael D. Mastrandrea, eds. 2014. “Human Health: Impacts, Adaptation, and Co-Benefits.” Pp. 709–54 in Climate Change 2014 Impacts, Adaptation, and Vulnerability. Cambridge: Cambridge University Press.

Humphreys, Stephen, ed. 2009. Human Rights and Climate Change. Cambridge: Cambridge University Press.

Humphreys, Stephen. 2013. Climate Change and Human Rights: A Rough Guide.

Limon, Marc. 2009. “Human Rights and Climate Change: Constructing a Case for Political Action.” Harvard Environmental Law Review 33(2):439–76.

Marks, Stephen P. 2014. Human Rights: A Brief Introduction.

Mason, Lisa Reyes, and Jonathan Rigg. 2019. People and Climate Change. edited by L. Reyes Mason and J. Rigg. Oxford University Press.

McMichael, Celia, Jon Barnett, and Anthony J. McMichael. 2012. “An Ill Wind? Climate Change, Migration, and Health.” Environmental Health Perspectives 120(5):646–54.

Meyers, Lawrence S., Glenn C. Gamst, and A. J. Guarino. 2013. Performing Data Analysis Using IBM SPSS. Hoboken, N.J. : Wiley.

Myers, Samuel S., Matthew R. Smith, Sarah Guth, Christopher D. Golden, Bapu Vaitla et al. 2017. “Climate Change and Global Food Systems: Potential Impacts on Food Security and Undernutrition.” Annual Review of Public Health 38:259–77.

Nordstrøm, Steen. 2010. Climate Security : From Agenda-Setting to Policy. Copenhagen: Institute for Strategy, Royal Danish Defence College.

OBrien, Karen, Asuncion Lera St. Clair, and Berit Kristoffersen, eds. 2010. Climate Change, Ethics and Human Security. Cambridge: Cambridge University Press.

Okiror, Samuel. 2020. “Uganda Calls in Troops as Violence Flares between Refugees and Locals.” The Guardian. Retrieved December 6, 2020 (https://www.theguardian.com/global-development/2020/sep/15/uganda-calls-in-troops-as-violence-flares-between-refugees-and-locals).

Powell, Rhonda. 2019. Rights as Security. Oxford University Press.

Quirico, Ottavio, and Mouloud Boumghar, eds. 2015. Climate Change and Human Rights. Routledge.

Relief Web. 2020a. “Kenya Situation Report 3 Jul 2020.” OCHA. Retrieved December 6, 2020 (https://reliefweb.int/report/kenya/kenya-situation-report-3-jul-2020).

Rustad, S. A., Palik, J., & Methi, F. (2020). *Conflict Trends in Africa, 1989–2019*.

Swinburn, Boyd A., Vivica I. Kraak, Steven Allender, Vincent J. Atkins, Phillip I. Baker et al. 2019. “The Global Syndemic of Obesity, Undernutrition, and Climate Change: The Lancet Commission Report.” The Lancet 393(10173):791–846.

von Uexkull, Nina. 2016. Climate, Conflict and Coping Capacity : The Impact of Climate Variability on Organized Violence.

Uvin, Peter. 2007. “From the Right to Development to the Rights-Based Approach: How ‘Human Rights’ Entered Development.” Development in Practice 17(4–5):597–606.

Wang, Helena, and Richard Horton. 2015. “Tackling Climate Change: The Greatest Opportunity for Global Health.” The Lancet 386(10006):1798–99.

Watts, Nick, Markus Amann, Nigel Arnell, Sonja Ayeb-Karlsson, Kristine Belesova et al. 2019. "The 2019 Report of The Lancet Countdown on Health and Climate Change: Ensuring That the Health of a Child Born Today Is Not Defined by a Changing Climate." The Lancet 394(10211):1836–78.

CGIAR Climate Security aims to address the impending security threats of climate change by showcasing the intricate feedback loops across political and socio-economic systems and the ways in which conflict dynamics can be influenced by climate-related factors in multiple ways. CGIAR Climate Security aims to highlight the interconnected drivers and pathways between climate and security by combining research on natural resource management, agricultural productivity, livelihoods and food security, climate science, youth and gender, value chains and markets to underpin the complex nexus of climate and security.

CGIAR's Climate Security work aims to integrate discourse of security into climate science through research, the development of open source data platforms, the elevation of partnerships to stimulate the exchange of vital resources and information, and the design of programs and interventions for peace building. For more visit us at https://www.climatesecurity.cgiar.org/

This research was carried out in partnership with the following organisations:

CCAFS is led by:

Alliance

Bioversity International

CIAT

CCAFS research is supported by:

CGIAR

Australian Government Australian Centre for International Agricultural Research

Irish Aid An Roinn Gnóthaí Eachtracha agus Trádála Department of Foreign Affairs and Trade

Ministry of Foreign Affairs of the Netherlands

New Zealand Foreign Affairs & Trade Aid Programme

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Agency for Development and Cooperation SDC

UKaid from the British people

USAID from the American people

IFAD Investing in rural people